DEVELOPMENT APPLICATION

PLANNING REPORT – LEVEL 2 ACTIVITY

WILLIAMS' QUARRY, REKUNA

Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

CONTENTS

FIGURES

APPENDICES

PART A - BACKGROUND INFORMATION

The Williams Quarry is located on private freehold land at 1356 Tea Tree Rd at Rekuna in the Southern Midlands Municipality (Figures 1 and 2).

The existing quarry is a Level 1 activity under the *Environmental Management and Pollution Control Act 1994* approved by the Southern Midlands Council to extract up to 4,999 cubic metre per annum.

The current quarrying operation includes the following activities:

- surface site preparation by soil removal and stockpiling;
- excavation and ripping of rock and gravel material;
- stockpiling of material in quarry area;
- loading trucks with wheel loader from stockpile area in quarry; and the
- transport of materials by truck with/without trailer.

There is no blasting or crushing for the Level 1 activity.

PROPONENT

The proponent is a self-employed businessman who operates an agricultural services and machinery repair business from the property which supports the quarry. The proponent's business is based at Tea Tree and is located on the same property to which their family reside:

Mr Craig Williams
Trading as – CA and SM Williams
ABN: 33 389 865 480
1356 Tea Tree Road TEA TREE TAS 7107
Mobile: 0407 129 562
Email: casmwilliams@bigpond.com

QUARRY DETAILS

Physical address – 1356 Tea Tree Road Rekuna TAS 7107

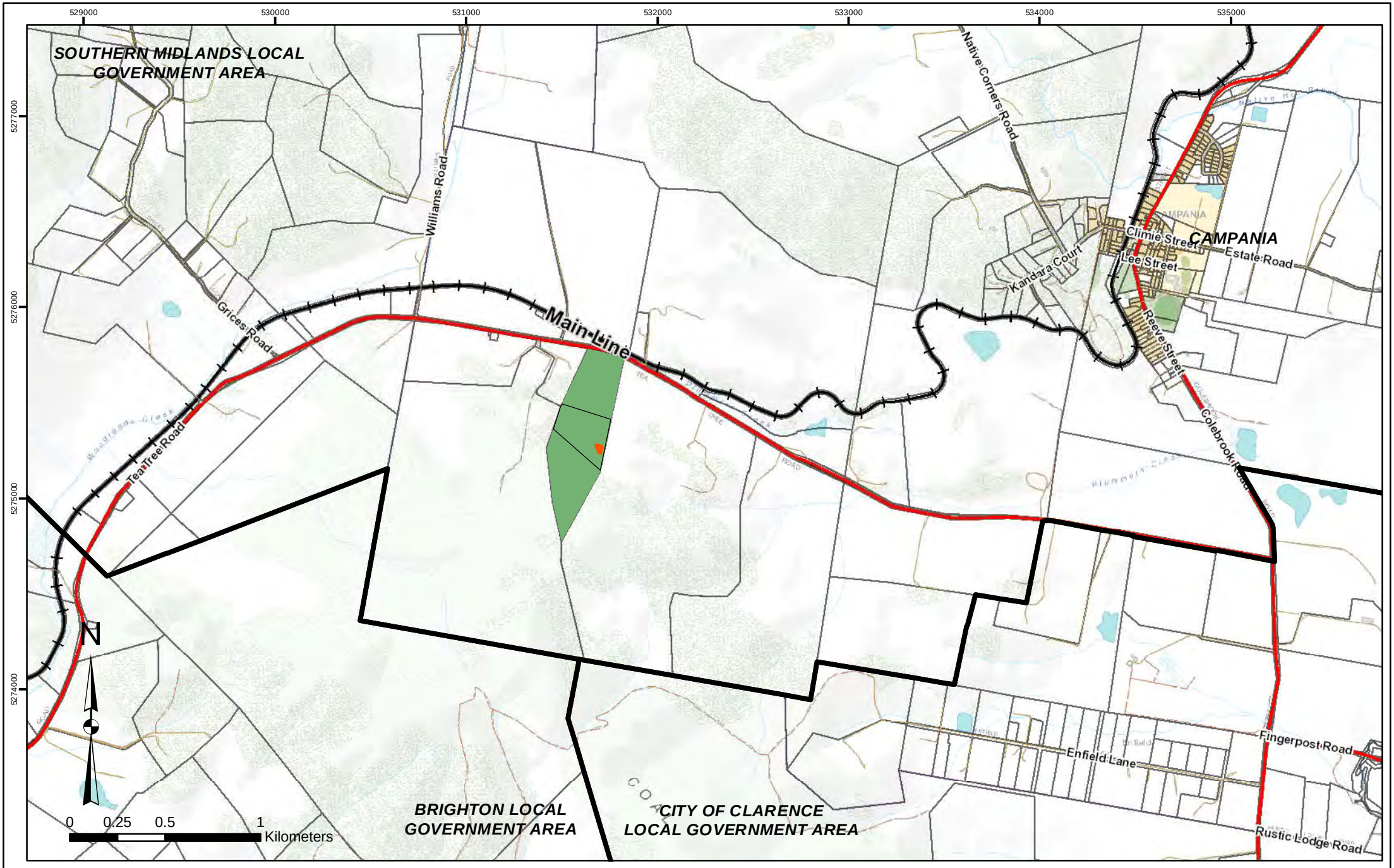
Land Title – 155147/1

PID – 2941285

Planning Zones (*Southern Midlands Interim Planning Scheme 2015*) – Rural Resource

Planning Permit and extraction limit – 4,999 cubic metres per annum (DA2014/64A)

Mining Lease Number – 1980P/M



Williams Quarry

Figure 1: Location of Williams' Quarry

- Quarry
- Mining Lease
- Title (155147/1)
- Local Government Areas

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DATUM: GDA94
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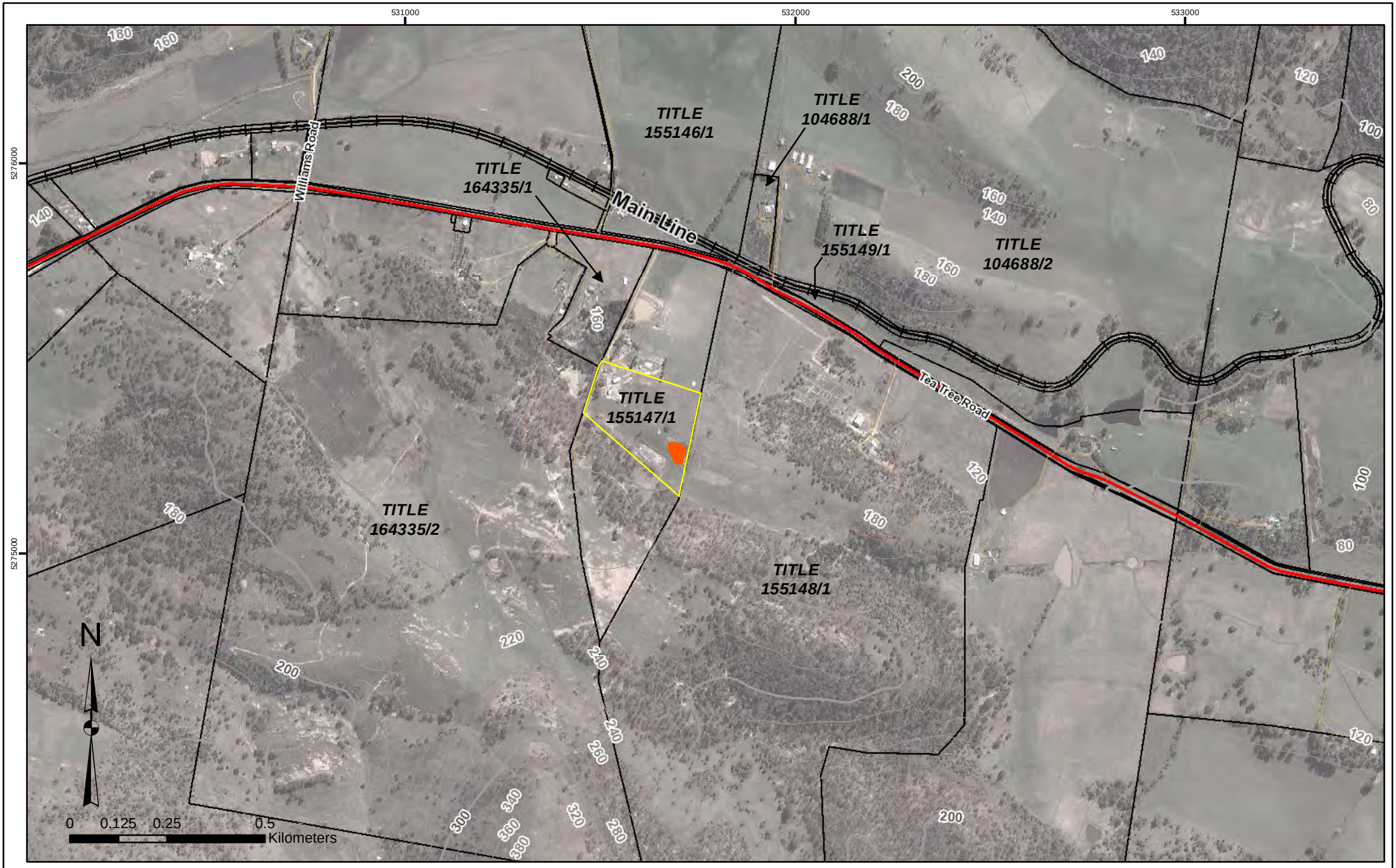
TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014



Williams Quarry

Figure 2: Land Titles and Mining Lease

Quarry

Mining Lease

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PART B – PROJECT

DEVELOPMENT DESCRIPTION

The quarry enables the landowner to supply a part of the local market for gravel and rock products for construction related works including, but not limited to, road base for private property road works, driveway gravel, fill for concrete slab construction and public road works.

The development is to -

- extract up to 10,000 cubic metres per annum of rock/gravel; and
- crush up 2,500 cubic metres of this total volume to produce a uniform gravel.

The expanded quarrying operation will include the following activities:

- surface site preparation by soil removal and stockpiling;
- excavation and ripping of rock and gravel material;
- crushing of some rock material to reduce material size;
- stockpiling of material in quarry area;
- loading trucks with wheel loader from stockpile area in quarry; and the
- transport of materials by truck with/without trailer.

There will be no blasting for the Level 2 activity.

OPERATING HOURS

Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.

Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.

MINERAL RESOURCE AND MINING LEASE

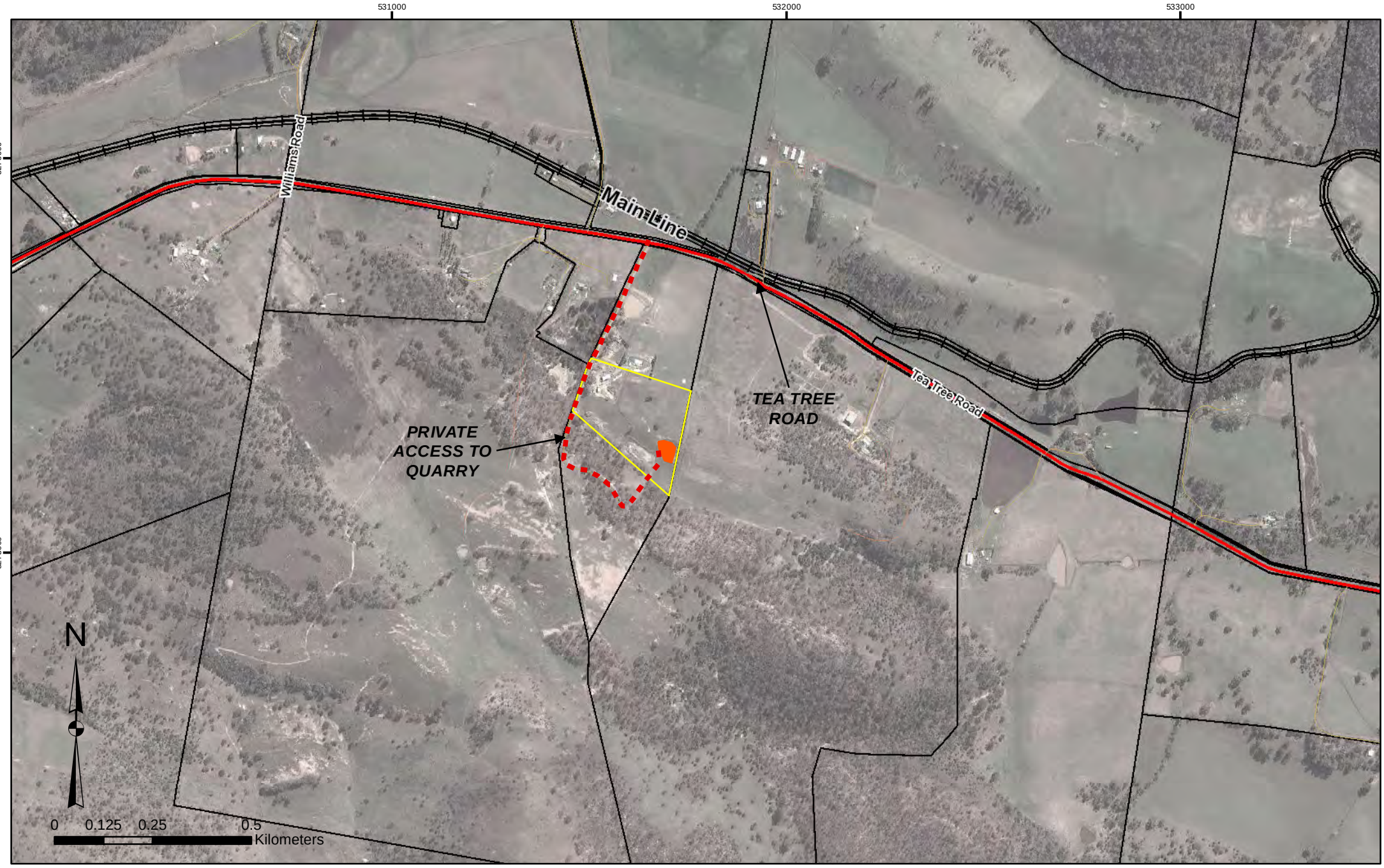
A Mining Lease (1980 P/M) has been issued by Mineral Resources Tasmania. The geology of the quarry is Jurassic dolerite with a thin clay-loam soil (Figure 4). The material to be extracted is a coarse fractured rock/gravel derived from in situ weathering of the bedrock.

QUARRY EQUIPMENT

The following machinery will be used in the expanded activity -

- Bulldozer - Fiat Allis 14B
- Loader - Allis Chalmers 605B
- Excavator - Komatsu PC200
- Truck - Volvo NH12 (10 t capacity)

All machinery (except a crusher) is owned by the proponent. A crusher will be brought to the quarry as and when required through a contractual arrangement with an equipment hire company. The crusher will be track-mounted, noise shielded, mobile and of a jaw-type.



Williams Quarry

Figure 3: Mining Lease and road network

Quarry

Mining Lease

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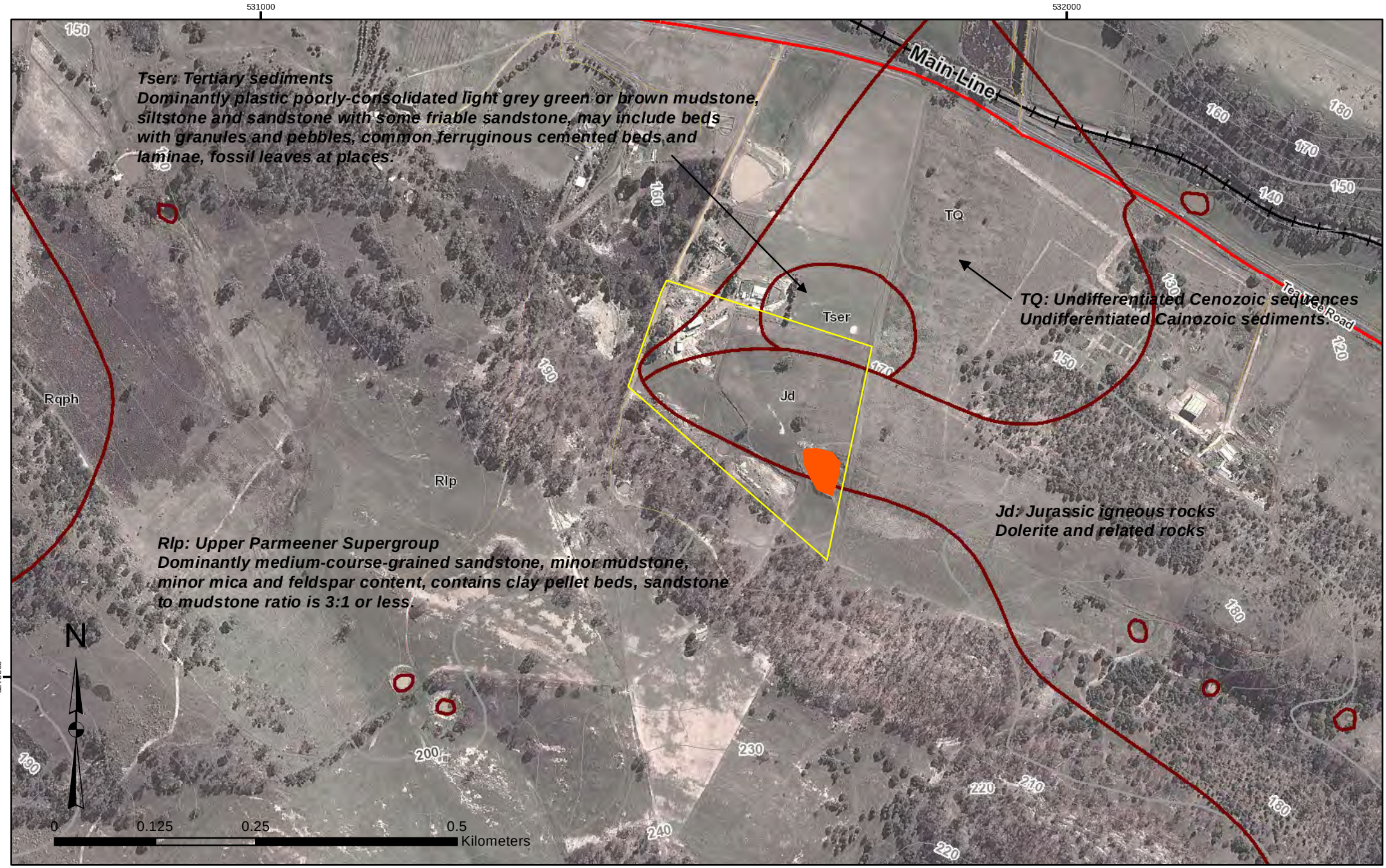

Williams Quarry

Figure 4: Geology and the Mining Lease

Quarry

Mining Lease

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ACCESS

The quarry (and Mining Lease) is accessed from Tea Tree Road (Figure 3). The quarry has quick and efficient (short distance to travel) access to Tea Tree Road which is owned and maintained by the Department of State Growth (ex- Department of Infrastructure, Energy and Resources). The access, which has a sealed strip directly off Tea Tree Road, is an on-farm (property) road used to access both the quarry and the existing residence and workshop on the property.

The access is gravel and sufficiently wide near Tea Tree Road for trucks and other vehicles to pass. Culverts and a roadside drain (eastern side) on the access have been installed at suitable locations. The access road surface through to the machinery shed and house exhibits no evidence of erosion from excessive surface flows.

QUARRY PLANS

Existing Layout

The approximate current layout of the quarry is shown in Figure 6a with the existing drainage patterns shown.

Proposed Layout

Infrastructure

The operation including car parking area and active quarry face will be contained within the Mining Lease (Figure 6a). The Access Road will be retained as it provides the best possible route from Tea Tree Road into the quarry (Figure 3).

Stockpiles

All material, whether crushed or not, will be stockpiled and stored *within* the quarry pit located within bunded area of the Level 2 activity (Figure 6b). Crushing and the loading of trucks will also occur in the quarry pit, utilising the ridge of the quarry to deflect noise to the south.

Soil stockpiles will be established in the form of a bund to provide a screen of the quarry when viewed from Tea Tree Road to maintain visual amenity of the hillock. These areas will be grassed and appropriately maintained for the life of the quarry.

Disturbed Area

The area disturbed at any one time by the Level 2 activity will be a maximum of 1 hectare in accordance with the terms of the Mining Lease – currently the area occupied is 0.7 hectares as shown in Figure 6b. The currently disturbed area of 0.7 hectares is likely to be maintained as the maximum area disturbed by active grassing of areas which are not needed for quarry activities.

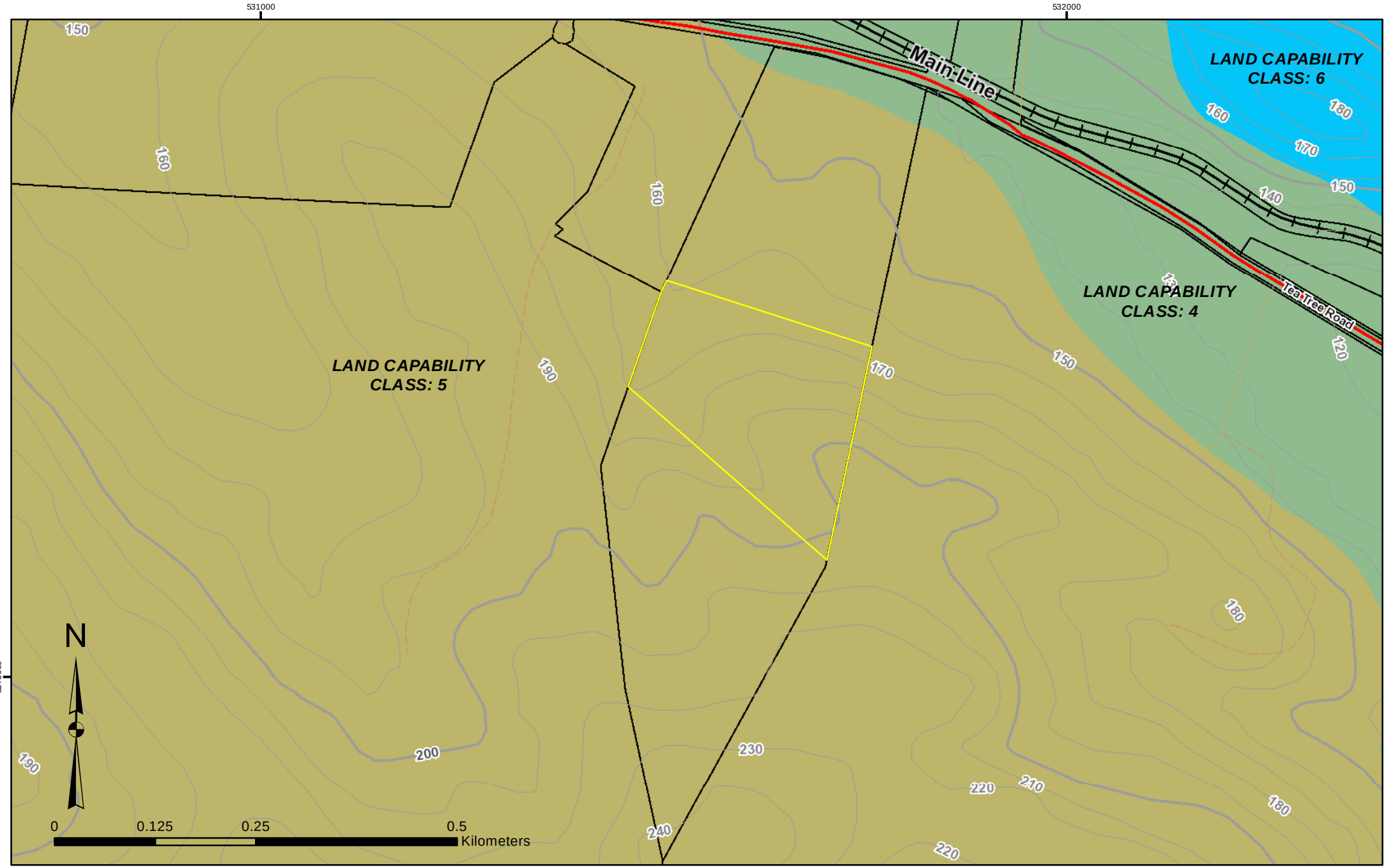
Setback

The 10m setback on the side boundary established under the approved Level 1 activity will be retained and the planting of trees has occurred in accordance with a Landscape Plan approved as part of the Level 1 activity. This setback distance will be maintained for the life of the Level 2 Quarry.

Drainage and sediment pond

The well drained nature of the fractured dolerite enables water (rainfall) to quickly drain through the quarry floor. Only during periods of heavy or sustained rainfall does ponding occur in the quarry with very infrequent periods of runoff from the quarry floor.

In order to detain and treat stormwater runoff from the 1 ha catchment (assuming at worst 0.7 ha is disturbed) the sediment pond must total 189 kL. A settling zone volume of 98 kL cannot be reduced. The required sediment zone volume of 91 kL is based on a 2 year cleanout period; as such it can be increased or decreased if shorter or longer duration between cleanouts is preferred.



Williams Quarry

Figure 5: Land Capability and the Mining Lease

Mining Lease

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Williams Quarry

Figure 5a: Existing Quarry Layout

Mining Lease

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Williams Quarry

Figure 6b: Proposed Quarry Layout

10m Quarry Setback

Mining Lease

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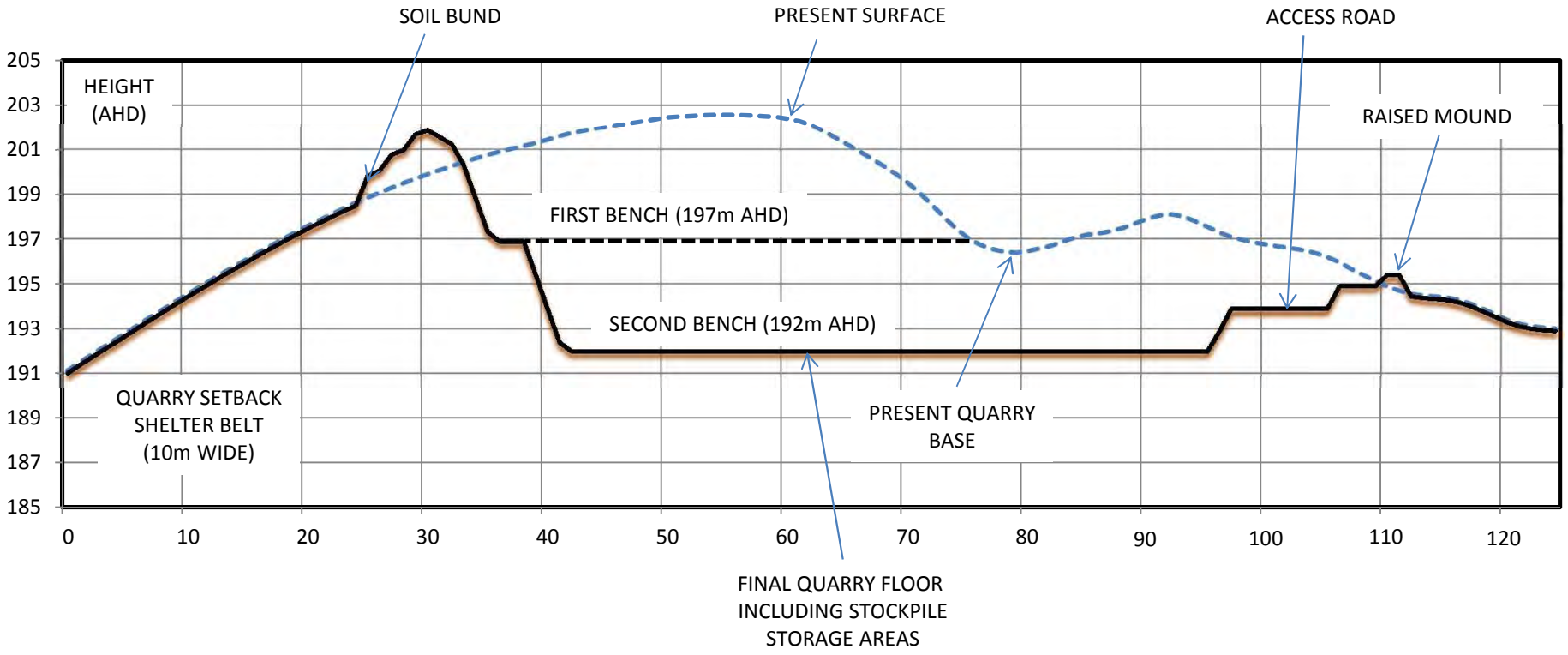
DATE: 14th SEPTEMBER 2014

FIGURE 6C: CROSS SECTION OF QUARRY EXTRACTION PLAN



One sediment pond will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events (see Appendix 1). As it stands the proposed 0.95 ML dam has more than sufficient capacity to require the removal of collected sediment from it after approximately 17 years – annual cleanouts will occur to maximise efficiency pf the pond and to obtain sediment for use in rehabilitation works. In addition, the quarry floor will retain and discharge a majority of stormwater through its floor. Therefore there will be sufficient capacity in the quarry pit and the dam to retain sediment onsite and protect the receiving environment.

Extraction Plan

The 10 year strategy for gravel/rock extraction is to develop a second bench after the existing active face has been pushed northwards (about 10m) and westward (about 30m) and made about 5m deeper. A cross-section of the quarry is shown in Figure 6c.

PART C – PLANNING SCHEME ASPECTS

USE CATEGORY

A quarry is defined as an *Extractive Industry* in the Interim Planning Scheme 2015 which is a Discretionary use within the Rural Resource zone.

ZONING

The land upon which the quarry (and Mining Lease) is located is zoned Rural Resource under the *Southern Midlands Interim Planning Scheme 2015* (the Scheme). All surrounding land is zoned Rural Resource, with a few areas zoned Utilities (associated with water infrastructure - reservoir) and further to the east and north, Significant Agriculture.

The following relevant Use Standards have been considered in this application.

26.3.3 Discretionary Use

Objective - To ensure that discretionary non-agricultural uses do not unreasonably confine or restrain the agricultural use of agricultural land.

Performance Criteria	Comments
P1 A discretionary non-agricultural use must not conflict with or fetter agricultural use on the site or adjoining land having regard to all of the following: (a) the characteristics of the proposed non-agricultural use; (b) the characteristics of the existing or likely agricultural use; (c) setback to site boundaries and separation distance between the proposed non-agricultural use and existing or likely agricultural use; (d) any characteristics of the site and adjoining land that would buffer the proposed non-agricultural use from the adverse impacts on amenity from existing or likely agricultural use.	**Development complies with P1.** • The adjoining land has not been used to run livestock or to conduct any agricultural activities (other than a domestic garden associated with the single residence on the property) for at least 20 years. • Land to the east is, with most on the immediately adjacent land of steep nature that triggers the Landslide Code (may be unsuitable for building construction including hothouses). • The property and adjoining lands are not part of any irrigation district. • The adjoining land is Land Capability 5 and 5+6, so its agricultural potential is limited to orchards, livestock grazing etc rather than cropping. • Despite the setback being only 10m, a shelterbelt has been installed and the nature of the quarrying activity is unlikely to generate dust of any volumes which may impact on adjoin agricultural activities. • Water is available to dampen the access road and the crusher will be fitted with sprayers to prevent dust (as is standard for modern mobile crushing units) – measures described in the Tasmanian Quarry Code of Practice as being industry standard to prevent dust emissions crossing the boundary of the land upon which the quarrying activity is conducted. • The existing or likely agricultural land uses of adjoining lands are not likely to impact on the amenity of this non-agricultural use.

The following relevant Development Standards have been considered in this application.

26.4.4 Design

Objective - To ensure that the location and appearance of buildings and works minimises adverse impact on the rural landscape.

Performance Criterion(P) OR Acceptable Solution(A)	Comments
A1 The location of buildings and works must comply with any of the following: (a) be located within a building area, if provided on the title; (b) be an addition or alteration to an existing building; (c) be located in an area not requiring the clearing of native vegetation and not on a skyline or ridgeline.	**Complies with A1.** The development does not involve the clearing of native vegetation and is not on a skyline or ridgeline.
P3 The depth of any fill or excavation must be kept to a minimum so that the development satisfies all of the following: (a) does not have significant impact on the rural landscape of the area; (b) does not unreasonably impact upon the privacy of adjoining properties; (c) does not affect land stability on the lot or adjoining areas.	**Complies with P1.** • The excavation of the pit will not have a significant impact on the rural landscape of the area – it is pre-existing in the landscape. • The further excavation of the pit will not unreasonably impact on the privacy of adjoining properties – no dwellings can 'see' the quarry pit. • Soil bunding installed at the existing activity, which will be retained as part of the expanded activity, providing a visual screen to the open pit from surrounding roads and dwellings.

SCHEME CODES

Bushfire prone areas

The Code does not apply to this development.

Potentially contaminated land

The Code does not apply to this development.

Landslide

The Code does not apply to this development.

Road and Railway Asset Code

The purpose of this provision is to:

(a) protect the safety and efficiency of the road and railway networks; and

(b) reduce conflicts between sensitive uses and major roads and the rail network.

The following relevant Use Standards have been considered in this application.

E5.5.1 Existing road access and junctions

Performance Criterion(P) OR Acceptable Solution(A)	Comments
P1 Any increase in vehicle traffic to a category 1 or category 2 road in an area subject to a speed limit of more than 60km/h must be safe and minimise any adverse impact on the efficiency of the road, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the nature of the road; (d) the speed limit and traffic flow of the road; (e) any alternative access to a road; (f) the need for the use; (g) any traffic impact assessment; and (h) any written advice received from the road authority.	**Development complies with P1.** • The access is already approved (via the Level 1 activity approved by the Department of State Growth) to receive up to 40 vehicle movements per day. • The development will not increase traffic movements beyond 40 per day from the access. • A chip-seal has been applied to Tea Tree Road to cater for the forces of tyres on the road surface caused by the turning of trucks onto the road from the access. • The Level 2 quarry activity is not likely to cause any adverse impact to the efficiency to the road network nor cause any safety issues with the access.
P2 Any increase in vehicle traffic at an existing access or junction in an area subject to a speed limit of more than 60km/h must be safe and not unreasonably impact on the efficiency of the road, having regard to: (a) the increase in traffic caused by the use; (b) the nature of the traffic generated by the use; (c) the nature and efficiency of the access or the junction; (d) the nature and category of the road; (e) the speed limit and traffic flow of the road; (f) any alternative access to a road; (g) the need for the use; (h) any traffic impact assessment; and (i) any written advice received from the road authority.	**Development complies with P2.** • The access is already approved (via the Level 1 activity approved by the Department of State Growth) to receive up to 40 vehicle movements per day. • The development will not increase traffic movements beyond 40 per day from the access. • SISD distances meet the requirements of the Scheme (based on a conservative 85th percentile estimate of 100km/hr the SISD is 250m which is achieved by the junction of Tea Tree Road and the access road); • Tea Tree Road is a Regional Freight Route which is designed to be used by trucks to cart goods and products; • A chip-seal has been applied to Tea Tree Road to cater for the forces of tyres on the road surface caused by the turning of trucks onto the road from the access. • The Level 2 quarry activity is not likely to cause any adverse impact to the efficiency to the road network nor cause any safety issues with the access.
A3	**Not relevant to the development.**

The annual average daily traffic (AADT) of vehicle movements, to and from a site, using an existing access or junction, in an area subject to a speed limit of 60km/h or less, must not increase by more than 20% or 40 vehicle movements per day, whichever is the greater.	

The following relevant Development Standards have been considered in this application.

E5.6.1 Development adjacent to roads and railways

The quarry development complies with the relevant Acceptable Solution.

E5.6.2 Road accesses and junctions

No new accesses are proposed so this aspect is not relevant to the development.

E5.6.4 Sight distances at accesses, junctions and level crossings

The development complies with the Acceptable Solution A1 – SISD is at least 250 m (the road is speed posted at more than 60 km/hr) based on a conservative 85th percentile of 100 km/hr (see Plate 1). The trimming of trees on the adjoining land to the east (1384 Tea Tree Road) near Tea Tree Road at about the 250m SISD from the junction would further extend the viewfield to about 260-280m – although the SISD required by the Scheme is achieved the proponent will request of the adjoining landowner, in the interests of public safety, to have these trees trimmed to maximise the viewfield from the junction.

Plate 1. Images of the road network and junctions near the Williams Quarry

A Entrance to private access (Access Road) onto the property, noting large setback from Tea Tree Rd to facilitate safe truck entry and exit.

B Entrance to private access (Access Road) onto the property. Arrow indicates location of quarry.

C Junction of Access Road and Tea Tree Road – looking east. SISD exceeds the minimum required by the Scheme (250 m assuming a conservative 85th percentile of 100km/hr).

D Junction of Access Road and Tea Tree Road – looking west. SISD exceeds the minimum required by the Scheme (>250 m assuming a conservative 85th percentile of 100km/hr).

Parking and Access

No car spaces are required as there are no employees associated with the development pursuant to Table E6.1 of the Scheme.

The following relevant Development Standards have been considered in this application.

E6.7.2 Design of Vehicular Accesses

Performance Criterion(P)	Comments
P1 Design of vehicle access points must be safe, efficient and convenient, having regard to all of the following: (a) avoidance of conflicts between users including vehicles, cyclists and pedestrians; (b) avoidance of unreasonable interference with the flow of traffic on adjoining roads; (c) suitability for the type and volume of traffic likely to be generated by the use or development (d) ease of accessibility and recognition for users.	**Development complies with P1.** • The access to Tea Tree Road is safe and meets the SISD required by the Scheme. • Pedestrians do not frequent Tea Tree Road – it is a rural road network not connected to residential areas – and if they were to then it would be a very rare occurrence and the access point would not interfere with their use of the road network. • Use of the access will not unreasonably interfere with the flow of traffic on adjoin roads (Tea Tree Road). • The access point onto Tea Tree Road has been strengthened by chip-seal at the conditioning of the Level 1 permit by the Department of State Growth. • The quarry development is not open to the public, there are no direct sales to the public from the quarry (delivery is by the owner of the

	quarry) and inspection of the quarry material by prospective customers is by inspection only. • The entrance is clearly demarcated by a roadside number (yellow signage) and a wooden fence line in a traditional rural property entrance style (see Plates 2 and 3).

E6.7.2 Design of Vehicular Accesses

Performance Criterion(P)	Comments
P1 Vehicular passing areas must be provided in sufficient number, dimension and siting so that the access is safe, efficient and convenient, having regard to all of the following: (a) avoidance of conflicts between users including vehicles, cyclists and pedestrians; (b) avoidance of unreasonable interference with the flow of traffic on adjoining roads; (c) suitability for the type and volume of traffic likely to be generated by the use or development; (d) ease of accessibility and recognition for users.	**Development complies with P1.** • The access to Tea Tree Road is safe and meets the SISD required by the Scheme. • No passing bays along the access road are proposed as they are not needed in this development as the access road is a private internal property road used by the owners and visitors to the property. • The quarry development is not open to the public, there are no direct sales to the public from the quarry (delivery is by the owner of the quarry) and inspection of the quarry material by prospective customers is by inspection only. • There will be no conflict between users of the access as it is a private internal property road used by the owners and visitors to the property. • The access in its current form is suitable for the type and volume of traffic that currently use the access. The gravel formation will also be capable of supporting more frequent truck usage from the extra volume of rock/gravel to be produced at the quarry development. • The entrance is clearly demarcated by a roadside number (yellow signage) and a wooden fence line in a traditional rural property entrance style (see Plates 2 and 3).

Stormwater Management

The purpose of this provision is to ensure that stormwater disposal is managed in a way that furthers the objectives of the State Stormwater Strategy. This code applies to development that requires the management of stormwater. This code does not apply to use.

A stormwater volume and sediment treatment assessment was conducted by Hydrodynamica (Appendix 1).

The following relevant Development Standards have been considered in this application.

Development Standard E7.7.1 – Stormwater disposal and management

Performance Criterion(P) OR Acceptable Solution(A)	Comments
P1 Stormwater from new impervious surfaces must be managed by any of the following: (a) disposed of on-site with soakage devices having regard to the suitability of the site, the system design and water sensitive urban design principles (b) collected for re-use on the site; (c) disposed of to public stormwater infrastructure via a pump system which is designed, maintained and managed to minimise the risk of failure to the satisfaction of the Council.	**Development complies with P1.** • The sediment pond to which water flowing from the development has been designed to cater for an ARI of 20 years. • Sediment will be cleaned from the pond for re-use in the quarry for rehabilitation works. • Water collected will be used in the development to dampen the gravels when crushed (to maintain a 5-10% water component to minimise dust) and the internal road and quarry pit during periods of dry weather.
P2 A stormwater system for a new development must incorporate a stormwater drainage system of a size and design sufficient to achieve the stormwater quality and quantity targets in accordance with the State Stormwater Strategy 2010, as detailed in Table E7.1 unless it is not feasible to do so.	**Development complies with P1.** • Sediment pond sizing has been based on an ARI of 20 years (see Appendix 1); and • Quality targets are likely to be met as the only source of nutrients is from the quarry itself which does not use nutrient producing chemicals/products nor does the quarrying process generate nutrient loadings.
A3 A minor stormwater drainage system must be designed to comply with all of the following: (a) be able to accommodate a storm with an ARI of 20 years in the case of non-industrial zoned land and an ARI of 50 years in the case of industrial zoned land, when the land serviced by the system is fully developed; (b) stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.	**Development complies with P1.** • Sediment pond sizing has been based on an ARI of 1 in 20 years (see Appendix 1); and • Stormwater will be no greater than current runoff as the maximum disturbed area (the area that may generate stormwater) permitted by the Mining Lease is 1 hectare.

Electricity Transmission Infrastructure Protection

The Code does not apply to this development.

Attenuation

The development is exempt from this Code as it is an activity requiring assessment under the *Environmental Management and Pollution Control Act 1994* by the Board of the Tasmanian Environment Protection Authority.

Biodiversity

The development is exempt from this Code as it is an activity requiring assessment under the *Environmental Management and Pollution Control Act 1994* by the Board of the Tasmanian Environment Protection Authority.

Waterway and Coastal protection

The development is exempt from this Code as it is an activity requiring assessment under the *Environmental Management and Pollution Control Act 1994* by the Board of the Tasmanian Environment Protection Authority.

Historic Heritage

The Code does not apply to this development.

Scenic Landscapes

The Code does not apply to this development.

Inundation prone Areas

The Code does not apply to this development.

Signs

There will be one sign erected at the frontage of the property that is associated with the development.

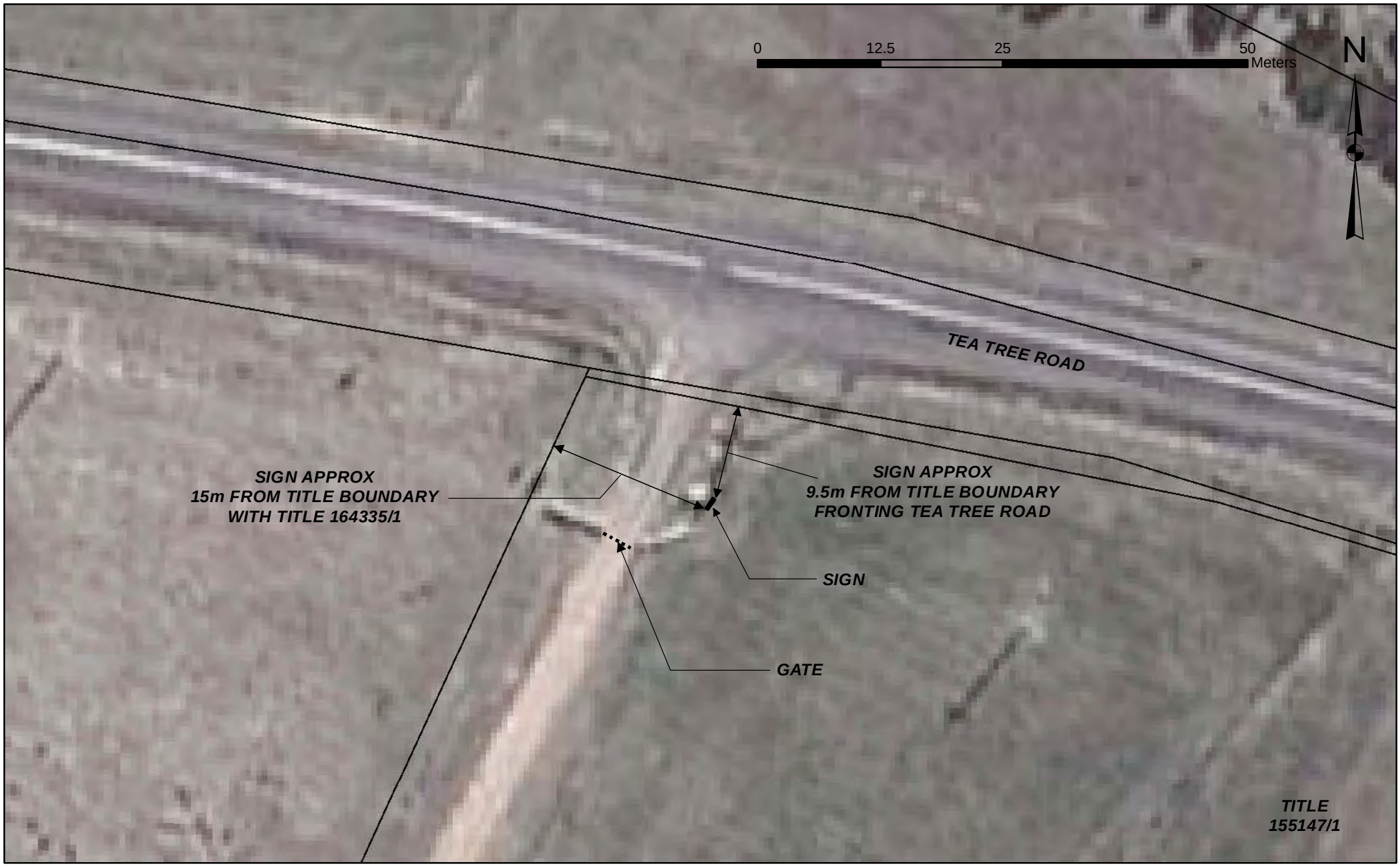
The sign is to be a ground based panel sign in accordance with the definition provided in the Scheme -

Ground Based Panel Sign	means a sign permanently attached to the ground on its own supportive structure, independent of any building, primarily intended to identify the premises and be seen from a distance. Does not include a pole or pylon sign or ground based sign.

The sign will be double-sided (so it can be seen from both an easterly and westerly direction) – the same design will be used for each side. Each panel will be 1000mm high x 1200mm wide in dimensions and be white with blue writing – the sign design is provided in Appendix 2.

The sign will be erected and held in place using, in part, the existing wooden fence on the eastern side of the gate. Wooden posts will be attached to the fence and dug into the ground to provide strength to the sign. The posts will in effect become part of the existing wooden fence. Posts will project no more than 2.8 m high such that the sign can be at a maximum height of 2.8 m above ground level. The panels once attached to the posts means that the base of the panel will be 1.8m above ground level – a height that is sufficient for the signage to be seen but to not be obtrusive into the viewfield of road users.

The location of the sign panel is shown in Plates 2 and 3 in relation to the front gate and existing wooden fence to show the context of the location relative to Tea Tre Road and the property frontage.



Williams Quarry

Figure 7: Quarry Sign Location

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PO Box 1 New Town TAS 7008

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CLIENT: CRAIG WILLIAMS

DATE: 16th SEPTEMBER 2015

Plate 2. Front gate of the property showing location of signage

Plate 3. Front gate and fence of the property showing location of signage

The following relevant Use Standards have been considered in this application.

Use Standard E17.6.1 – Use of signs

Performance Criterion(P) OR Acceptable Solution(A)	Comments
P1 A sign must be a discretionary sign in Table E.17.3.	**Development complies with P1.** • A 'ground based panel sign' is listed as Discretionary in the Rural Resource zone.
A2 A sign associated with the sale of goods or services must relate directly to the use of the building or site to which it is affixed.	**Development complies with A1.** • The sign relates to activities occurring on the property where the sign is to be erected**.**
A3 A sign must not contain flashing lights, moving parts or moving or changing messages or graphics, except if a Statutory Sign	**Development complies with A3.** • The sign will have no moving parts nor changing or flashing lights/messages.

The following relevant Development Standards have been considered in this application.

Use Standard E17.7.1 – Standards for of signs

Performance Criterion(P) OR Acceptable Solution(A)	Comments
P1 A sign not complying with the standards in Table E17.2 or has discretionary status in Table E17.3 must satisfy all of the following: (a) be integrated into the design of the premises and streetscape so as to be attractive and informative without dominating the building or streetscape; (b) be of appropriate dimensions so as not to dominate the streetscape or premises on which it is located; (c) be constructed of materials which are able to be maintained in a satisfactory manner at all times; (d) not result in loss of amenity to neighbouring properties; (e) not involve the repetition of messages or information on the same street frontage; (f) not contribute to or exacerbate visual clutter; (g) not cause a safety hazard.	**Development complies with P1.** • The sign will comply with the requirements of Table 17.2 - (a) Height above the ground no more than 5000mm; (b) Width no more than 1500mm; and (c) Does not encroach on any road or other public reservation. • The sign will be erected to advise persons of the existence of the quarry ('Williams Quarry') and simply provide the name of the quarry, the name of the operator, the product available from the quarry (but noting that gate sales are not available – purchases are by delivery **only** by the quarry operator) and contact details for the quarry operator. • The sign will be made of metal with plastic covering/overlay of a high UV stabilised material – wooden posts will be used to erect the sign in conjunction with the existing front wooden fence as shown in Plates 2 and 3; • The sign will not cause the loss of amenity to any adjoining lands; • The sign will not repeat messages or information on the same street frontage – the sign is unique to

	the property upon which the Level 2 activity is to occur; • The sign will not contribute to or exacerbate visual clutter and it will not cause a safety hazard as it will be within the size outlined in Table 17.2.
A2 The number of signs per business per street frontage must comply with all of the following: (a) maximum of 1 of each sign type; (b) maximum of 1 window sign per window; (c) if the street frontage is less than 20 m in length, the maximum number of signs on that frontage is 3; (d) if the street frontage is 20 m in length or greater, the maximum number of signs on that frontage is 6. except for the following sign types, for which there is no limit; (i) Building Site, (ii) Name Plate, (iii) Newspaper Day Bill, (iv) Open/Closed, (v) Real Estate, (vi) Street Number, (vii) Temporary Sign.	**Development complies with A2.** • Only one sign (double-sided) will be erected**.** • There is an existing name plate which is exempt from the Code. • Street frontage is >20 m in length.
A3 Signs must not obscure or prevent or delay a driver from seeing a Statutory Sign or a Tourist Information Sign.	**Development complies with A3.** • The sign is not located near any Statutory Signs or Tourist Information Signage.
A4 Signs must not resemble Statutory Signs because of the same or similar shape, size, design, colour, letter size or lighting.	**Development complies with A4.** • The sign will not resemble Statutory Signs.

E17.7.2 – Not relevant to the sign proposed for this development.

Wind and solar energy

The Code does not apply to this development.

Telecommunications

The Code does not apply to this development.

Acid sulphate soils

The Code does not apply to this development.

Dispersive soils

The Code does not apply to this development.

Appendix 1 – Williams Quarry Sediment Basin Assessment (Hydrodynamica)

SEDIMENT BASIN FOR QUARRY OPERATIONS ASSESSMENT

FOR VAN DIEMEN CONSULTING

WILLIAMS QUARRY

Rekuna

August 2015

HYDRODYNAMICA
44 PENQUITE ROAD LAUNCESTON TAS 7250
T 04312 08450 E cameron.oakley@h-dna.com.au

HYDRODYNAMICA

Project: Williams Quarry Sediment Basin Assessment

Authors: Cameron Oakley

Consulting Engineer

B.Eng (Hons), B.Tech (Env.), MBA

DATE	NATURE OF REVISION	REVISION NUMBER	PREPARED BY	AUTHORISED BY
31/08/2015	Final	1	Cameron Oakley	Cameron Oakley

1. EXISTING SITE & PROPOSAL

The Williams dolerite quarry is located at 1356 Tea Tree Road Rekuna, which is approximately 3.2 km south-west of Campania. It is proposed that existing quarrying operations will be expanded and will include the following activities (Van Diemen Consulting, 2015):

- surface site preparation by soil removal and stockpiling;
- excavation and ripping of rock and gravel material;
- crushing of some rock material to reduce material size;
- stockpiling of material in quarry area;
- loading trucks with wheel loader from stockpile area in quarry; and the
- transport of materials by truck with/without trailer.

Being fractured dolerite stormwater runoff quickly drains through the quarry floor. This will continue to occur with expansion of the quarry. It is anticipated that only during periods of heavy or sustained rainfall that runoff from the quarry floor will occur. If this eventuates it is likely to contain entrained sediment from the quarry.

It is proposed that the existing dam at the north west of the site be used to intercept any potentially sediment-laden runoff and provide protection of downstream waterways from pollution.

It is currently proposed that the existing dam be increased to 0.95 ML in capacity. The following assessment was conducted to determine whether this capacity is suit able using methodology contained in Landom's Blue Book: *Volume 1 Managing Urban Stormwater- Soils and Construction - 4th ed* (2004) and *Volume 2E Managing Urban Stormwater- Soils and Construction – Soils and Construction – Mines and Quarries* (2008).

2. DATA & ASSUMPTIONS

The methodology contained in the *Blue Book* is based on the Revised Universal Soil Loss Equation (RUSLE) to predict the long term, average, annual soil loss from sheet and rill flow under specified management conditions (Landcom, 2004). This enables sedimentation basins to be designed to effectively mitigate sediment pollution to downstream lands and waterways. Table 2 of this report shows the full calculation.

The methodology takes into account the ability of rainfall to cause erosion which has been found to be a function of the 2 year ARI, 6 hour event (5mm/hr). This site specific rainfall intensity was obtained from the Bureau of Meteorology's (BOM) rainfall Intensity-Frequency-Duration (IFD) for the site (refer to Table 1).

For developments which are ongoing for greater than 3 years which discharge to sensitive receiving environments the Blue Book *Volume 2E - Managing Urban Stormwater- Mines and Quarries* (Landcom, 2008) also recommends designing sediment basins to provide adequate volume to retain the 5-day, 95th-percentile rainfall event. That is that the basin will have the capacity to retain the volume of water generated 95% of all 5-day rainfall accumulations.

The BOM has intermittently recorded nearly 55 years of rainfall data at their Campania (The Pines) weather station no. 94009. From this data set the 5-day, 95th-percentile rainfall depth was calculated to be 38.4mm. This value was checked against rainfall record from the Richmond (Brookbank) BOM station no. 94055 which, although 10km from the site, has 91.7 years of data. Using this data the5-day, 95th-percentile rainfall depth was calculated at 33.1mm. The Campania depth was greater and was therefore used for the calculations.

Intensity-Frequency-Duration Table

Location: 42.675S 147.375E NEAR.. Rekuna Issued: 31/8/2015

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

	Average Recurrence Interval						
Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	34.0	46.2	66.7	81.1	100	128	152
6Mins	31.9	43.2	62.2	75.5	93.2	119	141
10Mins	26.6	35.6	49.9	59.7	72.8	91.6	107
20Mins	20.1	26.3	35.0	40.7	48.3	59.0	67.8
30Mins	16.6	21.5	27.8	31.8	37.3	44.9	51.0
1Hr	11.5	14.7	18.4	20.7	23.9	28.3	31.7
2Hrs	7.64	9.78	12.1	13.6	15.6	18.4	20.6
3Hrs	5.96	7.65	9.52	10.7	12.3	14.5	16.2
6Hrs	3.88	5.00	6.30	7.12	8.24	9.78	11.0
12Hrs	2.50	3.24	4.13	4.70	5.47	6.54	7.39
24Hrs	1.57	2.05	2.63	3.00	3.51	4.20	4.76
48Hrs	.951	1.24	1.60	1.83	2.15	2.58	2.93
72Hrs	.689	.901	1.17	1.35	1.59	1.93	2.20

(Raw data: 15.06, 3.32, 0.92, 26, 6.15, 1.8, skew=0.32, F2=3.88, F50=15.38)

Table 1. BOM IFD Data for Rekuna

In addition to rainfall data the RUSLE considers the combined effect of slope length and gradient on soil loss. To inform these calculations it was determined that the maximum distance from the top of the Williams Quarry catchment to the proposed dam is approximately 150m, and the average slope to be at worst 5%.

Finally, Table F3 in Volume 1 of the Blue Book recommends volumetric runoff coefficient (C_v) values based on design rainfall depth and runoff potential based on soil hydrologic groups. From discussions with Dr Richard Barnes it was decided to assume there is low to moderate runoff potential as per soil hydrologic group B defined by Landcom (2004) as:

Water moves into and through these soil materials at a moderate rate when thoroughly wetted. Usually, they consist of well-drained soils with medium, loamy textures or clay loams with moderate structure. They shed runoff only infrequently.

This gives a recommended C_v coefficient of 0.34 (34%).

3. CALCULATIONS

The following table shows the calculations used to determine the minimum dam capacity required to effectively remove sediment. It determines the sediment zone volume of the basin, which is the volume needed to hold captured sediment, and the settling zone volume, which is the volume required to facilitate efficient settling.

Basin Volume = Sediment Zone Volume + Settling Zone Volume

1. Sediment Zone Volume

Blue Book Vol.1 Appendix J Sheet J-5

Site area	Williams Quarry		Remarks
Total catchment area (ha)	1		Data provided by Dr R Barnes
Disturbed catchment area (ha)	0.7		
Rainfall data			
Design rainfall depth (days)	5		Ref Vol.2E Table 6.1
Design rainfall depth (percentile)	95		Assumed 'sensitive' receiving environment and operations ongoing for > 3 years
5-day, 95th-percentile rainfall event (mm)	38.4		Calculated from Campania (The Pines) rainfall record, BOM station 94009
Rainfall intensity: 2-year, 6-hour storm (mm/hr)	5		See IFD data for the site Table 1 of Report
RUSLE Factors			
Rainfall erosivity (*R*-factor)	820		Automatic calculation from above data
Soil erodibility (*K*-factor)	0.05		RUSLE data can be obtained from Vol 1, Appendixes A, B and C
Slope length (m)	150		Data provided by Dr R Barnes
Slope gradient (%)	5		
Length/gradient (*LS*-factor)	1.7		From Vol. 1 Table A 1
Erosion control practice (*P*-factor)	1.3		Default
Ground cover (*C*-factor)	1		Default
Calculations			
Soil loss (t/ha/yr)	91		Calculated
Soil Loss Class	1		See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	70		Calculated
Soil Loss Volume (Sediment Zone Volume) (m^3)	98		Based on clean-out every 2 years

2. Settling Zone Volume

Blue Book Vol.1 Appendix J Page J-4

Site area	Williams Quarry		Remarks
Disturbed catchment area, A (ha)	0.7		
Volumetric runoff coefficient, C_v	0.34		Vol.1 F-3, assume Soil Hydrologic Group B
5-day, 95th-percentile rainfall event	38.4		Campania rainfall record
Settling Zone Volume (m3)	91		Calculated

3. Total Basin Volume = Settling Zone Volume + Sediment Zone Volume

Sediment Zone Volume (m^3)	98	
Settling Zone Volume (m^3)	91	
Total Required Capacity (m^3)	189	

Table 2. Sediment basin capacity calculations

4. CONCLUSION

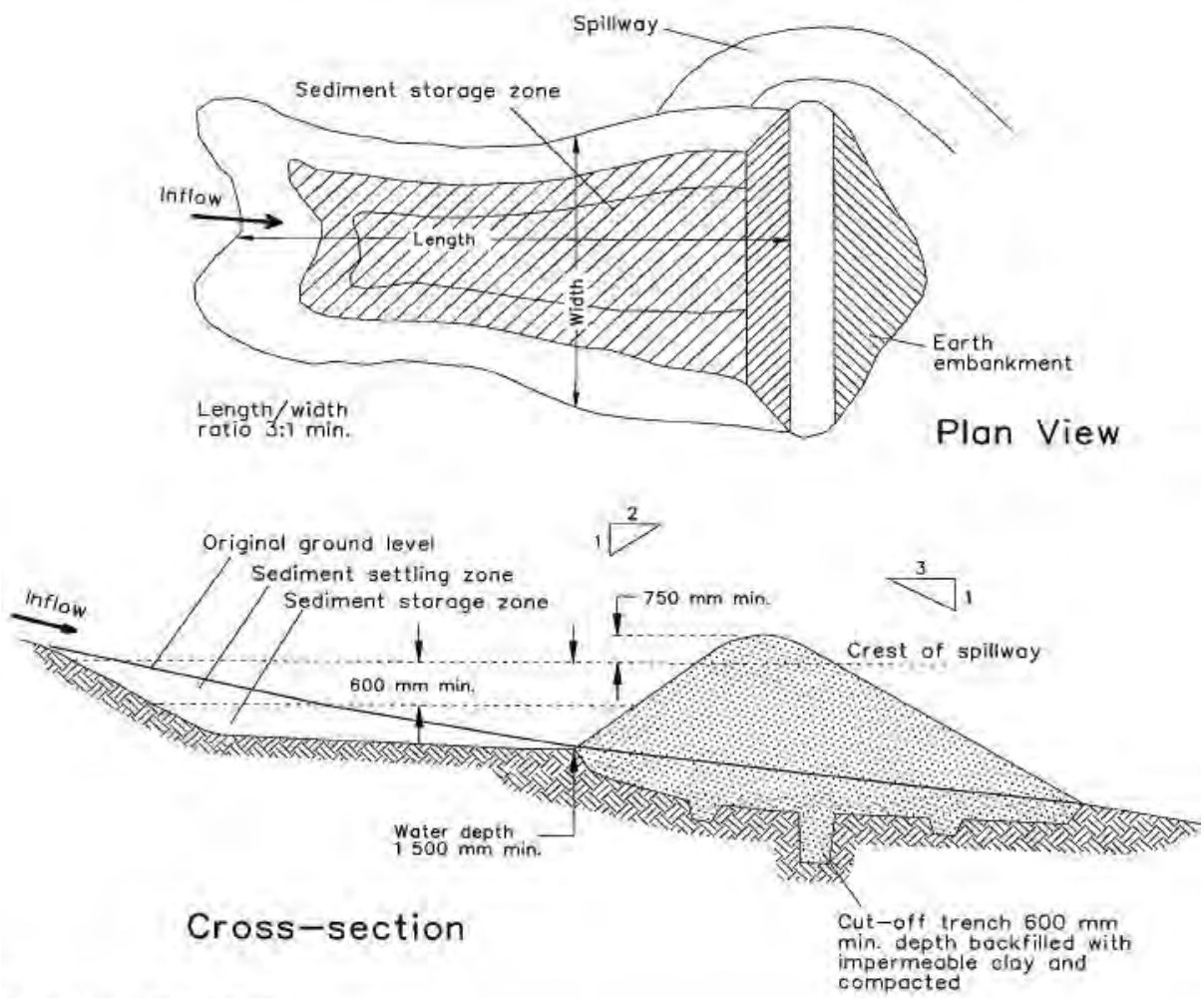
In order to detain and treat stormwater runoff from the 1 ha catchment (assuming at worst 0.7 ha is disturbed) the dam must total 189 kL. A settling zone volume of 98 kL cannot be reduced. The required sediment zone volume of 91 kL is based on a 2 year cleanout period; as such it can be increased or decreased if shorter or longer duration between cleanouts is preferred.

As it stands the proposed 0.95 ML dam has sufficient capacity to require the removal of collected sediment from it after approximately 17 years. In addition the quarry floor will retain and discharge a majority of stormwater through its floor. Therefore there will be sufficient capacity in the quarry pit and the dam to retain sediment onsite and protect the receiving environment.

Minimum basin dimensions are detailed in the Blue Book is shown in Appendix A.

APPENDIX A

SEDIMENT BASIN CONCEPT DESIGN



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.

Appendix 2 – Sign panel design

Williams Quarry

ph 0407 129562

- Sales by appointment only
- No Dogs
- No smoking

"LET US ROCK YOU"

Van Diemen Consulting Pty Ltd

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New Town, Tasmania

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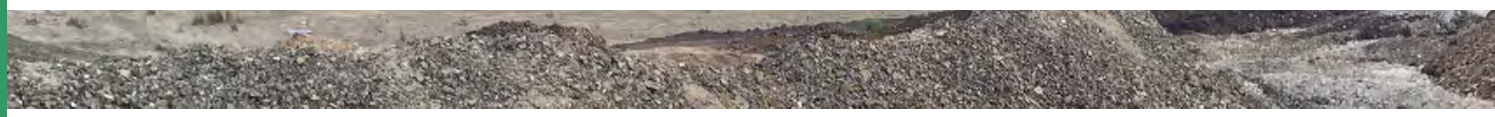
Document Status

Revision	Author	Review	Date
1	R Barnes C McCoull	C Williams	31-08-15
1	R Barnes C McCoull	R Barnes	31-08-15
2	R Barnes C McCoull	R Barnes	15-09-15

ENVIRONMENTAL EFFECTS REPORT

WILLIAMS' QUARRY, REKUNA



Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

CONTENTS

FIGURES

APPENDICES

ABBREVIATIONS / GLOSSARY

DA	Development Application
DSG	Department of State Growth
DPIPWE	Department of Primary Industries, Parks, Water and Environment
EMPCA	*Environmental Management and Pollution Control Act 1994 (Tas)*
EPA	Environment Protection Authority
LUPAA	*Land Use Planning and Approvals Act 1993 (Tas)*
ML	Mining Lease
QCP	Quarry Code of Practice (Tasmania)
(the) Scheme	Southern Midlands Interim Planning Scheme 2015
SMC	Southern Midlands Council
WMP	Weed Management Plan

PART A - BACKGROUND INFORMATION

SCOPE

This EER has been prepared to facilitate the approval of an upgrade (increased volume to be extracted and some crushing) to a hard rock quarry at 1356 Tea Tree Road, Tea Tree – from the Council approved 4,999 cubic metre per annum limit (Appendix 1) to 10,000 cubic metres extracted of which up to 2,500 cubic metres will be crushed (Level 2 activity under the *Environmental Management and Pollution Control Act 1994*).

The Williams Quarry is located at 1356 Tea Tree Rd Rekuna in the Southern Midlands Municipality (Figures 1 and 2.

PROPONENT

The proponent is a self-employed businessman who operates an agricultural services and machinery repair business from the property which supports the quarry. The proponent's business is based at Tea Tree and is located on the same property to which he and his family reside:

Mr Craig Williams
Trading as – CA and SM Williams
ABN: 33 389 865 480
1356 Tea Tree Road TEA TREE TAS 7107
Mobile: 0407 129 562
Email: casmwilliams@bigpond.com

QUARRY DETAILS

Physical address – 1356 Tea Tree Road Rekuna TAS 7107

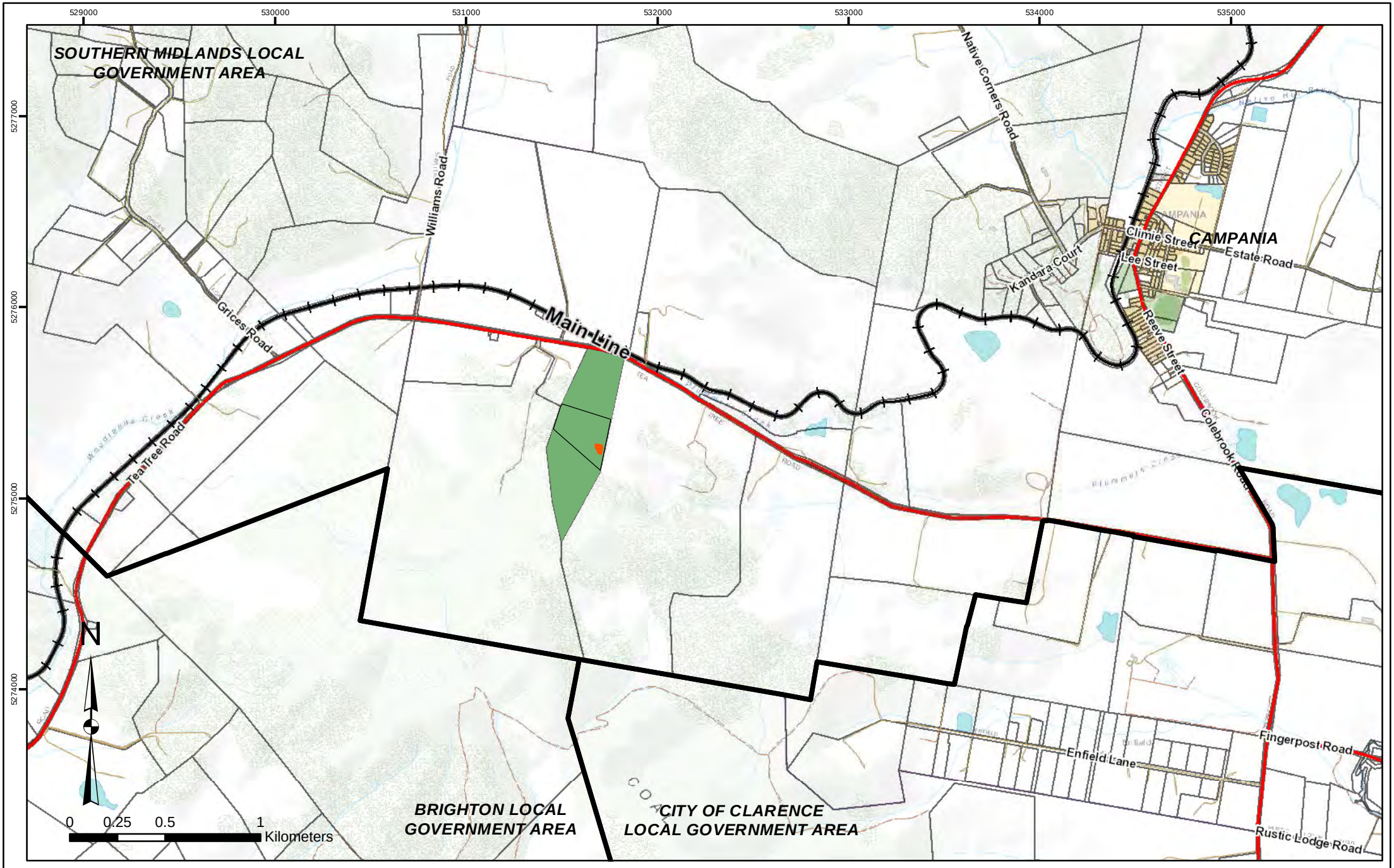
Land Title – Volume 155147 Folio 1 (Appendix 3)

PID – 2941285

Planning Zones (*Southern Midlands Interim Planning Scheme 2015*) – Rural Resource

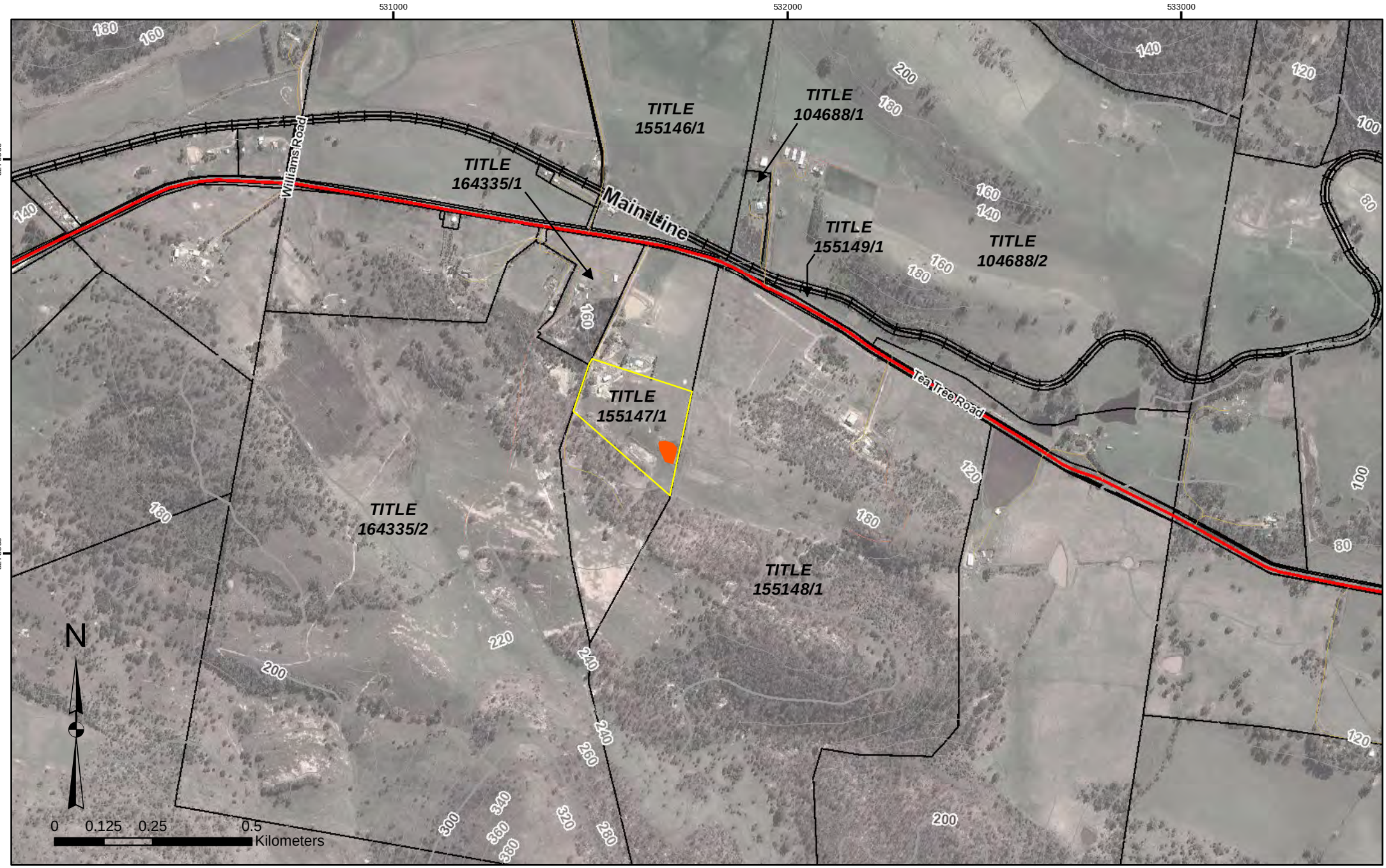
Planning Permit and extraction limit – 4,999 cubic metres per annum (DA2014/64A – Appendix 1)

Mining Lease Number – 1980P/M



Williams Quarry

Figure 1: Location of Williams' Quarry



Williams Quarry

Figure 2: Land Titles and Mining Lease

Quarry

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

PART B - PROJECT DESCRIPTION

The quarry enables the landowner to supply a part of the local market for gravel and rock products for construction related works including, but not limited to, road base for private property road works, driveway gravel, fill for concrete slab construction and public road works.

B.1 DESCRIPTION

The development is to -

- extract up to 10,000 cubic metres per annum of rock/gravel; and
- crush up 2,500 cubic metres of this total volume to produce a uniform gravel.

The expanded quarrying operation will include the following activities:

- surface site preparation by soil removal and stockpiling;
- excavation and ripping of rock and gravel material;
- crushing of some rock material to reduce material size;
- stockpiling of material in quarry area;
- loading trucks with wheel loader from stockpile area in quarry; and the
- transport of materials by truck with/without trailer.

There will be no blasting for the quarrying activity.

B.2 OPERATING HOURS

B.2.1 Existing Level 1 Operating Hours

Operating hours are – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.

B.2.2 Proposed Level 2 Operating Hours

Operating hours are to remain the same which are the standard operating hours recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays[1].

Crushing will be limited to a single event (a maximum of 5 consecutive days per annum), and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing[2]. There is **no** blasting.

B.2.3 Operating Days

The number of days per annum for which the quarry will be operated is difficult to define as quarries by their very nature are demand driven. Specifically, the number of days within each year that gravel/rock would be carted from the quarry to customers is very difficult to define. A quarry can go for days or weeks without any material being sold, and then there is activity associated with a contract or series of contracts that require

[1] Commitment 1: Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.

[2] Commitment 2: Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.

the material. All quarry operators are exposed to the same market forces of supply and demand and hence it is not possible for any quarry operator to predict the ex. It is important to highlight that the number of gravel truck movements onto Tea Tree Road will not increase per day from the Level 1 to level 2 activity, rather truck movements will simply occur on more days of the year (subject to the restrictions on operating day and hours).

For the Level 2 activity the number of truck movements per day will be capped at 15 (30 movements) – the same approved capped number of truck movements for the approved Level 1 activity. A 10t capacity truck will be used. For 10,000 cubic metres (16,000t based on a 1.6 ratio) carting 10t loads = 1,600 loads (approx).

If carting occurs on 200 days it means there are 8 loads per day (16 vehicle movements) required to cart the full extraction volume of 16,000t per annum. Activity may occur within the quarry on the days that carting is not conducted, or there may be a combination of work in the quarry (stockpiling some material) and also carting on that same day. As the proponent is a sole trader conducting the business himself he can only be carting or working in the quarry itself at any one time. Some form of activity at the quarry, like the Level 1 activity, is likely to occur on around 180-270 days of the year.

B.3 MINING LEASE AND MINERAL RESOURCE

A Mining Lease (1980 P/M) has been issued by Mineral Resources Tasmania. The extraction rates are unlikely to exhaust the resource available at the location in the next 20-25 years which is estimated at between 250,000 and 350,000 cubic metres of material (minimum 25 years of supply assuming full extraction of 10,000 cubic metres per annum each and every year).

Disused and/or exhausted areas of the quarry will be rehabilitated progressively throughout its operation to appropriately contoured slopes and pasture established for livestock grazing.

B.4 QUARRY EQUIPMENT

B.4.1 Machinery

The same machinery used in the Level 1 activity will be used in the expanded activity –

- Bulldozer - Fiat Allis 14B
- Loader - Allis Chalmers 605B
- Excavator - Komatsu PC200
- Truck - Volvo NH12 (10 t capacity)

All machinery (except a crusher) is owned by the proponent.

B.4.2 Crushing Unit

Crushing units are usually hired by smaller operators. A crusher will be brought to the quarry as and when required through a contractual arrangement with an equipment hire company. The crusher will be track-mounted, noise shielded, mobile and of a **jaw-type**.

The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum). Crushers currently available for hire can produce around 1,000 cubic metres of crushed material per day – meaning that at full production the full 2,500 cubic metres could be crushed in about 3 days, but 5 days of crusher use per annum has been self-imposed by the proponent, the additional 2 days is to cater for any break-downs of machinery within that period.

The noise impact assessment was conducted using noise readings/spectrums from the machinery used at the site which are listed above, and also the noise readings from an open-air, unshielded stationary impact-type crusher used at the Clive's Hill Quarry, Old Beach. The jaw-type proposed to be used intermittently at the Williams Quarry will be substantially quieter than the impact-type upon which noise modelling has been

conducted by Mr Terts (see Appendix 7) – this conservative approach over-estimates noise emissions at sensitive uses.

B.5 QUARRY ACCESS

The quarry (and Mining Lease) is accessed directly from Tea Tree Road (Figure 3) – a Regional Freight Route under the classification of the Tasmanian State Road Hierarchy (2007) prepared by Department of Infrastructure, Energy and Resources (now DSG).

The quarry has quick and efficient (short distance to travel) access to Tea Tree Road which is owned and maintained by the Department of State Growth (ex- Department of Infrastructure, Energy and Resources). The access, which has a sealed strip directly off Tea Tree Road, is an on-farm (property) road used to access both the quarry and the existing residence and workshop on the property.

The access is gravel and sufficiently wide near Tea Tree Road for trucks and other vehicles to pass each other whilst entering and exiting the access. Culverts and a roadside drain (eastern side) on the access have been installed at suitable locations. The access road surface through to the machinery shed and house exhibits no evidence of erosion from excessive surface flows.

A chip seal has been applied to the section of Tea Tree Road adjacent to the access which DSG required to be strengthened to cater for heavy truck movements. This requirement was included with the Planning Permit issued for the Level 1 quarry (Appendix 1) and has now been completed to the satisfaction of DSG.

B.6 QUARRY PLANS

B.6.1 Existing Level 1 Quarry Layout

The approximate current layout of the quarry and existing drainage patterns are shown in Figure 5a.

B.6.2 Proposed Layout

Infrastructure

The activity including car parking area and active quarry face will be contained within the Mining Lease (Figure 5b). The Access Road as shown in Figure 3 provides the best possible route from Tea Tree Road into the quarry – it is of a width, grade and surface formation to cater for truck movements.

Stockpiles

All material, whether crushed or not, will be stockpiled and stored *within* the pit located within the bunded area of the Level 2 activity (Figure 5b). Crushing and the loading of trucks will also occur in the pit, utilising the ridge of the quarry to deflect noise to the south.

Bunding for noise attenuation and visual amenity

Soil stockpiles have been established as part of the Level 1 activity in the form of a bund (see Figure 5a) to provide a screen of the quarry when viewed from Tea Tree Road to maintain visual amenity of the hillock. Additional soil will be used to increase the height of the bunding at the western end of the quarry area to further create a physical barrier to noise emissions that may be directed to the north-west towards houses. The bunding areas will be grassed (some already have been grassed but growth is slow due to the unusually dry seasonal conditions) and appropriately maintained for the life of the quarry. There is ample soil material on the site to reshape and contour the bund to improve noise attenuation services if this is required.

Disturbed Area

The area disturbed at any one time by the Level 2 activity will be a maximum of 1 hectare in accordance with the terms of the Mining Lease – the area currently occupied is 0.7 hectares as shown in Figure 6b. The currently disturbed area of 0.7 hectares is to be maintained as the maximum area

disturbed (ie bare soil and rock) by actively grassing those areas which are not needed for quarry activities.

Setback

The 10m setback on the side boundary established under the approved Level 1 Quarry will be retained. The planting of trees has occurred in accordance with a *Landscape Plan* approved for the Level 1 activity (Appendix 2). This setback distance will be maintained for the life of the Level 2 Quarry.

Drainage and sediment pond

The well drained nature of the fractured dolerite enables water (rainfall) to quickly drain through the quarry floor. Only during periods of heavy or sustained rainfall does ponding occur in the quarry.

In order to detain and treat stormwater runoff from a 1 ha catchment (assuming at worst 0.7 ha is disturbed – that is, the disturbed area is going to be potentially generating sediment due to a lack of vegetative cover) the sediment pond must total at least 189 kL (0.189 ML). A 1 hectare catchment has been used as this is the maximum allowable area open at any one time by the Mining Lease, and a 0.7 hectare disturbed area has been used in the calculations to model the sediment generating potential of the area where sediment generation is most likely to occur. The model is able to consider full catchment size relative to the disturbed component to generate a more likely scenario of sediment runoff with water flow.

One sediment pond will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events (see Appendix 5). The proposed 0.95 ML dam will have more than sufficient capacity to capture and treat water leaving the pit/disturbed area for approximately 17 years. Notwithstanding this, **annual cleanouts will occur** to maximise efficiency of the pond and to obtain sediment for use in rehabilitation works. The capacity of the sediment pond exceeds what is required to manage water flows/sediment capture and should cater for extremely unusual high rainfall events, such as a 1 in 100-year rainfall event, which is in excess of best practice.

The pond will be constructed and commissioned within 2 months of the full approval being obtained for the Level 2 activity.

B.6.3 Extraction Plan

The 10-year strategy for gravel/rock extraction is to develop a second bench after the existing active face has been pushed northwards (about 10m) and westward (about 30m) and made about 5m deeper.

B.6.4 Extraction Process

Images Plate 1 illustrates the current location of the active face and areas stripped of topsoil from which the bunding was created. They also show where relevant the location of houses identified in Figure 9.

Rock is ripped from an active quarry face which is an area from the top of natural ground level (less the topsoil) to about 3-4 m depth. Machinery operates at this level (below natural ground level less topsoil) to remove material from the face and to stockpile it for carting.

An area to the west of the active face has been stripped of its topsoil, to assist with the creation of the bunding, but this will be progressively worked as the active face moves towards it – noting that the face is from the top of the natural ground level (les topsoil) to about 3-4 m depth.

The third image in Plate 1 highlights the location of the crusher when it would be in use at the quarry – well below in situ rock level and certainly well below the in situ rock - bund level combined. Furthermore, the crusher will only be used once per annum and for a maximum of 5 consecutive days to process 2,500 cubic metres of uniform-sized gravel product. There is ample topsoil and clay material at the quarry to recontour the bund to improve noise attenuation services provided by the bunding.

	Area adjacent to working face (rocks to right of image is the top of the working face) with area in background cleared of topsoil to create the northern bund. Arrow indicates roofline of house just hidden behind trees (house 3 in Figure 9 which is 654.0 metres from the quarry).
	Area cleared of topsoil to create the northern bund. This is the natural surface of the rock product to be extracted working from the quarry face towards the west. The quarry face is below the natural ground level and hence machinery will be operating below the overall height of the bund and in situ rock formation. This will also assist with noise attenuation. Arrow indicates roofline of house just hidden behind trees (house 3 in Figure 9 which is 654.0 metres from the quarry).
	Blue arrow shows location of crusher when it is in use. Orange arrow shows location of active face (in behind the stockpiled material) from where material is being extracted. The location of the ute illustrates that there is not only the bunding but also in situ rock that provides topographic shielding to houses from noise emissions. Yellow arrow indicates roofline of house just hidden behind trees (house 3 in Figure 9 which is 654.0 metres from the quarry). Green arrow indicates part of house just hidden behind trees (house 4 in

	Figure 9 which is 491.9 metres from the quarry).
	Image of the pit looking from the bund to its north. Orange arrow shows location of active face from where material is being extracted. The location of the ute illustrates that there is not only the bunding but also in situ rock that provides topographic shielding to houses from noise emissions. Blue arrow shows location of crusher when it is in use (the top of the ute can just be seen in image).

E.7 RATIONALE AND ALTERNATIVES

The quarry was established as a Level 1 activity (defined under EMPCA) by the proponent to enable the extraction of rock to supply the local market, and in particular agricultural enterprises in the region which require such product to build on-farm laneways. Since establishing the quarry as a Level 1 activity the market has broadened to include a demand for consistent-sized gravel material for some clients. Hence the (i) increased production levels are to meet the demand and (ii) the crushing of some material (up to 2,500 cubic metres per annum) is to meet the requirements and expectations of clients.

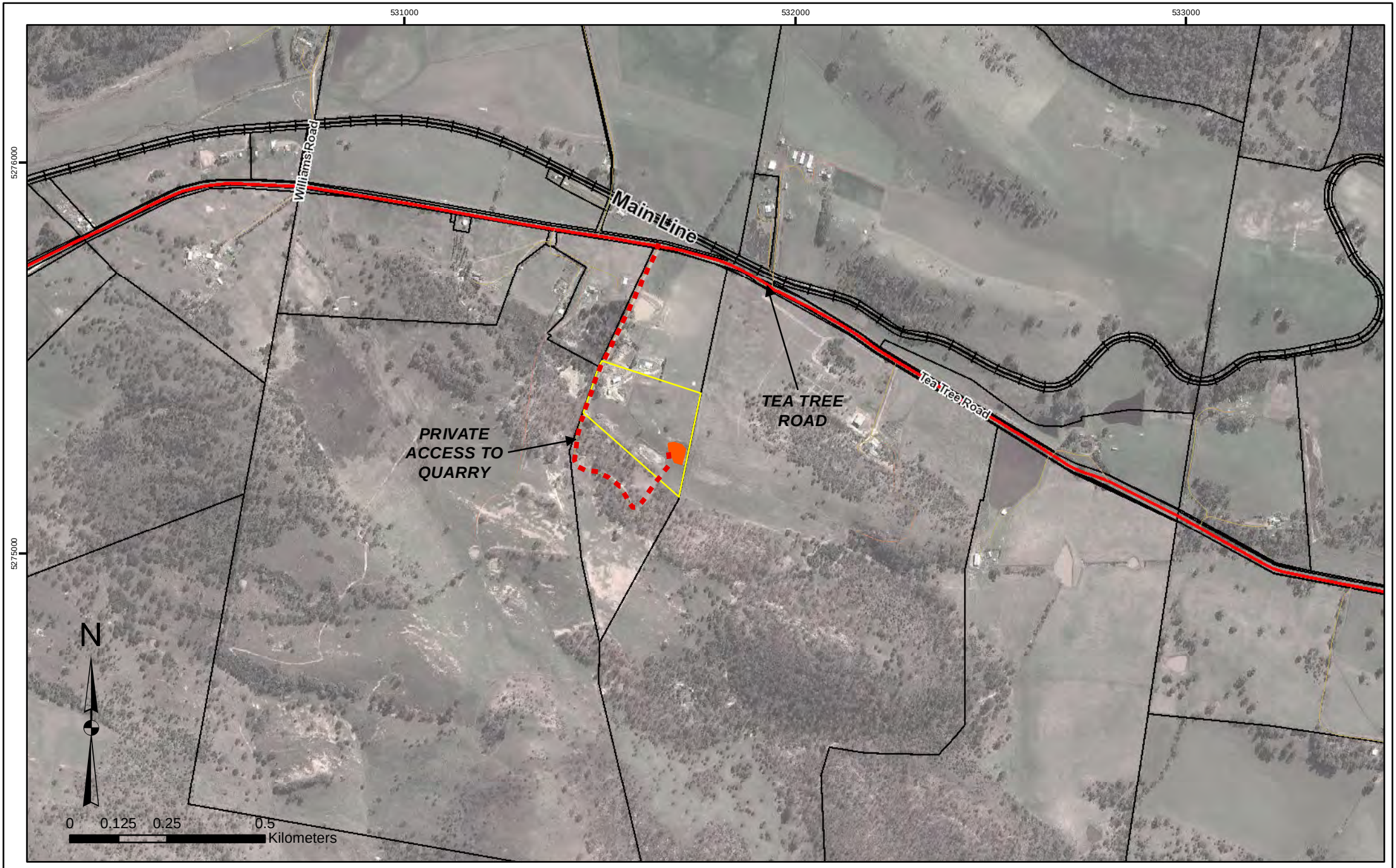
The operation will enable the landowner to supply a broader part of the local market for gravel and rock products for construction related works including, but not limited to, road base for private property road works, driveway gravel, fill for concrete slab construction and public road works. This activity will enhance the diversity of activities currently occurring on the property which will provide a greater source of income and income security for the landowner and his family.

No alternatives have been considered as the proponent owns this land and there is a suitable resource available for extraction in an environmentally responsible manner.

B.8 SOCIO-ECONOMIC ASPECTS

As noted previously, the proponent is a self-employed businessman who operates an agricultural services and machinery repair business from the property which contains the quarry. The proponent's business is located on the same property to which he and his family reside.

The operation will enable the landowner to supply a broader part of the local market for gravel and rock products for construction related works including, but not limited to, road base for private property road works, driveway gravel, fill for concrete slab construction and public road works. This activity will enhance the diversity of activities currently occurring on the property which will provide a greater source of income and income security for the landowner and his family.



Williams Quarry

Figure 3: Mining Lease and road network

Quarry

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

PART C - PROJECT AREA

The quarry is small and prior to its formalisation through the Level 1 assessment process it had been opportunistically utilised for a number of years due to its high quality product, ease of extraction and close proximity to a transport route to local markets (Tea Tree Road is easily accessed and provides direct connections to the growing areas of Brighton and through to the Coal River Valley region).

C.1 CLIMATE PARAMETERS

The nearest Bureau of Meteorology weather recording station is at Campania ('Kincora') to the east of the quarry. The station details for the Campania weather station are -

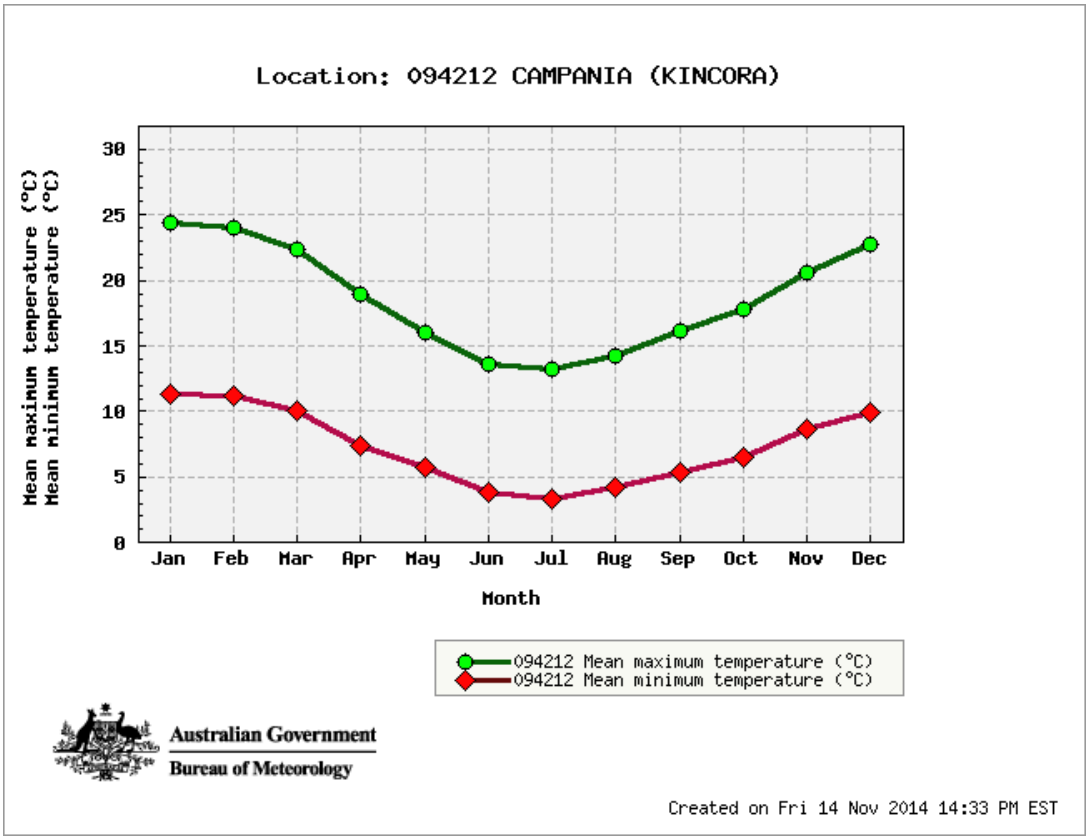
- **Site number:** 094212
- **Latitude:** 42.69 °S **Longitude:** 147.43 °E
- **Elevation:** 45 m

The quarry location occurs in a region with cool winters and warm summers (Graph 1), with most precipitation occurring in the winter and spring period (Graph 2).

Winds at nearby Campania are predominantly north, north-west to westerly throughout the year which is typical for southern Tasmania generally. There is a distinct peak in strong southerly and gentle south-easterly winds in the afternoon period which reflects sea breezes in summer and southerly changes in the winter-autumn period. The stronger southerly winds recorded at Campania are more gentle breezes at the quarry owing to the occurrence of the Coal River Tier (including Brains Hill), to the south of the property itself, which deflects southerly winds. Stronger southerly winds impact Campania due to its occurrence at the northern end of the north-south oriented Coal River Valley.

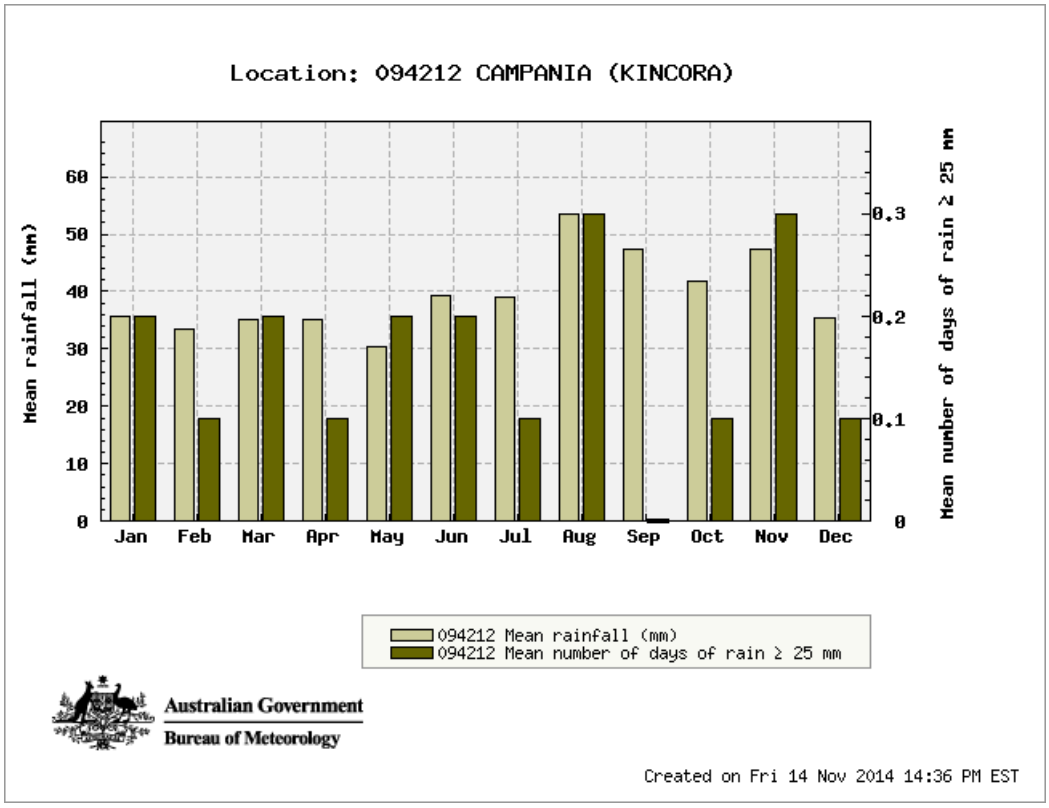
Graph 1. Mean monthly temperatures and mean maximum temperatures for Campania, Tasmania

Source: Bureau of Meteorology 2014



Graph 2. Mean monthly rainfall for Campania ('Kincora'), Tasmania

Source: Bureau of Meteorology 2014



C.2 ACCESS ROAD

The quarry (and Mining Lease) is accessed from an Access Road which joins onto Tea Tree Road (Figure 3).

The quarry has quick and efficient (short distance to travel) access to Tea Tree Road which is owned and maintained by the Department of State Growth (ex- Department of Infrastructure, Energy and Resources). The gravel Access Road, which has a sealed strip directly off Tea Tree Road, is an on-farm (property) road used to access both the quarry and the existing residence on the property.

The Access Road is gravel and sufficiently wide near Tea Tree Road for trucks and other vehicles to pass. Culverts and a roadside drain (eastern side) on the Access Road have been installed at suitable drainage locations. The Access Road surface through to the machinery shed and house exhibits no evidence of erosion from excessive surface flows. The road surface itself is well compacted and maintained by the owner however the surface of the Access Road from the house/machinery shed through to the quarry laydown area will need to be improved by the addition of gravel and culverts.

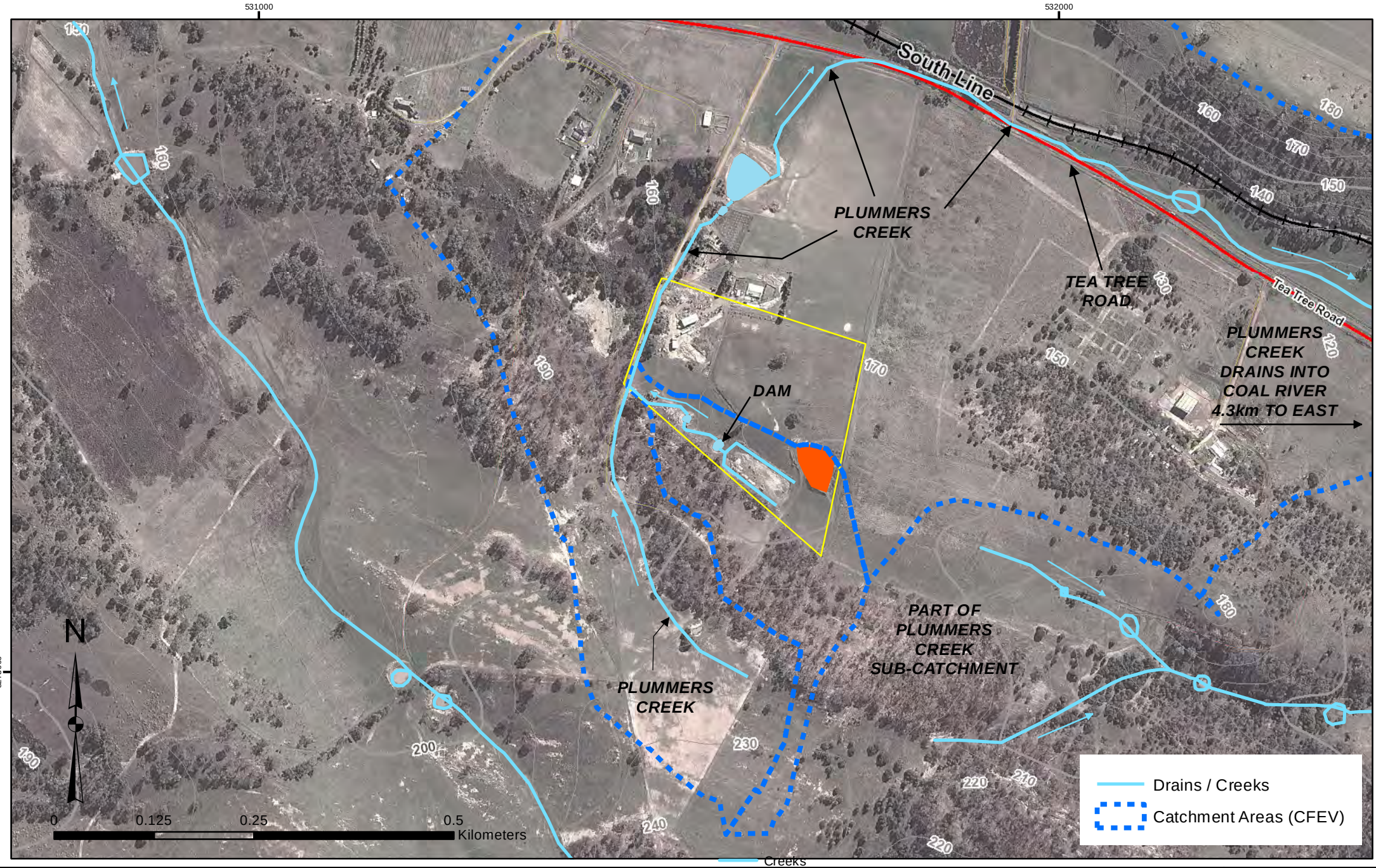
C.3 SURFACE WATER DRAINAGE

The quarry (and Mining Lease) occurs within the Plummers Creek catchment (Figure 4a) which flows eastward to the Coal River near Campania. There are no natural watercourses within the Mining Lease – the drainage is all via existing man-made structures (dams and ponds) and surface drains. The existing Level 1 quarry utilises a series of two sediment ponds to capture and treat water for sediment removal as shown in Figure 4a.

C.4 GEOLOGY, SOILS AND LAND CAPABILITY

The geology of the quarry is Jurassic dolerite with a thin clay-loam soil (Figure 4b). The material to be extracted is a coarse fractured rock/gravel derived from in situ weathering of the bedrock.

The Land Capability recorded by DPIPWE in the area is 4 and 5 (Figure 4c) however the steep terrain, shallow skeletal soils and rockiness of the soil at the quarry would make a Land Classification of 5 and 6(+7) more appropriate for the area covered by the Mining Lease. As the quarry activity does not require blasting it is very unlikely that the activity of ripping will materially affect the stability of any slope in the Mining Lease.



Williams Quarry

Figure 4a: Natural drainage and catchments around and through the proposed Mining Lease

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

Williams Quarry

Figure 4b: Geology and the Mining Lease

Quarry

Mining Lease

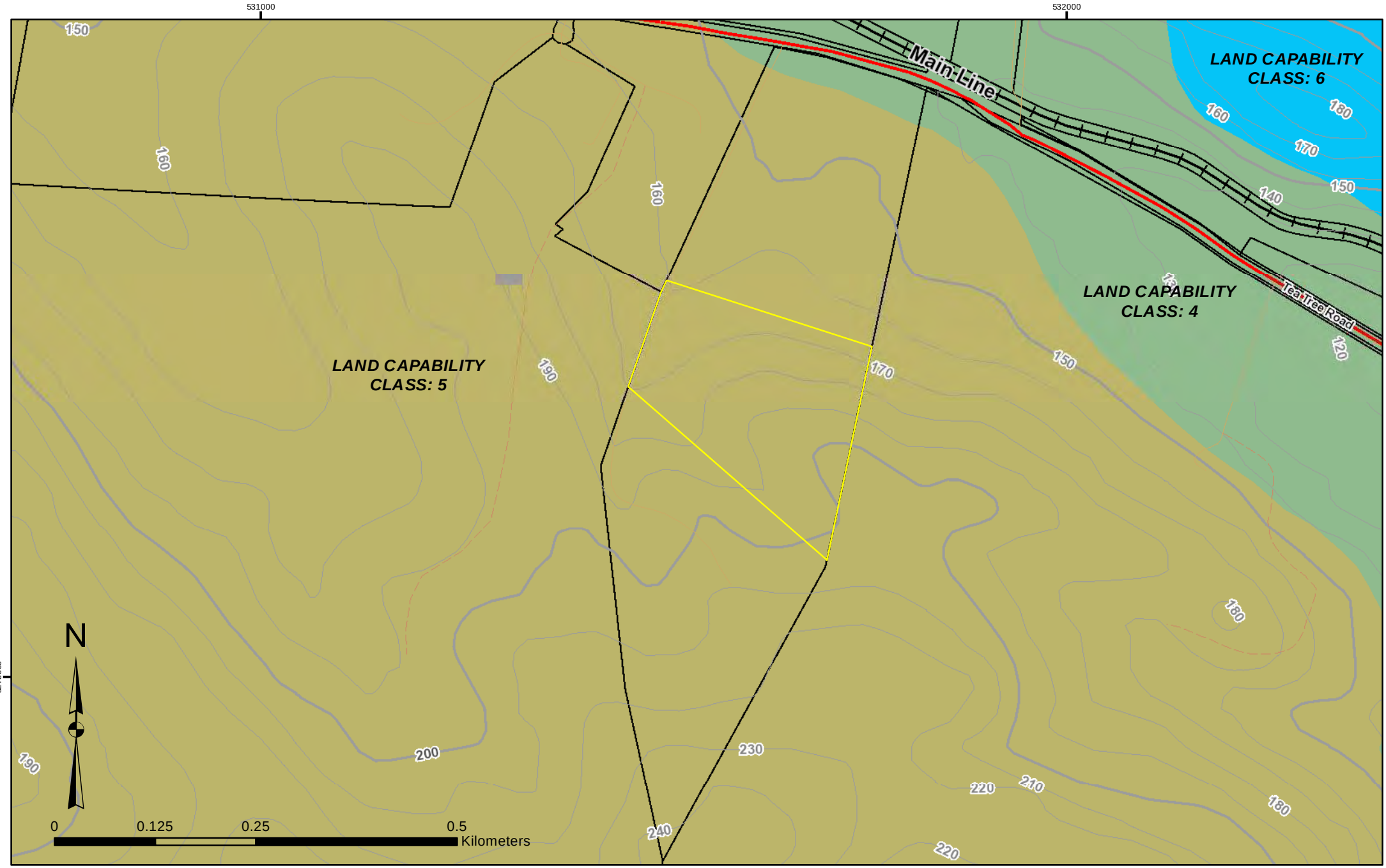
Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014



Williams Quarry

Figure 4c: Land Capability and the Mining Lease

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
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DATUM: GDA94
GRID: MGA Zone 55

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CLIENT: CRAIG WILLIAMS

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Williams Quarry

Figure 5a: Existing Quarry Layout

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
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CLIENT: CRAIG WILLIAMS

DATE: 14th SEPTEMBER 2014

Williams Quarry

Figure 5b: Proposed Quarry Layout

10m Quarry Setback

Mining Lease

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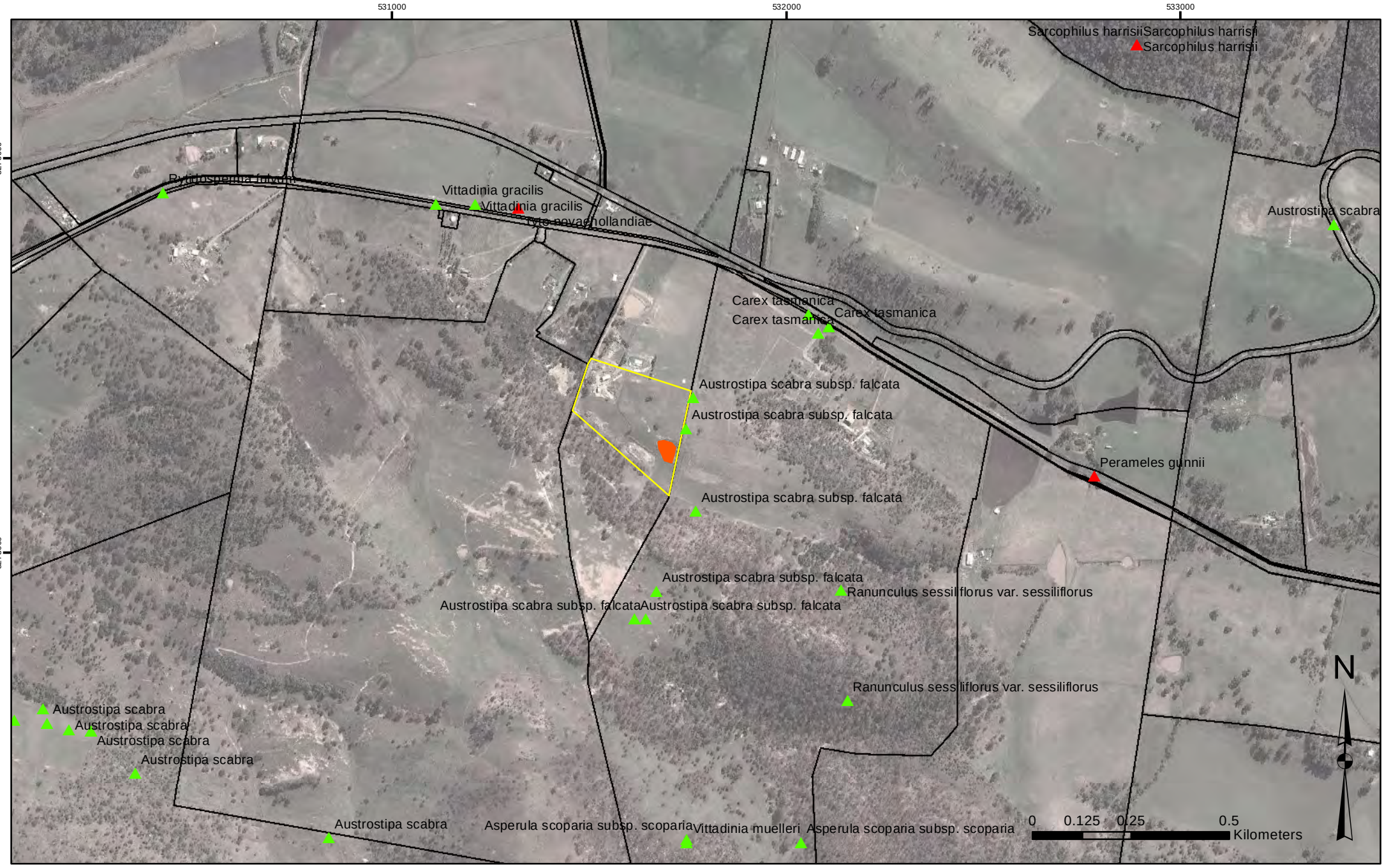
DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 14th SEPTEMBER 2014



Williams Quarry

Figure 6: Natural Values Atlas data for threatened species

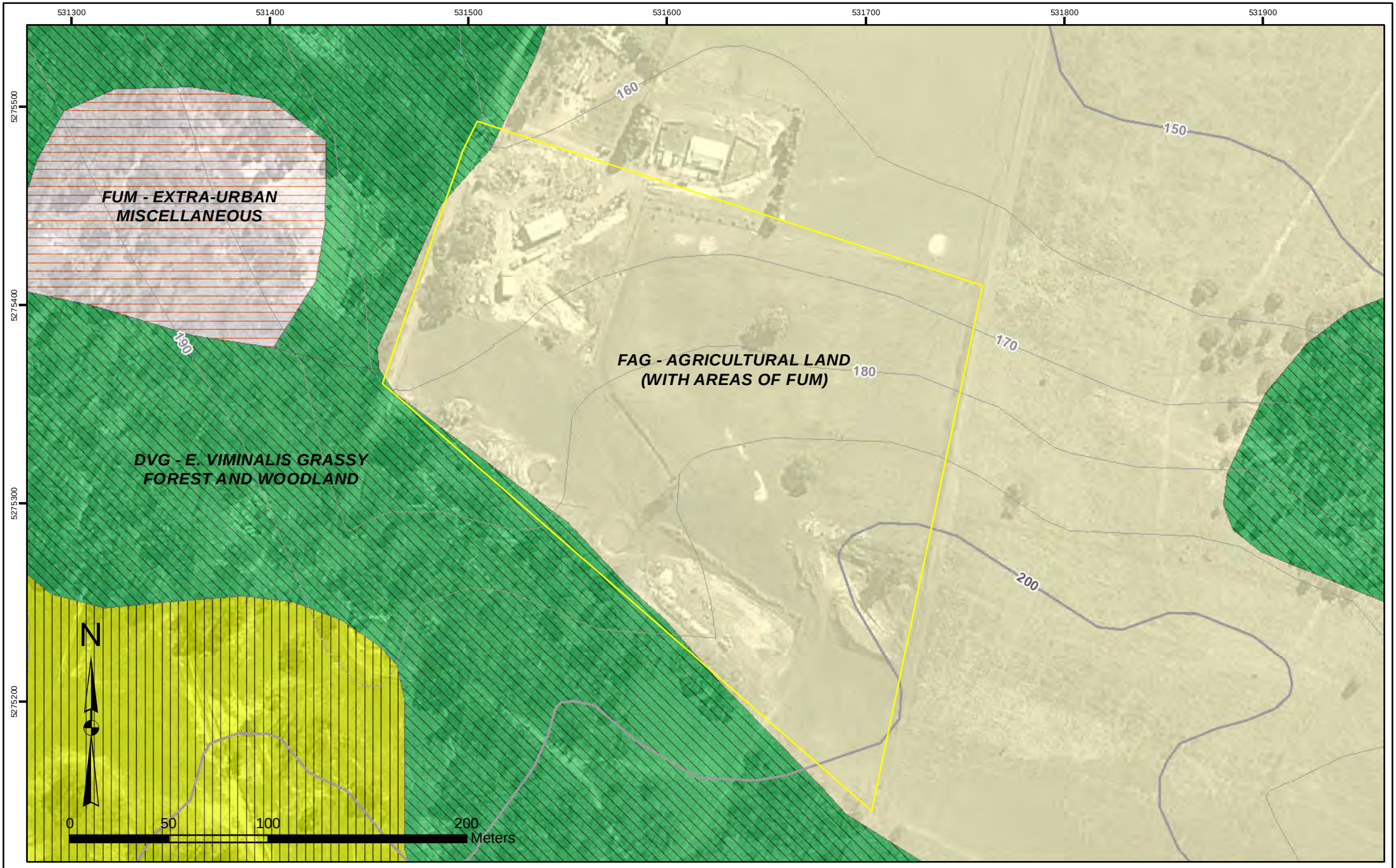
NVA Flora
NVA Fauna
Quarry
Mining Lease

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014



Williams Quarry

Figure 7: Vegetation in the Mining Lease

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

Williams Quarry

Figure 8: Weeds in Mining Lease

Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

PART D - POTENTIAL ENVIRONMENTAL EFFECTS

D.1 FLORA AND FAUNA

There are likely to be negligible impacts to flora and fauna as the quarry operations are in pasture used for livestock grazing (Figure 7). The pastures are well maintained and actively ploughed and fertilised on a regular basis.

Most nearby records of threatened native grass and herb species occur in degraded pastures that have not been regularly ploughed or stocked, which tends to enable these species to colonise due to irregular soil disturbance and low fertility levels. Curly sedge has been located on adjoining lands, and along Tea Tree Road itself, in damp areas associated with soaks – typical habitat for this species.

The forest within 500m and 1 km line of sight is not suitable for the nesting of wedge-tailed eagle (*Aquila audax fleayi*) due to its small stature, lack of wind protection and most was burnt in a wildfire in 2013-14.

None of the plant species of significance that have been recorded in the region were recorded in or near the quarry during a survey in October 2014 by Dr Richard Barnes. As noted above, the site is pasture which has been ploughed in parts, fertilised and managed for agricultural uses for some time. Hence it is unnecessary to provide a detailed report that documents the findings of a survey which yielded nothing of any consequence (ie no threatened flora or fauna locations or significant habitat).

The only native vegetation community near the quarry is *Eucalyptus viminalis* dry forest and woodland (TASVEG 3 mapping – DVG – Figure 7) which will not be affected by the quarry activities. This vegetation type is **not** a threatened community listed on the *Nature Conservation Act 2002*.

D.2 WEED MANAGEMENT

Notable weeds within or directly adjacent to the active quarry are horehound and Californian thistle (Figure 8). A Weed Management Plan (Appendix 4) is being implemented as part of the quarry operation[3].

D.3 RIVERS, CREEKS, WETLANDS AND ESTUARIES

The quarry (and Mining Lease) occurs within the Plummers Creek catchment (Figure 4a) which flows eastward to the Coal River near Campania. There are no natural watercourses within the Mining Lease – the drainage is all via existing man-made structures (dams and ponds) and surface drains.

There will be no impacts to rivers, creeks, wetlands or estuaries from the activity.

D.4 SURFACE AND GROUNDWATER MANAGEMENT

One sediment pond (0.95ML) will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events[4] (see Appendix 5).

The 0.95 ML pond has more than sufficient capacity to facilitate the removal of sediment from water flows that may occur from the quarry after. Sediment trapped by the sediment pond near the quarry will cleaned out annually[5]. The collected sediment will be mixed with stockpiled top soil for progressive rehabilitation of disused quarry areas.

[3] Commitment 3: A Weed Management Plan is being implemented at the quarry operation.

[4] Commitment 4: One sediment pond (0.95ML) will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events.

[5] Commitment 5: Sediment trapped by the pond will be removed annually. The collected sediment will be mixed with stockpiled top soil for progressive rehabilitation of disused quarry areas.

D.5 AIR EMISSIONS

The primary air emission associated with quarry operations is dust. Dust can be a nuisance to neighbours and may be a safety hazard to quarry employees. Generally, the emission of visible dust should be confined within the boundary of the premises, except in remote areas.

Potential sources of dust within the quarry operation are from:

- The ripping of rock during dry windy conditions (summer months);
- The removal of grass cover and the stripping of topsoil (very limited as the footprint will not increase significantly from its current extent and the amount of topsoil is negligible);
- The movement of rock and gravel within the quarry by machinery;
- Crushing of rock material;
- Road (gravel) use in and next to the quarry; and
- Stockpiled gravel and fines.

D.5.1 Access Road and Traffic

The Access Road from its junction with Tea Tree Road has a gravel surface. The adjacent standing pine trees and other eucalypts and scrubby understorey vegetation do not provide evidence for any dust emissions from current road usage. Indeed, there is no evidence that significant amounts of dust escape from the quarry or Access Road based on an examination of the standing vegetation 50 metres away from the quarry operation (ie the trees and native vegetative cover at 50 m from the site is not affected by dust cover). Given the low rainfall of the area, any dust from the quarry that blows onto the standing vegetation is likely to persist for some time, unlike that which occurs in higher rainfall areas where dust is washed from the foliage of roadside vegetation (eg towards Brown Mountain).

Despite the lack of evidence to suggest any significant dust generation from the quarry or Access Road, as a dust suppression measure, during periods of dry weather the road surface, area near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the sediment pond or on-site water cart truck[6]. Additional dust mitigation measures for the Access Road are provided in the Transport Impact section.

D.5.2 Crusher Location and Dust Suppression

The QCP suggests that 'Fixed plant and other working areas should be located on the premises with due regard to dust and noise emissions which may affect neighbours outside the premise's boundary. Plant location should also take into account the visibility of the plant.'

Consistent with the QCP, the crusher (which is mobile rather than fixed but the principle of the QCP still applies) will be located at the site identified in Figure 5b each and every time it is used in the quarry (once per year for a maximum of 5 consecutive days). This location is both shielded visually from any sensitive use and also maximises the noise attenuation of the crusher from solid earth and soil/rock bunding.

Standard industry practice is to dampen material prior to crushing and to also have installed sprayers on the output chute to minimise dust emissions from an otherwise dry product. Mobile modern crushers have such features installed and there is a water source available to operate these dust suppression measures whilst crushing.

[6] Commitment 6: As a dust suppression measure, during periods of dry weather the Access Road surface, areas near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the nearby sediment pond or on-site water cart truck.

D.6 LIQUID EFFLUENT

There is no toilet or any other amenities provided at the quarry - these are provided at the existing dwelling on the property. One hydrocarbon spill kit is stored at the quarry in the event of a spillage.

D.7 SOLID WASTES

The activity will not produce any earth-based solid wastes as all of the materials extracted will be sold for various end uses (rock, gravel) or would be used in rehabilitation works (topsoil and clay).

The servicing of machinery may generate solid waste (eg. oil filters, worn tyres) however machinery is removed from the quarry and serviced at the existing workshop on the property rather than on-site in the quarry. Waste generated by the servicing of machinery is disposed of in accordance with best practice principles[7].

Waste generated by workers from general refuse (eg lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling[8]. No waste bins are provided at the quarry for general refuse.

D.8 NOISE EMISSIONS

D.8.1 Quarry Code of Practice Background

All earth-moving operations have the potential to produce noise, and this can be a source of public disapproval of quarries. The QCP suggests that where residences exist adjacent to a quarry, precautions should be taken to reduce the impact of noise. The QCP indicates that with the exception of blasting where permitted (NB. **no** blasting will occur at this quarry), noise from activities in a quarry affecting residential premises, must not exceed 10 dB(A) above the normal ambient noise levels during daytime operations.

The QCP suggests the following approaches to minimising noise propagation that may impact on neighbours –

1. Enclosures may be required around crushing and screening plants.
2. Solid barriers, such as bund walls and topographical features, provide the most effective 'in line' reduction of sound levels. Reliance on a barrier of vegetation alone will result in only marginal reduction in noise levels.
3. Access tracks and haul roads should be well maintained to prevent corrugation that contributes to truck noise, and truck drivers should be encouraged, where possible, to use access roads which have the least impact on the community.
4. Machinery should be well maintained and lubricated. Modern equipment is generally quieter than ageing machinery.

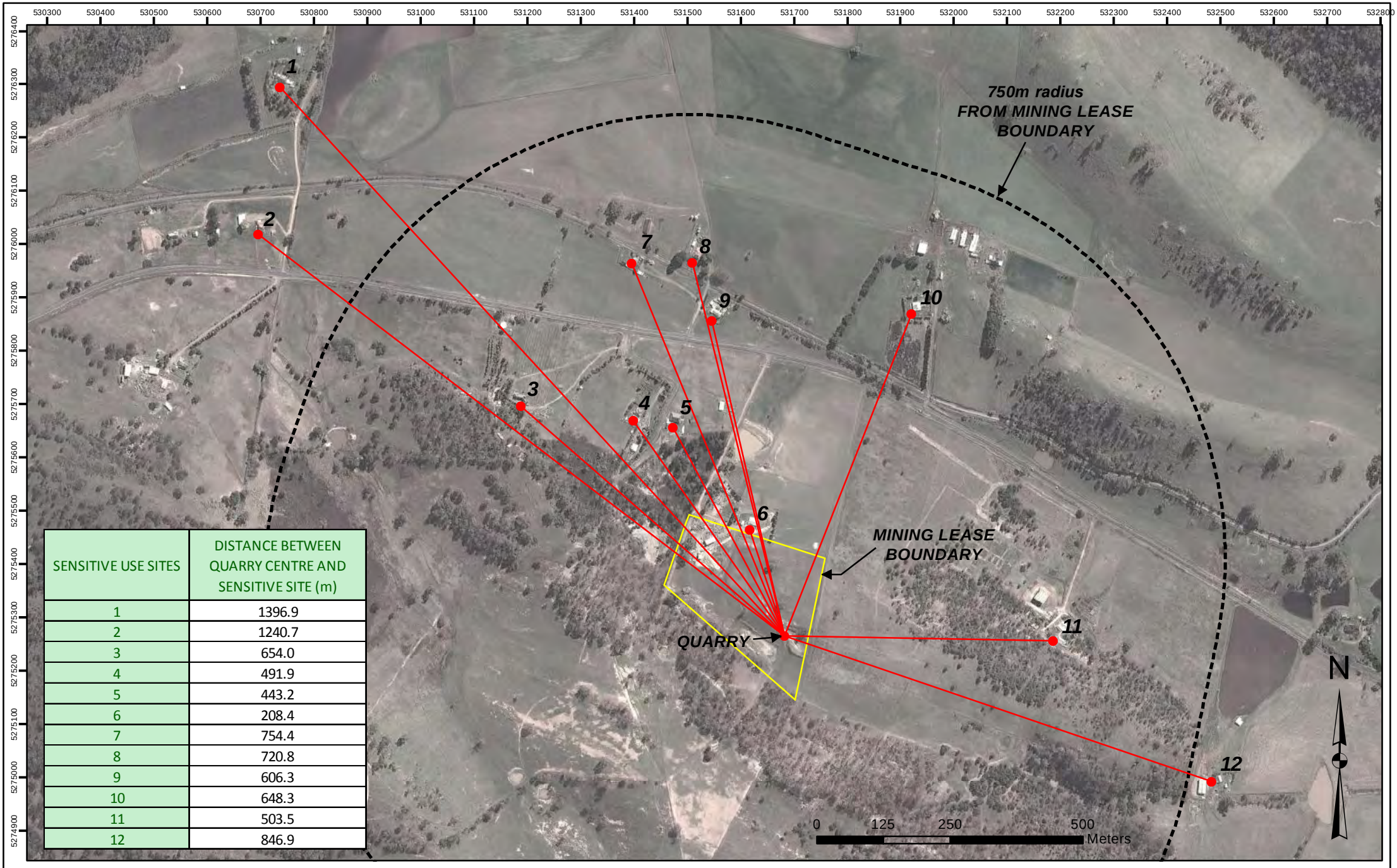
D.8.2 Quarry Noise Generation Sources

Most of the rock and gravels are ripped, excavated and then stockpiled for loading into a truck.

Some material (up to 2,500 cubic metres of material) will be crushed to reduce overall particle size. A crusher will be brought to the quarry as and when required through a contractual arrangement with an equipment hire company. The crusher will be track-mounted, noise shielded, mobile and of a **jaw-type**.

[7] Commitment 7: Waste generated by the servicing of machinery is disposed of in accordance with best practice principles.

[8] Commitment 8: Waste generated by workers from general refuse (eg lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling.



SENSITIVE USE SITES	DISTANCE BETWEEN QUARRY CENTRE AND SENSITIVE SITE (m)
1	1396.9
2	1240.7
3	654.0
4	491.9
5	443.2
6	208.4
7	754.4
8	720.8
9	606.3
10	648.3
11	503.5
12	846.9

Williams Quarry

Figure 9: Sensitive Use Locations

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 22nd JULY 2014

The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum)[9]. Crushers currently available for hire can produce around 1,000 cubic metres of crushed material per day – meaning that at full production the full 2,500 cubic metres could be crushed in about 3 days, but 5 days of crusher use per annum has been self-imposed by the proponent, the additional 2 days is to cater for any break-downs of machinery within that period.

The noise impact assessment was conducted using noise readings/spectrums from the machinery used at the site which are listed above, and also the noise readings from an open-air, unshielded stationary impact-type crusher used at the Clive's Hill Quarry, Old Beach. The jaw-type proposed to be used intermittently at the Williams Quarry will be substantially quieter than the impact-type upon which noise modelling has been conducted by Mr Terts (see Appendix 7) – this conservative approach provides an over-estimate of noise emissions at sensitive uses.

No blasting will occur at the quarry as it is unnecessary to extract the material.

D.8.3 Quarry Activity Noise Survey Background

To aid the design and implementation of a suitable noise assessment of the expanded activity a series of topographic profiles were constructed using contour data for 12 of the nearest Sensitive Uses – out to 1.4kms from the active quarry pit. The topographic profiles and map showing the location of each of the 12 Sensitive Uses are contained in Appendix 6.

The nearest permanent residence not owned by the proponent is located approximately 443.2 metres north-west of the quarry pit (house 5 in Figure 9) with the second nearest being approximately 491.9 metres to the north-west of the quarry (house 4 in Figure 9). The noise sources at both residential properties is mainly Tea Tree Road as they are closer to the road than they are to the quarry.

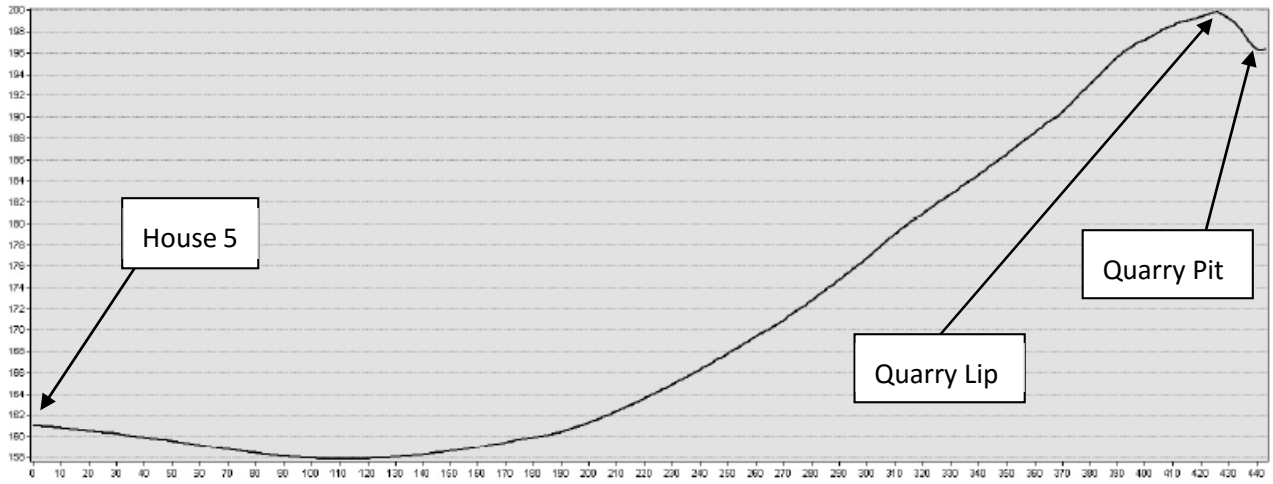
The table and annotations in Figure 9 show that there are 10 dwellings within 1,000m of the quarry pit, the pit itself being the closest point of the quarry activity to the dwellings (with the laydown area being further away). Of these, one is owned by the quarry proponent (house 6 in Figure 9). Eight of the 11 dwellings, including that of the quarry proponent, occur within the 750m SRAD noted in the *Quarry Code of Practice*. Two additional dwellings (houses 1 and 2 on Figure 10) occur approximately 1.3 and 1.2 kms from the quarry pit respectively.

There is a very distinctive topographic pattern associated with the quarry it relative to the surrounding dwellings – they all occur at a lower elevation to the quarry pit and there is a quarry 'lip' which shields the pit from direct line of sight to all of the dwellings within the 1,000m zone. For house 5 there is a very distinctive and rapid decrease in elevation between the hill which supports the quarry and the house location itself – with a very prominent ridge identified along the northern edge of the quarry pit (Graph 4). This 'ridge' or quarry lip is evident on all of the topographic profiles in Appendix 5. Even for houses to the east the ridge/lip is still prominent, with an extra noise attenuating plateau/ridge occurring at about 220m from the house location (Graph 5).

Graph 3. Topographic Profile from House 5 shown in Figure 9 to Williams Quarry pit

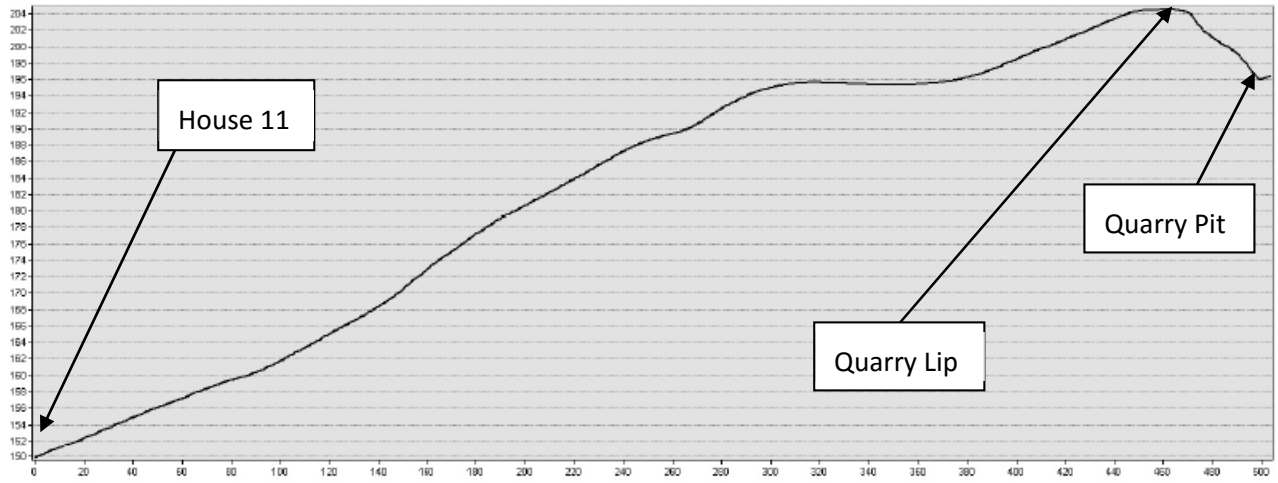
(x axis – distance from house to pit, y axis – height)

[9] Commitment 9: The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum).



Graph 4. Topographic Profile from House 11 shown in Figure 9 to Williams Quarry pit

(x axis – distance from house to pit, y axis – height)



D.8.4 Crushing and Quarry Activity Noise Survey and Assessment

The Noise Assessment conducted by Mr Pearu Terts (Appendix 7) provided the below summary -

1. The crusher and general quarry noise at the nearest residence 440 m away (house 5, Figure 9) is estimated to be 35 dB(A) with no or little wind and 45.0 dB(A) with wind towards the nearest residence;
2. The ambient noise level near the boundary of the nearest neighbour (house 5, Figure 9), with the quarry shut is 39 dB(A) and the background L90 noise level was 30 dB(A) during the day; and
3. The proposed quarry is likely to meet the noise requirements of the Tasmanian Quarry Code of Practice.

The crusher is usually the loudest noise source in a quarry. The crusher will be located **in** the quarry pit, as shown in Figure 5b, as this location provides the best shielding for noise emissions and is the basis that underpinned the assessment conducted by Mr Terts.

The noise assessment and calculations conducted by Mr Terts are based on actual noise measurements generated by a stationary, unshielded impact-type crusher and shifter located at the Clive's Hill Quarry, Old Beach. The crushing at the Williams Quarry will be via a track-mounted, noise shielded, mobile, jaw-type

crusher. The jaw-type proposed to be used intermittently at the Williams Quarry will be substantially quieter than the impact-type upon which noise models have been based by Mr Terts.

Using the Clive's Hill Quarry crusher measurements and modelling, the crusher and shifter noise based on the topography at the Williams Quarry is calculated by Mr Terts at the nearest neighbour (house 5 on Figure 9) to be 35.3 dB(A) with no wind and 45.0 dB(A) with a gentle breeze towards the residence, with a south-easterly breeze. Stronger winds increase the background noise level because of the wind in trees and bushes. The noise levels at the other dwellings are less than at the predicted noise levels at the nearest neighbour, being house 5 on Figure 9.

The quarry and quarry activities are not seen from the nearest residence due to the topography and trees. Consequently any received quarry activity noise is not the direct sound but rather it is attenuated sound. The quarry operates during daylight and does not operate on Sundays, which are time periods that are especially sensitive in terms of noise occurrence (ie. periods of sleep and relaxation, higher likelihood of persons in attendance at their residence). Furthermore, the considerable expense of contracting the crusher, and cost of floating it to the quarry, the 2,500 cubic metres will be crushed in a single event (with the machine likely to be capable of crushing around 1,000 cubic metres per operating day) of a maximum of 5 (consecutive) days. To further minimise noise nuisance, crushing will only occur between 0800 hrs and 1600 hrs on operating days.

The measured noise levels in terms of Leq indicate that the 10 dB(A) differential requirement of the *Quarry Code of Practice*, between the noise levels with the quarry operating and when shut down, is likely to be met 440 m away from the pit. The Leq noise levels are generally higher near residential premises due to human activities and equipment such as pumps and/or heat pumps.

Mr Terts notes that the World Health Organization's (WHO) Guideline for noise levels outside bedrooms is that with the window open, Leq = 45 dB(A) and Lmax = 60 dB(A). His report (Appendix 7) notes that these conditions too, are likely to be met.

Mr Terts (Appendix 8) noted that 'The reflection effect off the irregular quarry face is likely to increase the noise level by no more than 2.5 dB(A). There are no sensitive areas south of the quarry face on which the noise can impinge and therefore it does not cause environmental nuisance.'

D.8.5 Truck Noise Assessment

The proponent commissioned further assessment work to comprehensively address the alleged noise issues associated with the use of the legal access road into the landowners' property.

The report is summarised below with the full report contained in Appendix 8 –

a. Empty and loaded trucks travelling on the quarry access road gave the following noise levels at 84 m:

	Leq (10 min) dB(A)	
Loaded	Empty	Ambient
from quarry	to quarry	
44.8	47.0	46.2
48.6	47.4	43.6
46.6	45.3	45.7

The results included Tea Tree Rd. traffic.

b. The maximum noise levels at 84 m were as follows:

	dB(A)	
Loaded	Empty	Tea Tree Rd traffic
60.1	58.5	63.1

c. We estimate that at the nearest house (# 5 on page C 2 of previous [noise] report), the access road is 111 m away and therefore there will be a reduction of truck noise by 2.4 dB(A) and possibly more because the road/tyre interaction is not visible because of the embankment. The Tea Tree Road is closer than our measuring location near the dam and therefore the Tea Tree Rd. traffic is about 1 dB or more louder. The quarry truck noise levels are acceptable.

d. The reflection effect off the irregular quarry face is likely to increase the noise level by no more than 2.5 dB(A). There are no sensitive areas south of the quarry face on which the noise can impinge and therefore it does not cause environmental nuisance.

e. The acoustic climate near the nearest residence is not tranquil. The Tea Tree Rd., traffic noise dominates with high speed heavy vehicles and large tyred 4 WD vehicles. In addition, there are jet air liners, motor bikes and goods trains blowing their warning horns twice near each railway crossing.

Railway Traffic

A railway line occurs on the northern side of Tea Tree Road which is regularly used by TasRail to transport goods – creates a very distinctive, infrequent but regular noise source. It is a requirement of the train operator to signal [by means of a loud horn] twice as they approach an uncontrolled crossing, of which there are four in and around Rekuna – one into the property Alma Lodge which is residence 10 on Figure 9 of the EER (almost opposite the property which will support the Level 2 quarry), one across Rekuna Station Road Road (adjacent to houses 7, 8 and 9 in Figure 9), one across Williams Road (adjacent to house 2 and near house 1 in Figure 9) and one across Grices Road to the west (not shown on Figure 9).

Trains can occur at any time of the day and night, and irrespective of the time of day or day of the week the signal must be given for each and every uncontrolled crossing.

D.8.6 Additional and Existing Noise Source Summary

The regular flow of vehicles on Tea Tree Road during daylight hours can be heard from the residence on 1356 Tea Tree Road as a low to moderate level background noise. Large trucks and noisy cars (eg broken muffler) produce a more defined and identifiable sound above the regular 'hum' of the background traffic noise level. In some cases, trucks using Tea Tree Road are quite audible.

A railway line occurs on the northern side of Tea Tree Road which is regularly used by TasRail to transport goods – creates a very distinctive, infrequent but regular noise source.

The nearest permanent residence not owned by the proponent is located approximately 443.2 metres north-west of the quarry pit (house 5 in Figure 9) with the second nearest being over 491.9 metres to the north-west of the quarry (house 4 in Figure 9). The noise sources at both residential properties is mainly Tea Tree Road as they are closer to the road than they are to the quarry.

The below aspects of the site and the quarry operation are likely to result in noise emissions that are acceptable to the local conditions in light of the existing noise sources and intrusions:

a. Most of the noise is deflected by the quarry face itself and shape of the pit – noise of machinery in the pit would be deflected to the south, away from any sensitive use;

b. Machinery operating at the laydown area will be shielded from direct noise emissions to nearby sensitive uses by the ridgeline/hillock on the property;

c. The Access Road near the closest sensitive use (the house at 420 metres distance) is lined with pine trees and other vegetation which attenuates some of the noise, and the incline of the Access Road will prevent the need to heavily brake when trucks go downhill even when laden with rock-gravel; and

d. Patterns of equipment use and noise location – machinery and truck use at the quarry will be restricted to operating hours as outlined in the *Quarry Code of Practice* – this overlaps with the peak

activity times of Tea Tree Road thereby minimising the sole impact of any noise from the quarry on surrounding land uses. Tea Tree Road is a Category 2 Road listed by DIER – freight route used by trucks – and is frequently used to access areas between Brighton, Richmond, Campania and through to the Midlands Highway (via the Brighton bypass or Mud Walls Roads connections).

e. Surrounding land use – the nearby Tea Tree Road is a major source of local noise. Other land uses such as farming activities can also generate high levels of noise as most machinery is diesel operated which operates within a low frequency range – tractors and diesel machinery can be heard for large distances over pasture land. Regular noise generators at the quarry such as trucks and excavator are of insufficient noise to over-power for any extended period of time the major influence of the background noise generated by Tea Tree Road.

A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA[10].

D.9 TRANSPORT IMPACTS

D.9.1 Route

Trucks will exit the property via the Access Road onto Tea Tree Road (DSG classified Category 2 – Regional Freight Route). This intersection provides an opportunity for gravel trucks to travel in an easterly or westerly direction depending on the location of the needs of the purchaser. Tea Tree Road is available to trucks of the size generated by the expanded activity without any weight restrictions. The division of available transport directions lessens the amount of truck movements in any one direction, although the actual percentage of traffic moving in either direction will depend on the destination of the material.

Tea Tree Road is a school bus route. For safety reasons, trucks will avoid entering and leaving the quarry in the period 20 minutes either side of the school bus collection and drop-off time, as advised by the school bus operator[11].

D.9.2 Type, Numbers and Frequency

Level 1 Activity

Traffic movements for the approved extraction of 4,999 cubic metre per annum (Level 1 Activity) will consist of a truck with or without trailer to collect material at no more than '15 truckloads' per day (30 truck movements) at full production capacity.

Level 2 Activity

For the expanded activity (10,000 cubic metres per annum = 16,000 tonnes per annum based on a 1.6 ratio) the number of truck movements per day will be capped at 15 (30 movements) – the same number of truck movements as will occur for the approved Level 1 activity. Like the Council approved Level 1 activity, the gravel carting trucks may use on occasion a trailer (capacity of around 5 tonnes) which will also comply with vehicle safety and regulation standards.

[10] Commitment 10: A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.

[11] Commitment 11: Trucks will avoid entering and leaving the quarry in the period 20 minutes either side of the school bus collection and drop-off time, as advised by the school bus operator.

It is important to highlight that the number of gravel truck movements onto Tea Tree Road will not increase per day from the Level 1 to level 2 activity, rather truck movements will simply occur on more days of the year (subject to the restrictions on operating day and hours).

For the Level 2 activity the number of truck movements per day will be capped at 15 (30 movements) – the same approved capped number of truck movements for the approved Level 1 activity.

A 10t capacity truck will be used.

For 10,000 cubic metres (16,000t based on a 1.6 ratio) carting 10t loads = 1,600 loads (approx).

If carting occurs on 200 days it means there are 8 truckloads per day (16 vehicle movements) required to cart the full extraction volume of 16,000t per annum.

Over a 0700 to 1900 hr operating day this could equate to 0.67 trucks per hour (1.34 vehicle movements), but realistically carting would be constrained over that day to fewer hours, say 4hrs which equals 2 trucks per hour (4 vehicle movements). If carting days comprised 15 loads per day then carting would be over 107 days, and for that 4 hrs of carting there would be 3.75 truckloads per hour exit onto Tea Tree Road, or 7.5 traffic movements per hour. For the Level 1 activity, for the past 2 months there have been on average 2 truckloads per day carted from the quarry – this is not reflective of the true demand for the product, it is simply reflective of the dry conditions that we currently face in the State which means that farmers are destocking and offering little investment into their farms as they need to retain the funds they have to wait until weather conditions improve.

It is extremely unlikely that there would be more than 3 truckloads per hour leave the quarry for delivery as there is the extra delivery time, unloading of the truck at the delivery location, return travel time and loading of the truck of the material that has been previously won. As a one-person operation the amount of traffic generation is determined by the one operator in relation to allocating time to win material, and then to cart material. Material will therefore not be carted every day, and indeed there may be days when there is no material carted, but on other days there may be the full 15 loads carted (30 vehicle movements).

There are additional vehicle movements from the Access Road onto Tea Tree Road, which will be managed by the proponent to be 40 movements or less per day in total for all of the activities occurring on the land (ie. residential access, quarry access and access to the Council approved machinery workshop [Industry – Limited Impact]).

Most material will be extracted from the quarry on a demand basis, as is the case with many quarries of this size. Therefore, the number and frequency of trucks to the quarry tends to occur in short periods where a particular job is being carried out. Regular small gravel loads will be extracted from the quarry to cater for small operations such as minor road maintenance (eg. pothole filling). Most truck movements are projected to occur between 0700 and 1500 hrs on Monday to Friday with low volume movements after that time and on Saturday.

D.9.3 Assessment of adjoining property -1220 Tea Tree Road

The residence at 1220 Tea Tree Road is approximately 95 m from the nearest point of the Access Road and 125m from the traffic travelling at up to 100km/hr on Tea Tree Road. The Access Road from Tea Tree Road also serves to provide access to the approved Level 1 activity, residential premises on the same land and the approved (Council issued Planning Permit) machinery workshop on the same land.

The Access Road has been used for a number of years (13) and no complaints have been received by the quarry proponent in relation to its current and approved level of use (ie. maximum of 40 vehicle movements per day), nor any use of the access road for residential, farming or workshop related use.

The surface of the Access Road at 1356 Tea Tree Road is gravel, with grassed verges and a slight drainage depression along the eastern side to facilitate water accumulation and drainage during periods of high or sustained rainfall. There is the potential for dust to be generated by trucks using the quarry Access Road, especially in dry periods. When winds are easterly or south-easterly the dust may become a nuisance to the

residence at 1220 Tea Tree Road. As Tea Tree Road is a Regional Freight Route, and with the nearby TasRail line now fully operational, there are already well established road noise nuisances that would affect the residence on 1220 Tea Tree Road.

The following measures will be applied to mitigate potential impacts of unreasonable levels of dust and noise caused to the residence at 1220 Tea Tree Road[12] –

- Ensure compliance with the operating hours and days for the quarry;
- Maintain the existing Complaints Register to record and address any complaints received in relation to Access Road usage by quarry related vehicles;
- Provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and
- Ensure trucks carrying gravel limit their speed to 20km/hr when using the Access Road.

D.10 DANGEROUS SUBSTANCES AND CHEMICALS

Fuel and oil are used in the quarry to operate and maintain functional machinery. There is no permanent storage of fuels, oils, lubricants or any other dangerous good in the quarry[13]. Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling[14].

When in the quarry, fuel and oil containers are stored at least 10 m from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container[15]. One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage[16].

The only chemicals used in the quarry are those for weed spraying. Weed spraying chemicals will be handled, used and disposed of in accordance with the manufacturer's directions and relevant regulations. Weed spraying will comply with the requirements of the Weed Management Plan for the quarry (Appendix 4).

D.11 SUSTAINABILITY AND CLIMATE CHANGE

Any use of machinery and vehicles will cause greenhouse gas emissions. Machinery owned and operated by the quarry proponent is well maintained which ensures maximum fuel/oil efficiency.

Water use will be negligible and will be provided through the use of the farm dam (water used for road and load dampening) or supplementary water cart truck. Mains water is available at the property in times of very low or no water availability from the sediment ponds or dam.

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[12] Commitment 12: The following measures will be applied to mitigate potential impacts of unreasonable levels of dust and noise caused to the residence at 1220 Tea Tree Road –

- Ensure compliance with the operating hours and days for the quarry;
- Maintain the existing Complaints Register to record and address any complaints received in relation to Access Road usage by quarry related vehicles;
- Provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and
- Ensure trucks carrying gravel limit their speed to 20km/hr when using the Access Road.

[13] Commitment 13: There is no permanent storage of fuels, oils, lubricants or any other dangerous good in the quarry.

[14] Commitment 14: Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling.

[15] Commitment 15: When in the quarry, fuel and oil containers are stored at least 10 m from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container.

[16] Commitment 16: One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage.

D.12 CULTURAL HERITAGE

The quarry and Mining Lease is not on listed on the Tasmanian Heritage Register or Tasmanian Historic Places Inventory (maintained by Heritage Tasmania).

D.13 ABORIGINAL HERITAGE

Aboriginal Heritage Tasmania has previously advised that '…the area around the Coal River Valley is considered a rich area for Aboriginal heritage. However, given the highly disturbed nature of the property there is no requirement for an Aboriginal heritage investigation in this case. Aboriginal heritage sites, regardless of site type, condition, size, or land tenure are protected in Tasmania under the *Aboriginal Relics Act 1975….*'.

An *Unanticipated Discovery Plan* (Appendix 9) will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered[17].

D.14 SITES OF HIGH PUBLIC INTEREST

The quarry is not located adjacent to or near any sites of high public interest such as reserves, protected sites, tourist walks or heritage buildings. There is no impact to sites of high public interest from the quarry.

D.15 SITE CONTAMINATION

The quarry has not been used for the storage or disposal of contaminated wastes including rock and soil. No soil/contaminant surveys or investigations are required.

D.16 SIGNIFICANT AREAS

The quarry is not located adjacent to or near any significant areas such as reserves, protected sites or heritage buildings. There will be no impact to significant areas from the quarry expansion.

D.17 COASTAL ZONE

No part of the quarry or area affected by the activity lies within 300 metres of the coast. There will be no impact to the coastal zone from the quarry expansion.

D.18 MARINE AREAS

The project is not likely to impact on the marine environment because water management measures will be established at the quarry to prevent sediment entering the waterway.

[17] Commitment 17: An *Unanticipated Discovery Plan* (Attachment 2 to these Guidelines) will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered.

PART E - REHABILITATION OF WORKINGS

It will always be the aim of the quarry operator to minimise the area of land 'open' at the quarry to minimise the overall impact the activity has on the local environment.

'Progressive rehabilitation' will apply at the quarrying operation for those areas that have been quarried and are no longer needed or used for the operation of the quarry[18]. Progressive rehabilitation refers to the rehabilitation of worked out, or surplus areas, while extractive operations are ongoing. It is an important component of quarry management, particularly where the pit is large or expanding. Progressive rehabilitation includes the stabilisation of the landform prior to revegetation and serves to ensure landform stability and revegetation on an ongoing basis.

The rehabilitation of quarry areas that are no longer being quarried or used for another purpose (such as a stockpile holding area, truck turning bay etc.) will be based on the following principles to re-establish agricultural pasture:

1. Benches ripped or cracked prior to substrate addition.
2. Stockpiled weathered gravel, topsoil (from quarry site) and sediment from sediment interceptors applied to prepared benches.
3. Application of pasture grasses and fertiliser.
4. Monitoring of the following factors:
    a. weed infestation;
    b. pasture establishment and growth success; and
    c. landform stability.

[18] Commitment 18: 'Progressive rehabilitation' will occur in those areas that have been quarried and are no longer needed or used for the operation of the quarry.

PART F – MANAGEMENT COMMITMENTS

Best practice quarry management is important to the quarry operator to minimise the risk of environmental nuisance/harm to the local community whilst providing a reliable source of high quality gravel/rock product to clients.

F.1 COMPLAINTS REGISTER

To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be maintained for the activity[19]. All complaints of relevance to the management of the quarry operation (eg. crushing, truck movements, stockpiling) will be recorded in the Complaints Register. Details of the ensuing investigation and management actions undertaken in relation to each complaint will also be recorded in the register.

F.2 COMMITMENTS SUMMARY

The proponent makes a series of commitments outlined in Table 2 to achieve sound environmental and socially responsible management of the quarry.

Table 2. Summary of management commitments

Number	Commitment
1	Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.
2	Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.
3	A Weed Management Plan is implemented at the quarry operation.
4	One sediment pond (0.95ML) will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events.
5	Sediment trapped by the pond will be removed annually. The collected sediment will be mixed with stockpiled top soil for progressive rehabilitation of disused quarry areas.
6	As a dust suppression measure, during periods of dry weather the Access Road surface, areas near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the nearby sediment pond or on-site water cart truck.
7	Waste generated by the servicing of machinery is disposed of in accordance with best practice principles.
8	Waste generated by workers from general refuse (eg lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling.

[19] Commitment 19: To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be prepared and maintained for the activity.

9	The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum).
10	A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.
11	Trucks will avoid entering and leaving the quarry in the period 20 minutes either side of the school bus collection and drop-off time, as advised by the school bus operator.
12	The following measures will be applied to mitigate potential impacts of unreasonable levels of dust and noise caused to the residence at 1220 Tea Tree Road – • Ensure compliance with the operating hours and days for the quarry; • Maintain the existing Complaints Register to record and address any complaints received in relation to Access Road usage by quarry related vehicles; • Provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and • Ensure trucks carrying gravel limit their speed to 20km/hr when using the Access Road.
13	There is no permanent storage of fuels, oils, lubricants or any other dangerous good in the quarry.
14	Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling.
15	When in the quarry, fuel and oil containers are stored at least 10 m from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container.
16	One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage.
17	An *Unanticipated Discovery Plan* (Attachment 2 to these Guidelines) will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered.
18	'Progressive rehabilitation' will occur in those areas that have been quarried and are no longer needed or used for the operation of the quarry.
19	To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be prepared and maintained for the activity.

Appendix 1 Planning Permit (4,999 cubic metres of extraction – Level 1 activity)

SOUTHERN
MIDLANDS
COUNCIL

Our Ref: T2941285

PLANNING PERMIT N° DA 2014/64
'Level 1 Gravel Quarry' defined as an Industry (Extractive)
1356 Tea Tree Road Rekuna

Council has issued this Permit, subject to the conditions set out below, for the development and use of a 'Level 1 Gravel Quarry' defined as an Industry (Extractive) at the land situated at 1356 Tea Tree Road and described on Certificate of Title 155147/1 and submitted by C A & S M Williams.

This Permit will lapse after a period of two (2) years from the date on which it was granted if the use or development in respect of which it was granted has not substantially commenced within that period.

CONDITIONS

1. The use or development must be carried out substantially in accordance with the application for planning approval, the *Quarry Code of Practice (1999),* the endorsed drawings and reports and with the conditions of this permit and must not be altered or extended without the further written approval of Council.
2. This permit shall not take effect and must not be acted on until 15 days after the date of receipt of this letter or the date of the last letter to any representor, whichever is later, in accordance with section 53 of the *Land Use Planning and Approvals Act 1993.*

Landscaping

3. The landscape planting across the eastern boundary of the site depicted in 'Figure 2: Quarry Layout' of the *Weed Management Plan* prepared by Van Diemen Consulting shall be completed within 6 months of the granting of a Mining Lease. Landscaping shall be to the satisfaction of the Manager of Development and Environmental Services.
4. The landscape planting, depicted in 'Figure 2: Quarry Layout' of the *Weed Management Plan,* shall be in accordance with a landscaping plan and species list submitted to Council prior to the plantings commencing. The plan shall be to the satisfaction of the Manager of Development and Environmental Services.

Address all correspondence to: The General Manager, PO Box 21, Oatlands, Tasmania 7120
Oatlands Office: 71 High Street, Oatlands Phone (03) 6254 5000 Fax (03) 6254 5014
Kempton Office: 85 Main Street, Kempton Phone (03) 6259 3011 Fax (03) 6259 1327
Email Address: mail@southernmidlands.tas.gov.au Web: www.southernmidlands.tas.gov.au
ABN 68 653 459 589

Access to State Roads

5. The existing access (1356 Tea Tree Road) and the roadway 10m each side of the centre of the existing access onto Tea Tree Road, must be upgraded to cater for the additional heavy vehicle turning movements. All works shall be in accordance with the conditions of a Permit provided by the Department of Stategrowth (see the 'Advice to accompany this permit' below the conditions).
6. No works in the State Road reserve shall commence until the Minister's consent has been obtained and a permit issued in accordance with the *Roads and Jetties Act 1935*. The developer can apply for the permit at permits@stategrowth.tas.gov.au
7. The access works and road works, required by a permit issued by the Department of Stategrowth, must be completed to the satisfaction of the Department prior to the cartage of any material from the quarry. It is the responsibility of the developer to notify the Council upon the satisfactory completion of the works.

Existing services

8. The developer must pay the cost of any alterations and/or reinstatement to existing services, Council infrastructure or private property incurred as a result of the proposed development works. Any work required is to be specified or undertaken by the authority concerned.

Advice to Accompany this Permit

General Advice

a) This permit does not imply that any other approval required under any other legislation has been granted.

b) If you notify Council that you intend to commence the use or development before the date specified above you forfeit your right of appeal in relation to this permit.

Blasting, crushing or screening

c) Blasting, Crushing or Screening of quarried material will require further approvals by Council.

Access Works and Road Works Advice

d) The Department of Stategrowth provided the following advice regarding the likely conditions and construction standards for road and access works that would likely be included in a Permit issued by the Department:

a. The strengthening of the pavement (20m – 10m each side of centre of access). The method of this strengthening is generally asphalt, but in this case it is possible that the fix would be a 7mm chip seal locking cover.

b. Upgrade the access to current construction standards and sealing of the access from the road edge to the property boundary, drainage, sight lines and environmental considerations.

300m Buffer – Standard Recommended Attenuation Distance (SRAD)

c. The '300m buffer' as depicted in Figure 10 and described in the *Environmental Effects Report* prepared by Van Diemen Consulting submitted with the Application is not endorsed or formalised by the issue of this permit.

d. The 300m attenuation distance described in the *Environmental Effects Report* is considered only for the purposes of assessing the Development Application to demonstrate existing land use/development within a 300m radius of the quarry operations area (quarry face and stockpile area).

Dated this Tuesday, 22 July 2014

David Cundall
Planning Officer
Obo Southern Midlands Council

Appendix 2 Williams Quarry Landscape Plan

WILLIAMS QUARRY, REKUNA

LANDSCAPE PLANTING PLAN

PLANNING PERMIT N° DA 2014/64

VERSION 3 22/4/15

Approved
Manager
Development & Environmental Services
Ref: DA 2014/64 Date: 23/4/15

Signature: .....

Van Diemen CONSULTING PO Box 1 NEW TOWN TAS 7008

CONTENTS

BACKGROUND

The Southern Midlands Council (SMC) approved a Level 1 Extractive Industry [quarry] development at 1356 Tea Tree Road Rekuna in 2014.

In the Environmental Effects Report submitted with the Development Application, the quarry operator committed to – Commitment 2 - A 10m setback on the side boundary will be established along the eastern side of the proposed Mining Lease within which no quarrying will occur.

The Permit granted by the SMC requires plantings based on the below conditions of the permit –

Landscaping

3. The landscape planting across the eastern boundary of the site depicted in 'Figure 2: Quarry Layout' of the *Weed Management Plan* prepared by Van Diemen Consulting shall be completed within 6 months of the granting of a Mining Lease. Landscaping shall be to the satisfaction of the Manager of Development and Environmental Services.
4. The landscape planting, depicted in 'Figure 2: Quarry Layout' of the *Weed Management Plan*, shall be in accordance with a landscaping plan and species list submitted to Council prior to the plantings commencing. The plan shall be to the satisfaction of the Manager of Development and Environmental Services.

LANDOWNER AND QUARRY MANAGER DETAILS

The quarry operator is a self-employed businessman who operates an agricultural services and machinery repair business from the property which supports the quarry.

LANDOWNER DETAILS

The business is based at Tea Tree and is located on the same property to which he and his family reside:

Mr Craig Williams
Trading as – CA and SM Williams
ABN: 33 389 865 480
1356 Tea Tree Road TEA TREE TAS 7107
Mobile: 0407 129 562
Email: casmwilliams@bigpond.com

QUARRY DETAILS

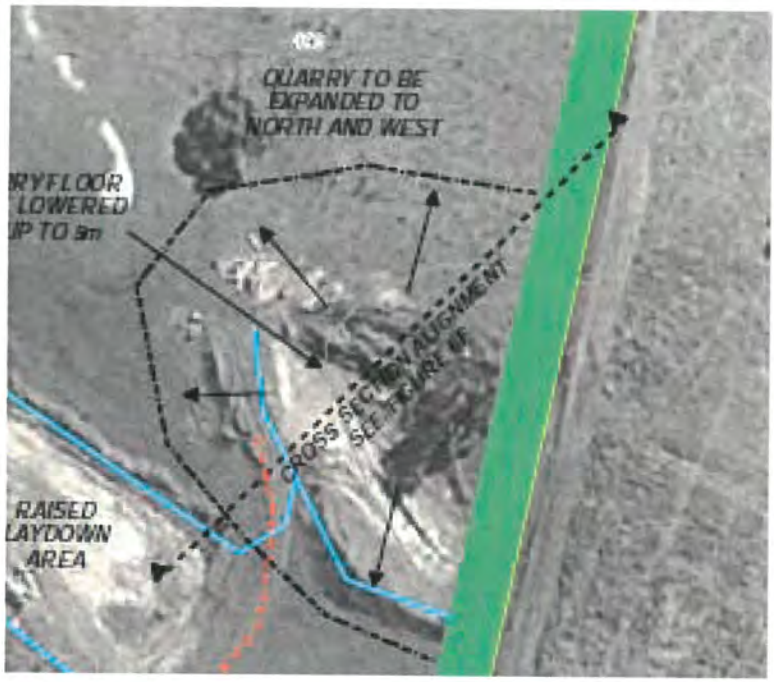
Physical address – 1356 Tea Tree Road Tea Tree TAS 7107
Land Title – 155147/1
PID – 2941285
Planning Zones (*Southern Midlands Planning Scheme 1998*) – Rural Agriculture

SITE PREPARATION

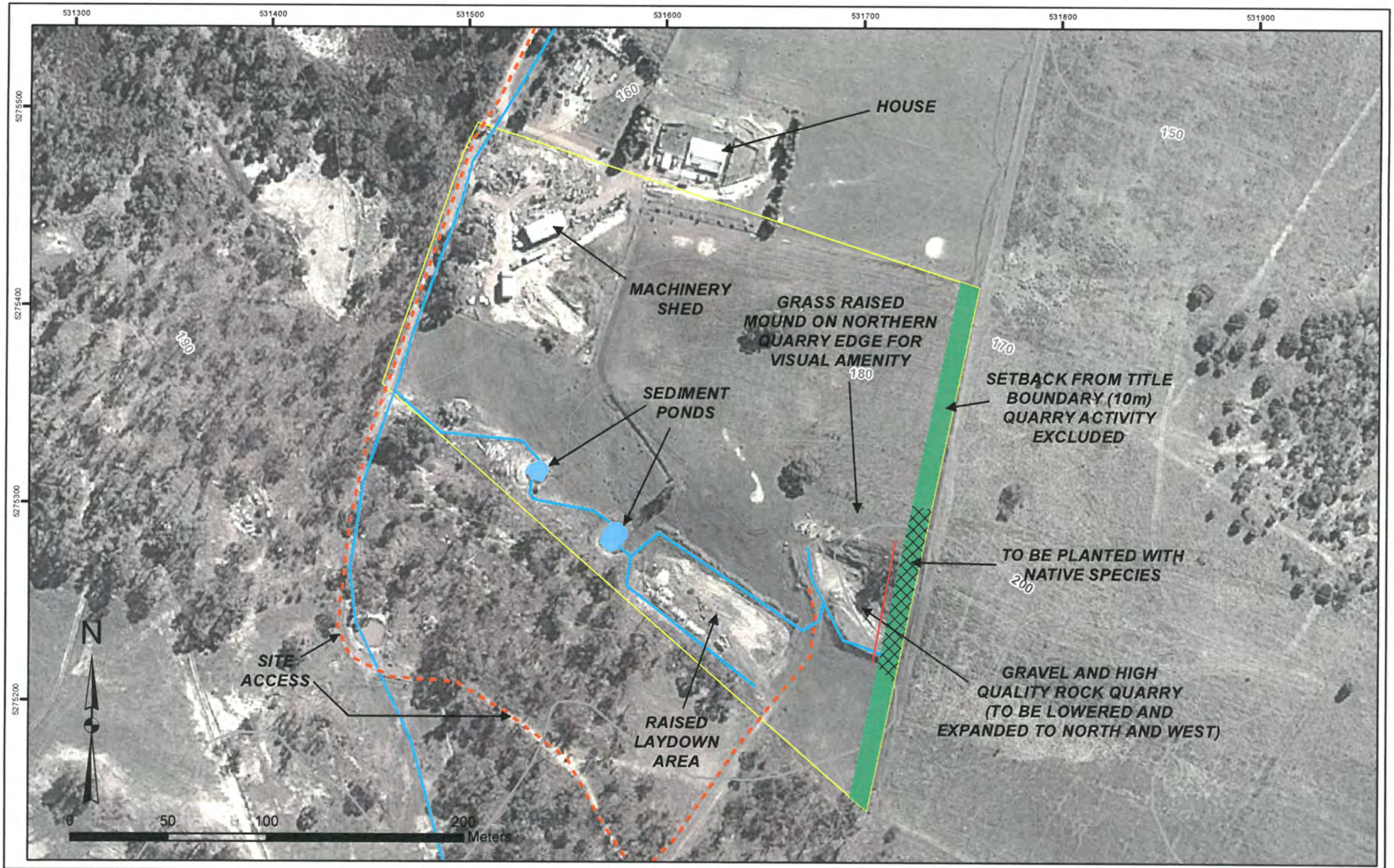
There are two components to this landscape plan – (i) the shelterbelt along the eastern boundary where it coincides with the quarry and (ii) the raised mound of stockpiled soil from the stripping of topsoil from the undisturbed areas to be quarried.

RAISED MOUND

A raised mound of stripped topsoil has been established along the northern boundary of the quarry to store and protect the topsoil for future rehabilitation works in the quarry. The image below shows the location of the cross-section presented in Figure 3 which specifically identifies the relationship of the raised mound to the quarry floor and benches to be established in the quarry as gravel extraction progresses.



Images of the soil stockpiled along the northern extent of the quarry ready for sowing with pasture grass when weather and soil conditions are suitable



Williams Quarry

Figure 2: Quarry Layout

Tree Planting Area
Quarry Setback
Mining Lease

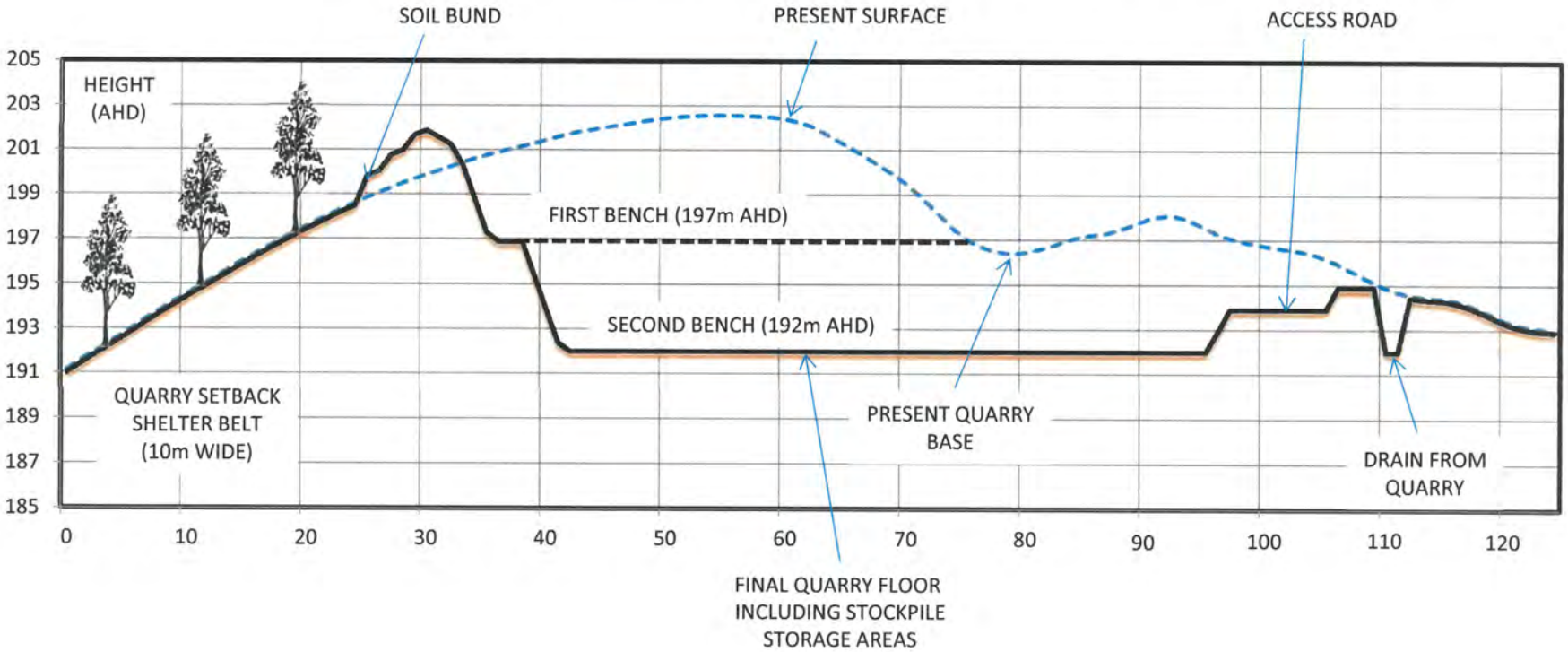
an Diemen Consulting

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

FIGURE 3 CROSS SECTION OF QUARRY EXTRACTION PLAN



SHELTERBELT

Soil to a minimum depth of 300mm has been placed onto the cracked/shattered rock that was exposed by the previous quarry workings. This is shown in the images below. The topsoil will be well watered (either by natural rainfall or through the use of a water cart and pump) prior to the trees being planted such that the soil moisture levels are high at the time of planting.

Images of the soil covered old quarry workings

GRASS ESTABLISHMENT

The raised mound of topsoil along the northern edge of the quarry will be sown with a pasture grass mix, standard for pasture development for adjoining pastures, when weather conditions are suitable for its application and seed germination.

TREE PLANTING

The 10m wide strip along an area at the eastern edge of the Mining Lease is to be planted as per Condition 4 of the Planning Permit – shown in Figure 2 attached. The north-south extent of the pit along the eastern edge of the setback is marked as a red line in Figure 2, which means that the planting area is longer than the extent of the pit.

A selection of species will be planted based on advice from a suitably qualified and experienced person/supplier. Soil will be used to cover the exposed rock, if any, in the setback area prior to tree planting as would be normally be required by MRT to stabilize the soil surface as part of rehabilitation works.

TREE SOURCES

Trees used in the planting will be grown by the proponent, or purchased from a reputable native plant nursery/supplier. At the time of planting each tree will be planted with a fertilizer tablet to aid growth in the early stage of establishment.

TREE SPECIES SELECTION

Trees species (which will all attain a mature height of at least 8m) used in the planting will include a single species planting or some combination of the following, subject to the availability of stock, plant survivorship and the landowner –

- *Eucalyptus globulus*, Tasmanian blue gum;
- *Eucalyptus viminalis*, white gum;
- *Eucalyptus rubida*, candlebark;
- *Eucalyptus perriniana*, spinning gum; and/or
- *Eucalyptus tenuiramis*, silver peppermint.

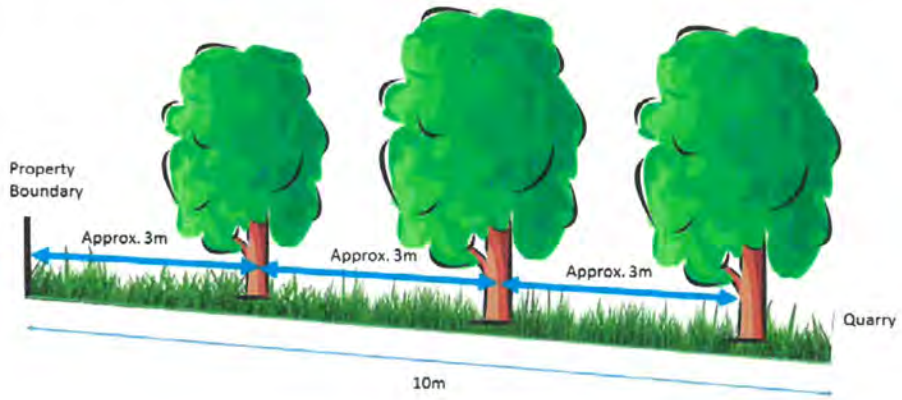
SPACING AND ROW WIDTH

Tree planting densities and the number of rows belt are listed in Table 1.

Table 1. Row number and density of plantings

Rows of trees	Space between rows	Tree Spacing (planting densities)
3	3 m from property boundary, then approx. 3m apart	I tree every 5 m

Diagrammatic representation of the tree plantings -



Van Diemen Consulting Pty Ltd

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This document has been prepared in accordance with the scope of services agreed upon between Van Diemen Consulting (VDC) and the Client.

To the best of VDC's knowledge, the report presented herein represents the Client's intentions at the time of completing the document. However, the passage of time, manifestation of latent conditions or impacts of future events may result in changes to matters that are otherwise described in this document. In preparing this document VDC has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this document, VDC has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

No responsibility is accepted for use of any part of this document in any other context or for any other purpose by third parties.

This document does not purport to provide legal advice. Readers should engage professional legal advisers for this purpose.

Document Status

Revision	Author	Reviewer and Organisation	Date
1	R Barnes	R Barnes, VDC	23-1-2015
1	R Barnes	C Williams, Quarry Manager	25-1-2015
1	R Barnes	Southern Midlands Council	19-2-2015
2	R Barnes	C Williams, Quarry Manager	15-3-2015
2	R Barnes	Southern Midlands Council	15-3-2015
3	R Barnes	C Williams, Quarry Manager	19-4-2015
3	R Barnes	Southern Midlands Council	22-4-2015

Appendix 3 Land Title Information

PROPERTY INFORMATION REPORT

VALUER GENERAL, TASMANIA

Issued pursuant to the Valuation of Land Act 2001

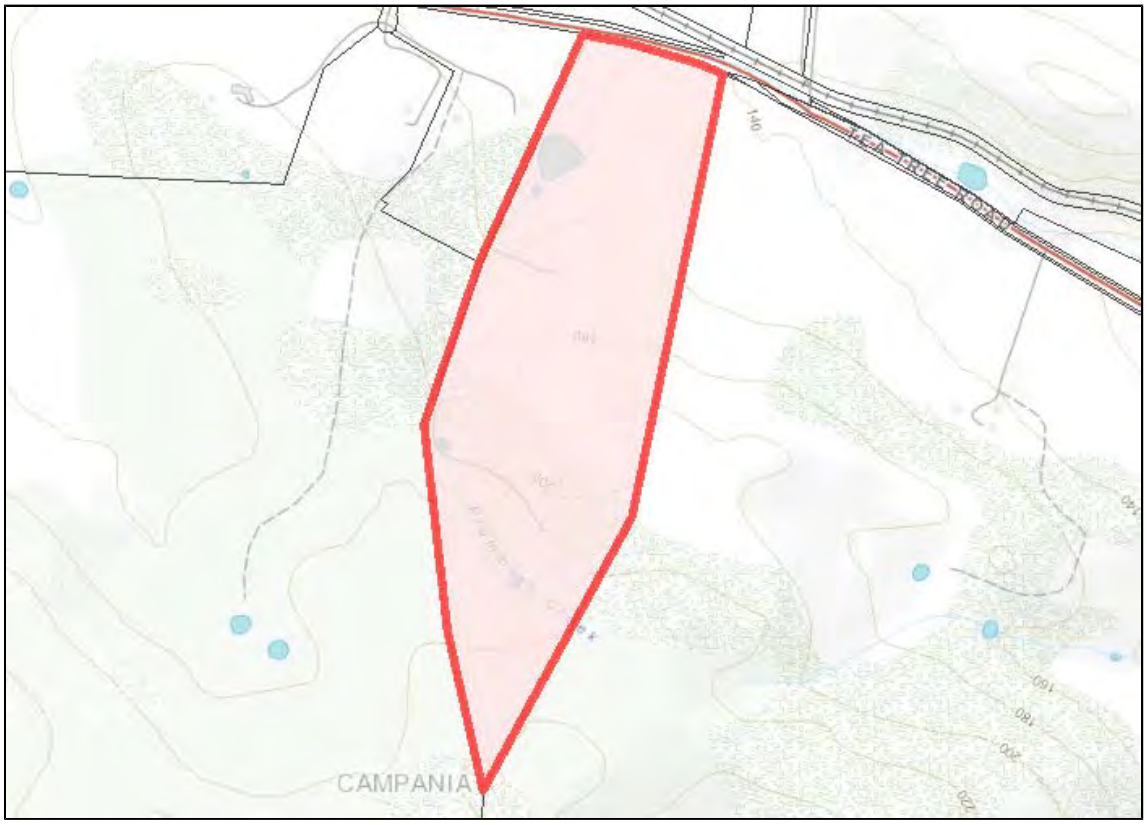
PROPERTY ID:	2941285
MUNICIPALITY:	SOUTHERN MIDLANDS
PROPERTY ADDRESS:	1356 TEA TREE RD CAMPANIA TAS 7026
TITLE OWNER:	155147/1 : CRAIG ANTHONY WILLIAMS, SALLY MAREE WILLIAMS
RATE PAYERS:	WILLIAMS, CRAIG ANTHONY WILLIAMS, SALLY MAREE
POSTAL ADDRESS:	TEA TREE RD CAMPANIA TAS 7026

MAIN IMPROVEMENTS SUMMARY

Improvements:	House,farm impts	
Improvement Sizes (Top 3 by Size):	**Area:** 138.0 square metres	**Improvement:** HOUSE
Number of Bedrooms:	3	
Construction Year of Main Building:	1965	
Roof Material:	Galvanised Iron	
Wall Material:	Weatherboard	
Land Area:	21.63 hectares	

LAST VALUATIONS

Date Inspected	Levels At	Land	Capital	A.A.V.	Reason
01/08/2009	01/10/2008	$200,000	$280,000	$11,200	Part from 1952214



Explanation of Terms

Property ID - A unique number used for Valuation purposes.

Date Inspected - The date the property was inspected for the valuation.

Levels At - The date at which values of properties are set to determine revaluations and any supplementary valuations in the revaluation cycle.

Land Value - The value of the property excluding all visible improvements such as buildings, structures, fixtures, roads, standings, dams, channels, artificially established trees, artificially established pastures and other like improvements but does include draining, excavation, filling, reclamation, clearing and any other such like invisible improvements make to the land.

Capital Value - The total value of the property, excluding plant and machinery, and includes the land value.

A.A.V. - The gross annual rental value of the property, excluding GST, municipal rates and land tax, but is not to be less than 4% (percent) of the capital value.

Multiple Tenancies - Properties that have multiple tenants are assessed for separate A.A.V's. e.g. a house and flat.

OWNER C.A. & S.M. WILLIAMS

FOLIO REFERENCE C.T. 132606/2

GRANTEE PART OF 870AC GRANTED TO JOHN TILL

PLAN OF TITLE

LOCATION
LAND DISTRICT OF MONMOUTH
PARISH OF DRUMMOND

FIRST SURVEY PLAN No. SP121755

COMPILED BY LESTER FRANKS SURVEY & GEOGRAPHIC PTY LTD

SCALE 1: 4000 LENGTHS IN METRES

REGISTERED NUMBER

P155147

APPROVED 25 FEB 2009

Alice Kawa
Recorder of Titles

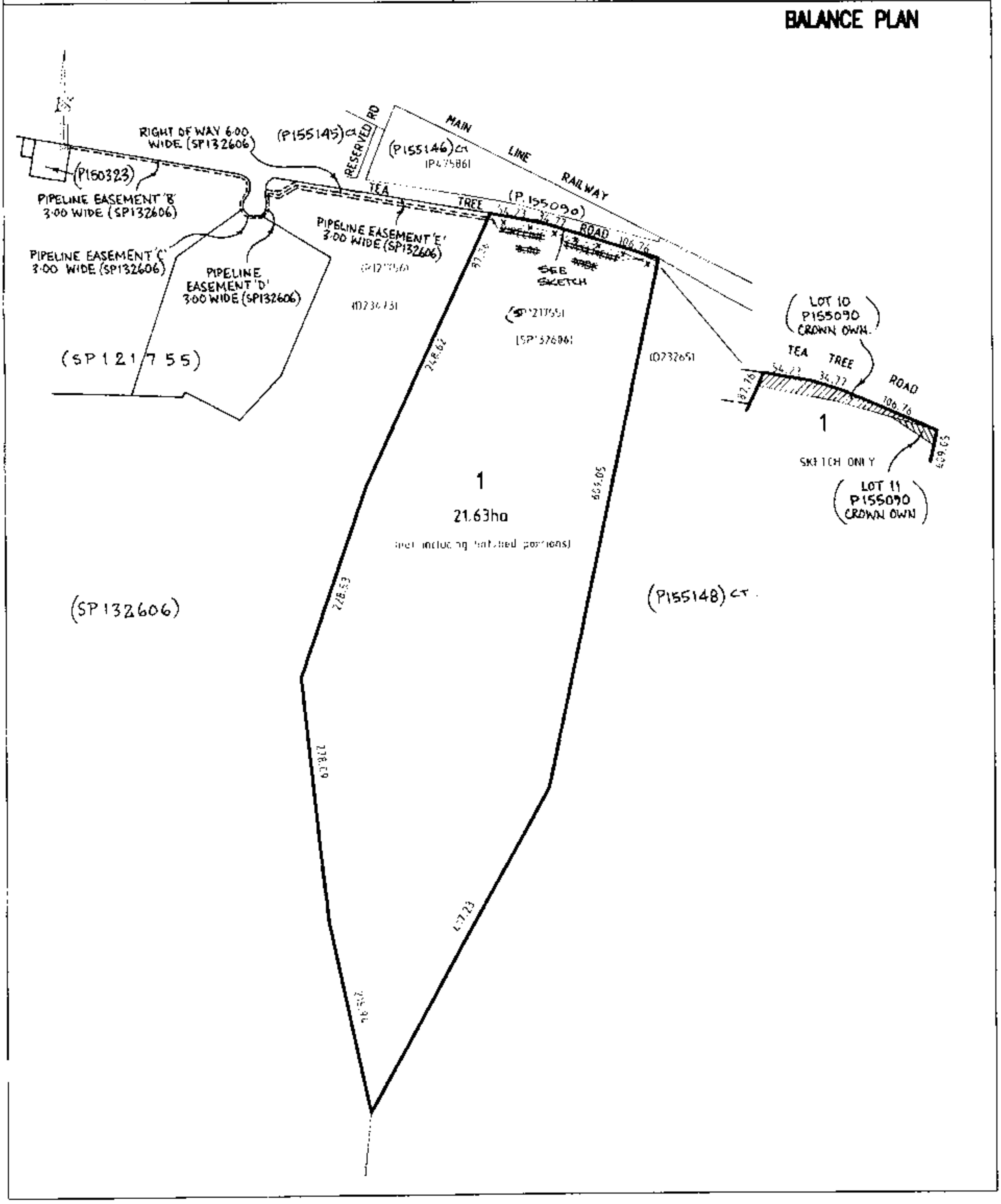
MAPSHEET MUNICIPAL CODE No. 125 (5227)

LAST UPI No. GGJ10

LAST PLAN No. SP132606

ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN

BALANCE PLAN



RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
155147	1
EDITION	DATE OF ISSUE
2	21-Dec-2010

SEARCH DATE : 07-Jun-2014
SEARCH TIME : 08.53 AM

DESCRIPTION OF LAND

Parish of DRUMMOND Land District of MONMOUTH
Lot 1 on Plan 155147
Derivation : Part of 870 Acres Gtd. to J. Till
Prior CT 132606/2

SCHEDULE 1

C253279 TRANSFER to CRAIG ANTHONY WILLIAMS and SALLY MAREE WILLIAMS Registered 30-Mar-2001 at noon (MF:2616/994)

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
SP 121755 & SP 132606 FENCING PROVISION in Schedule of Easements
SP 121755 COUNCIL NOTIFICATION under Section 83(5) of the Local Government (Building and Miscellaneous Provisions) Act 1993.
SP132606 BENEFITING EASEMENT: a pipeline easement over the Pipeline Easements 'B''C''D' & 'E' 3.00 wide on P. 155147
SP132606 BENEFITING EASEMENT: a right of carriageway over the Right of Way 6.00 wide on P.155147
C995562 MORTGAGE to Australia and New Zealand Banking Group Limited Registered 21-Dec-2010 at 12.01 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

Appendix 4 Weed Management Plan

WILLIAMS' QUARRY, TEA TREE

WEED MANAGEMENT PLAN

JUNE 2014

Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

CONTENTS

OBJECTIVES OF PLAN

The meaning of weed(s) in this Plan has the same meaning as a *declared weed* in the *Weed Management Act 1999*.

The objectives of this Weed Management Plan (the Plan) are to:

- record and map the occurrence of weeds and within the Mining Lease;
- identify and implement management measures within the Mining Lease to -
    - minimise the risk of spreading propagules of weeds within the Mining Lease and to locations outside the Mining Lease;
    - control and/or eradicate weeds where practicable;
    - ensure that rehabilitation works are not compromised by the occurrence or growth of weeds; and to
    - minimise the risk of introducing soil-borne pathogens into the Mining Lease where they may be on-carried to another site.
- monitor and review the results of on-ground actions as required; and
- establish a mechanism to review the Plan, including its objectives and implementation.

QUARRY OPERATOR

The Quarry owner and Operator is:

Mr Craig Williams
Trading as – CA and SM Williams
ABN: 33 389 865 480
1356 Tea Tree Road TEA TREE TAS 7107
Mobile: 0407 129 562
Email: casmwilliams@bigpond.com

WEED PLANNING AND MANAGEMENT FRAMEWORK

The Plan operates within an existing framework of legislative and planning requirements for the management and control of weeds.

Weed Management Act 1999

The objectives of the Act further the objectives of the Resource Management and Planning System (RMPS) of Tasmania. In particular the Act provides for the control and eradication of weeds having regard to the need to -

a) minimise negative effects of weeds on the sustainability of Tasmania's productive capacity and natural ecosystems; and

b) promote a strategic and sustainable approach to weed management; and

c) encourage community involvement in weed management; and

d) promote the sharing of responsibility for weed management between government, natural resource managers, the community and industry in Tasmania.

Weed Management Regulations 2000

The Regulations are the statutory rules that underpin the Act itself. They detail the requirements and measures referred to in the Act, including:

a) Tolerance Level Requirements (in relation to seed contamination levels within grain imported into the State);

b) Livestock Importation Prescribed Measures; and

c) Infringement Notices and Penalties.

Weed Management Plans

Once a species has been listed as a Declared Weed a Weed Management Plan (WMP) is developed for it.

A WMP should include the:

- name of the target weed (including details of how to identify the species and how it is spread through the environment);
- objectives and methods of the Plan;
- comments on the effect on the environment if strategy is implemented;
- cost of strategy and proposed funding method to implement;
- monitoring /Evaluation methods;
- time period within which the Plan operates and milestones for review; and the
- region or area of operation for the Plan.

Quarry Code of Practice 1999

The Code of Practice provides guidance and advice in Section 6.8 on the prevention of weed spread within and from quarry/mine sites.

MINING LEASE

LOCATION

The Williams Quarry is located on private freehold land at 1356 Tea Tree Road Tea Tree (Figure 1). It is a small quarry with up to 4,999 cubic metres of rock-gravel extracted per annum.

- Physical address – 1356 Tea Tree Road TEA TREE TAS 7017
- Mining Lease Number – TBA
- Mining Lease Size – TBA

VEGETATION

The quarry itself has been cleared of all native vegetation, with the surrounding landscape being comprised of pasture, and heavily burnt (2013 bushfire) eucalypt dry grassy forest and woodland.

DRAINAGE

The well drained nature of the dolerite itself enables water (rainfall) to quickly drain through the quarry floor. Only during periods of heavy or sustained rainfall does ponding occur in the quarry with very infrequent periods of runoff from the quarry floor. A series of sediment ponds exist to the west of the quarry (Figure 2) which capture runoff to enable sediment to be captured – sediment removed from the ponds when they are cleaned is re-used at the quarry for rehabilitation pruposes.

GEOLOGY

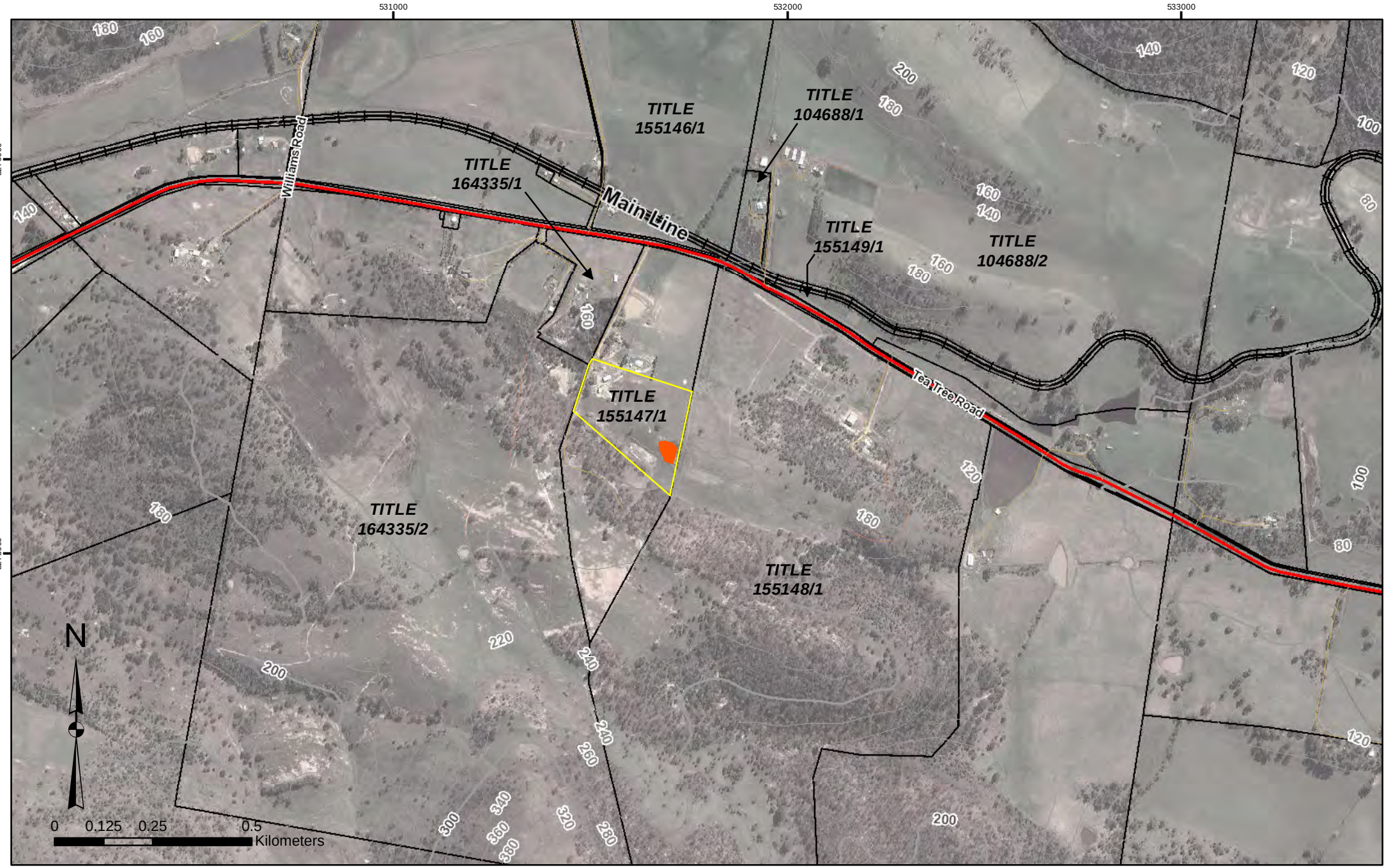
The geology of the quarry is Jurassic dolerite with a thin clay-loam soil derived from in situ weathering of the bedrock. Rock to the south of the quarry is Triassic sandstone.

WEEDS IN THE MINING LEASE

Two weeds were identified within the proposed Mining Lease (Figure 3). Descriptions of each weed are provided below. Details on the management of the weeds listed below are provided in 'Plan Implementation'.

CALIFORNIAN THISTLE

Californian thistle is a perennial (long-lived) plant. Over winter the top growth dies off leaving only the root system. The roots remain alive from year to year and actively spread through the soil. In spring the roots produce rosettes (whorls of leaves close to the ground), which send up a branched stem to about 1 metre in height. Each flower head contains a large number of rose-purple to lavender florets smelling strongly of honey. Male and female flowers are borne on separate plants. Infestations that have either all male or all female plants spread by vegetative growth only. If male and female plants are found within the same infestation, viable seed is produced and the infestation spreads both vegetatively and by seed. Californian thistle spreads vegetatively by budding from the extensive rootstock and from seed.



Williams Quarry

Figure 1: Land Titles and proposed Mining Lease

Quarry

Proposed Mining Lease

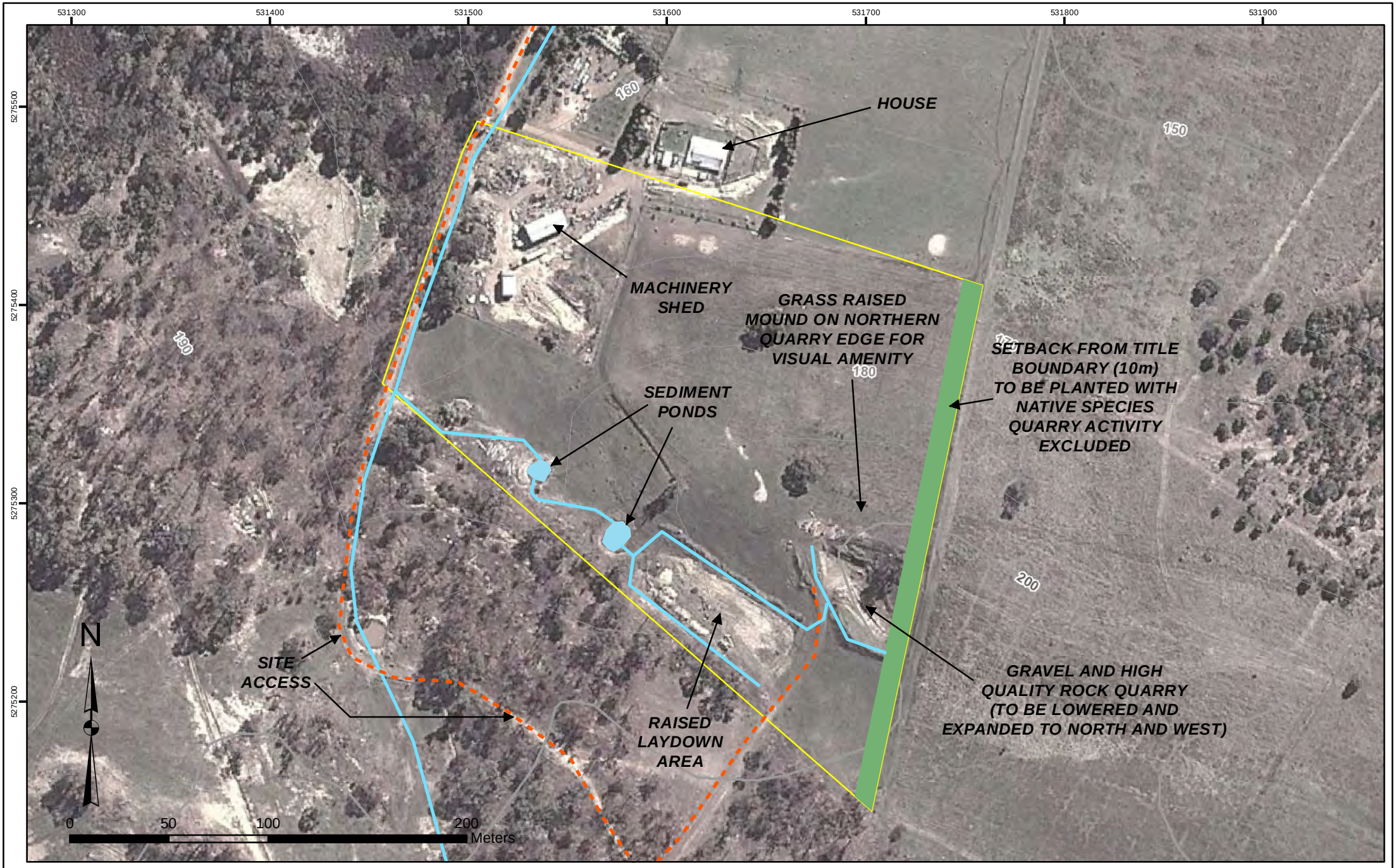
Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014



Williams Quarry

Figure 2: Quarry Layout

Quarry Setback

Proposed Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

HOREHOUND

Horehound is a branching, perennial (long-lived) plant growing to a height of about 80 cm. The stems and lower surface of the leaves are covered with white woolly hairs, giving the plant a silvery appearance. The leaves have a "crinkly" appearance and the leaf margins have rounded teeth. The white flower clusters are densely packed, forming balls of flowers that surround the upper stems at each leaf node. Most seed germinates after autumn rains but some germination also occurs through winter into spring. Established plants flower over several months during summer and autumn and new growth is produced each year in autumn and spring. Horehound is spread by seed carried by stock as the fruit or burr readily attaches to wool and fur.

Williams Quarry

Figure 3: Weeds in proposed Mining Lease

Proposed Mining Lease

Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 6th JUNE 2014

ROOT-ROT FUNGUS (*PHYTOPHTHORA CINNAMOMI*)

Root-rot fungus (*Phytophthora cinnamomi, PC*) is a soil borne pathogen that causes death in a wide range of native plant species often leading to floristic and structural changes in susceptible plant communities.

PC evolved in tropical areas and requires warm, as well as moist, soils for at least some time of the year to produce sporangia and release zoospores (Rudman 2005). Only those areas of the State that are below an altitude of about 700m above sea level have soils sufficiently warm for this to occur (Podger *et al* 1990). Vegetation types below 700m elevation may not be wholly or partly susceptible if closed canopies keep soil temperatures cool during the summer months, such as tall wet eucalypt forests over rainforest species, or rainforest communities.

PC can be spread through the movement of infected soil or plant material by people or animals, and can even be transported by water percolating through soil or via surface water, such as in creeks and other drainage lines. Transport of PC to new areas is usually through soil/dirt adhering to vehicles and machinery. Transport into non-roaded areas of high human usage is mainly via bushwalking items such as tents or footwear, but can also occur by bird activity.

The fungus is not always evident in the landscape as it attacks root systems of susceptible species, usually causing death in new growth or the yellowing of leaves followed by loss of vigour and, in most cases, death. The fungus can inhabit the root systems of resistant species without any visible signs of infection within the host plant.

It is highly unlikely that PC is active and/or can persist in the Quarry or surrounds, even if it has been transported there, because the local climatic conditions (very dry summer – atumn periods with low annual rainfall – about 550 mm per annum) are not conducive to the germination, growth and reproduction of the species in the area. On this basis, no special management requirements at the Quarry are needed to address this pathogen.

KEY MANAGEMENT OBJECTIVES FOR AREAS IN THE QUARRY

For management purposes it is prudent to identify areas of activity in the proposed Mining Lease which can be the focus of specific weed control and monitoring activities. These areas have not been spatially defined as the active face and quarry floor as well as the soil stockpiles will change over time.

QUARRY OPERATIONAL AREA

The Operational Area incudes the active face, quarry floor, gravel-rock stockpiles, sediment pond and vehicle parkng area. The operational area is where the gravel/rock material is extracted, cruched and stored prior to collection by trucks for delivery so it should be kept weed-free to –

- minimise the risk of contaminating the gravel product with weed propagules; and to
- minimise the risk of vehicles leaving the quarry with weed propagules.

Weeds not already in the quarry that may be introduced to the quarry by trucks and vehicles are most likely to be first seen in the quarry or immediate surrounds. The Quarry Operator will be vigilant in observing any new plants that appear in the quarry and seek advice from a suitably qualified person as to their identification. This approach should ensure that any new weeds that enter the quarry are detected and eradicated before they become established in the quarry.

TOPSOIL STOCKPILES

The topsoil that is stockpiled around the quarry should be assessed regulary by the qarry operator for horehound, Californian thistle and other weeds. Weed outbreaks should be sprayed as soon as possible (noting the appropriate time of the year for the spraying to occur which can vary for each species) as part of the Weed Spraying Program. There are already existing outbreaks on some stockpiles.

ACCESS ROAD

The section of Access Road that occurs within the Mining Lease should be regularly assessed (at least once every month during spring and summer and three monthly in autumn and winter) for weed occurrence and growth. Weed outbreaks should be sprayed as soon as possible (noting the appropriate time of the year for the spraying to occur which can vary for each species) as part of the Weed Spraying Program.

PLAN IMPLEMENTATION

ROLES AND RESPONSIBILITIES

Quarry Owner and Operator

Responsible for ensuring that:

- all staff and contractors are briefed on the requirements of the Plan and its importance to the overall success of quarry operation;
- this Plan is applied and implementation monitored through regular assessments of the proposed Mining Lease;
- variations to this Plan are developed and approved prior to their implementation.
- this Plan is appropriately implemented and reviewed from time to time; and
- staff and contractors are trained in weed hygiene measures, with emphasis on those relevant to their appointed tasks.

Staff and Contractors

All staff and contractors that work within the proposed Mining Lease are responsible for:

- applying weed hygiene measures for which they have received training;
- reporting any breaches of this Plan to the Quarry Operator as soon as practical, providing written details of the breach, and any measures that were immediately taken to reduce the likelihood of any environmental harm; and
- reporting new occurrences of weeds to the Quarry Operator within a reasonable timeframe of detection.

SPRAYING PROGRAM

The Quarry Operator will implement a targeted Weed Spraying Program on-site as they have the expertise and equipment to cnduct their own weed spraying rather than out-source it to a contractor. The program will be reviewed each year and updated as new information about the occurrence of weeds within the proposed Mining Lease become available. The Weed Spraying Program will form part of this Plan and carry with it the same responsibilities of implementation outlined in 'Role and responsibilities'.

The Plan each year will take the form of a Works Plan which will comprise the following –

1. A **map** showing the areas where weeds occur, what species they are and a works area number (to reference to the associated spreadsheet); and
2. A **spreadsheet** similar to that contained in Appendic B which will identify the works area, weed of concern and the management of that weed or roup of weeds.

The spreadsheet will be updated electronically with a new worksheet for each Work Plan, thus maintaining a record of the works recorded and completed. The printed version of the Works Plan once implemented will be signed by the officer responsible for the works and filed at the office of the Quarry Operator for future reference.

For all weed spraying at the Quarry, the Rivercare 'Guideline for Safe and Effective Herbicide Use near Water' (Appendix A) will be applied.

HEAVY MACHINERY WASHDOWN

The highest risk of transporting propagules is from heavy machinery, such as excavators, as these have the ability to carry large clods of dirt and mud in which seed propagules can be lodged. Transport trucks pose

little risk to the transportation of weed propagules if they remain on the hard surface of the roads and the gravel loading areaand that these areas are well managed to exclude weeds.

Wherever possible machinery will be brought into the quarry and surrounds in a clean condition; free of weed propagules, clods of dirt and vegetative matter. This approach will also assist to minimise the risk of introducing root-rot fungus to the quarry.

Site Selection

The exact location of any required washdown site in the quarry should be decided on the following criteria:

- Stormwater settlement ponds or areas designed for the capture of runoff from roads should be preferentially used for washdown **if** they are practical to access;
- If stormwater settlement ponds are not readily accessed, ensure washdown is conducted as close as possible to the source of the material being removed;
- Ensure run-off does not directly enter a watercourse or waterbody, a 30m buffer from any waterway or waterbody is desirable;
- Select a mud-free location (e.g. well grassed, gravel) which is gently sloped to drain effluent away from the washdown area;
- Allow adequate space to safely move tracked vehicles and allow safe vehicle access around the heavy machinery; and
- Pay particular attention to potential hazards near or at the washdown site (e.g. overhead powerlines, powerpoles and fences).

If there will be large quantities of effluent or there is a risk of extensive run-off, the washdown area should be bunded and a sump constructed to safely dispose of the effluent. Take particular care where the effluent is likely to be contaminated with oil or fuel.

Washdown prescriptions

For each of the washdown sites the following prescriptions will be applied: Note: Do NOT apply water to equipment that may be damaged by water.

1. Locate washdown site as close as possible to the source of the materials being removed, and prepare the surface or construct bunding as required.
2. Safely park the vehicle free of any hazards (e.g. electrical), ensure the engine is off and the vehicle is immobilised.
3. Look over the vehicle, inside and out, for where dirt, plant material including seeds are lodged. Pay attention to the underside of the vehicle, radiators, spare tyres, foot wells and bumper bars.
4. Remove any guards, covers or plates if required, being careful of any parts that may cause injury.
5. Knock off large clods of mud, use a crow bar if required and sweep out the cabin.
6. Brush off dried plant material like weed seeds and chaff in radiators and other small spaces where this material lodges.
7. Clean down with a high pressure hose (using potable drinking water) and stiff brush/crowbar.
8. Start with the underside of the vehicle, wheel arches, wheels (including spare). Next do the sides, radiator, tray, bumper bars etc and finally upper body.
9. Clean associated implements, e.g. buckets.
10. Check there is no loose soil or plant material that could be readily dislodged or removed.

11. Wash effluent away from the machinery; do not drive through wash effluent.

Contractors should keep a log book of where and when they wash down machinery, and of where they then took the machinery. These data are useful in ensuring that checks are made of the washdown locations in the event that any undesirable plants become established in these locations.

MONITORING AND REVIEW

The Plan is intended to be flexible and allow change to the focus of management actions, especially the weed spraying program, as the occurrence, extent and severity of weed infestations change across the site.

The Figures attached to this Plan may be reviewed and modified from time to time as new data become available, especially following field surveys to identify, record and map new and current weed occurrences in the proposed Mining Lease.

MONITORING

The early detection of any weeds that enter the proposed Mining Lease is important to ensure that any control or eradication program has the highest likelihood of success. A survey to identify new weed species within the proposed Mining Lease should be conducted at the intervals decided by a suitably qualified person. This approach should enable early detection of weed species before they reach an extent where control and eradication is very costly and/or difficult to achieve. Key weed species of concern if they are detected in the proposed Mining Lease are listed in Table 1.

The following survey regime will be applied during the life of the quarry operation:

1. Surveys and assessments by a suitably qualified person will be made at intervals to –
    a. identify, record and map any new weed species not previously recorded;
    b. assess and map the extent of known weed infestations to determine if they are becoming larger and/or more significant such that control measures can be modified; and
    c. review/assess the weed control works that have been conducted and to provide advice, where necessary, on the management of weeds.
2. Areas where weed control/eradication works have occurred (eg spraying) will be assessed no more 12 months after the treatment occurred to determine if the measures implemented were successful. Where measures have proved unsuccessful, repetition and/or modification of the weed control technique(s) will be employed.

REVIEW OF PLAN

The objectives, responsibilities and management actions within this Plan will need to adapt to new information about the site as it becomes available. The Plan will be reviewed each year in or as needed (eg. when a significant infestation of a weed on the site is detected).

REFERENCES

Podger F, Mummery DC, Palzer CR and Brown MJ (1990) Bioclimatic analysis of the distribution of damage to native plants in Tasmania by *Phytophthora cinnamomi*. *Australian Journal of Botany* **15,** 281-289.

Rudman T (2005). Interim *Phytophthora cinnamomi* Management Guidelines. Nature Conservation Report 05/7, Biodiversity Conservation Branch, Department of Primary Industries, Water and Environment, Hobart

Table 1. Weeds of concern that may enter the proposed Mining Lease

Weed Common Name	Scientific Name	Significance if it was detected in Mining Lease
Viper's bugle	*Echium vulgare*	High
Paterson's curse	*Erica plantagineum*	High
Spanish heath	*Erica lusitanica*	Moderate
Onopordum thistles	*Onopordum* species	Moderate
saffron thistle	*Carthamus lanatus*	Low
ragwort	*Senecio jacobea*	Low
nodding thistle	*Carduus nutans*	Low

APPENDIX A

'Guideline for Safe and Effective Herbicide Use near Water', DPIPWE

Photograph: Lynn Broos

Guidelines for Safe and Effective Herbicide Use Near Waterways

The control and management of weeds near waterbodies is a challenge faced by many landholders across Tasmania. Waterbodies are particularly sensitive to herbicide contamination, so the decision to apply herbicides in the vicinity must be taken with great care.

Weed control near waterbodies requires a long-term commitment to eradication, perhaps 5–10 years or more, as the seed banks of many 'woody' weed species (eg blackberries, gorse) may remain viable for decades. Weeds can also spread along watercourses, making their control difficult. A staged, planned approach to weed control, alongside a program to re-establish native riparian species, is necessary to ensure the safe restoration of riparian areas. Restoring native vegetation helps to reduce the presence of weed species, ensures the stability of banks, shades the waterway (which helps prevent future weed invasion), and provides habitat for local fauna.

Definitions

For the purposes of this guideline, the following definitions apply:

Riparian land	Any land that adjoins, directly influences, or is influenced by a body of water at any time of the year.
Waterbody	Includes natural watercourses (streams, creeks, rivers), natural wetlands, ponds, lagoons, constructed drainage channels, dams and ponds, reservoirs and lakes.
Permanently inundated/perennial	These areas have water all year round.
Occasionally inundated/ intermittent	These areas have water some time of the year.
Rarely inundated/ephemeral	These are areas that rarely contain water (eg areas that flood on rare occasions).
Toxicity	The inherent poisonous quality/qualities of a substance, measured by what size dose is likely to cause harm (acute toxicity is measured by the amount of active ingredient - mg/kg live body weight - required to kill 50% of a test group of animals - this is called LD50).

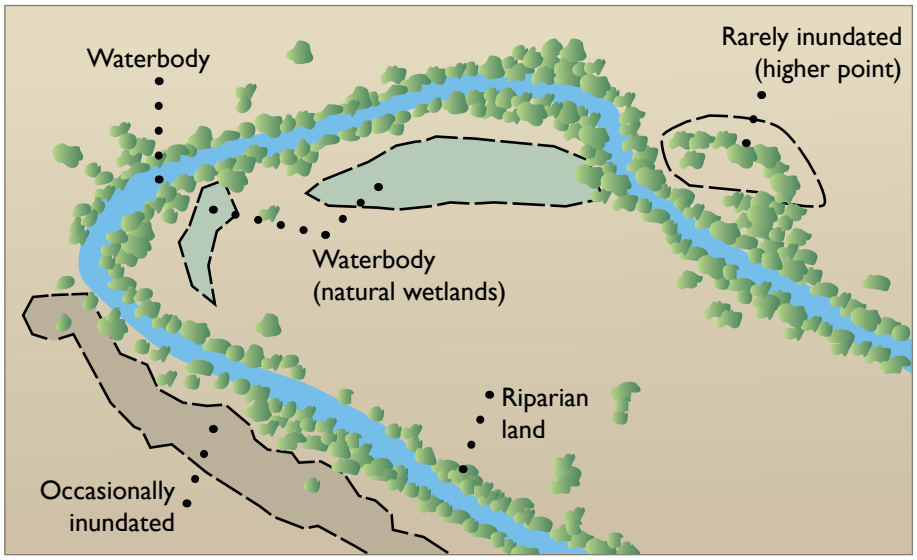


Figure 1: Appropriate and effective herbicide usage near water requires consideration of specific situations

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Primary Industries, Parks, Water and Environment

Tasmania
Explore the possibilities

A Planned Approach

Assess your site

What type of waterbody is it?

If your site is permanently inundated, you need to consider very carefully the choice of herbicide, recognising the risk to your aquatic ecosystem and the danger that the herbicide may pose to the surrounding environment. You also need to identify points of access to the site.

If your site is occasionally or rarely inundated, choose a time when the chance of rainfall is low and therefore the risk of runoff contaminated with herbicide is likely to be low. Figure 1. illustrates the different zones found in aquatic situations which may affect herbicide use.

What types of weeds are present?

Identify the species of weed and the extent of the infestation. Table 2 details the recommended herbicide control for a number of riparian weeds, the method and time of year for application. It also suggests alternatives to the use of chemicals.

Do the weeds have value at the site?

Consider whether the weeds are serving a useful purpose at the site. They may be acting as a buffer to control erosion, or as a filter to promote water quality. They may have a value to animal species as a source of food or shelter.

If you believe that you have native plants or animals that might be adversely affected by your proposed weed control, seek professional advice.

You may be able to stage the removal of weeds to minimise any impact on erosion or on animal life. You will almost certainly need to restore the habitat once weeds have been eradicated.

Are native species present at the site?

Identify any native plant species at your site. You may need to protect these species from overspray or mark them to prevent accidental spraying. These native plants will be the starting point to restoring the riparian zone.

Choose your control method

Landholders should always consider non-chemical solutions as a preferred option before deciding to use herbicides. These include biological control (eg by introduction of gorse mite, see photo below), slashing, mulching, controlled grazing (controlling timing, intensity and frequency), or hand removal. Often a combination of chemical and non-chemical methods is most appropriate. Whichever method or combination of methods is used, it is important to consider the potential negative impacts on the environment and limit these as much as possible.

Biological agents such as Gorse spider mite may be options for use near waterways, courtesy of Tasmanian Institute of Agriculture.

Understanding herbicides

Herbicides are designed to control and eradicate pest plants ('weeds'). However, it is important to realise that many herbicides have toxic effects in aquatic ecosystems. Native plants, invertebrates, frogs and fish may be harmed by herbicides. The inappropriate use of herbicides may also cause significant risks to human health where water is pumped from a bore for domestic use, or flows to reservoirs.

Herbicides can enter waterbodies either directly through spray or spray drift, or they can move into waterbodies via surface water run-off or leaching and sub-surface draining.

Herbicides can be broadly classified according to their chemical structures and modes of action. Table 1 shows the three major types of herbicide.

Table 1: Herbicide classification

Pre-emergent (residual)	These herbicides are designed to inhibit the germination of pest plants. They are therefore applied before the pest plant germinates and are often residual in the soil for long periods. They are generally not considered to be safe for use near waterbodies and are not recommended for use due to their persistence in the environment.
Knockdown non-selective	These herbicides are designed to be applied directly to the target pest plant, either through being sprayed onto foliage or applied directly to the cambium layer using any of the direct application methods described in Table 3. They may vary in mode of action and some may persist as residues in the environment.
Selective	Selective herbicides are designed to act on only one type of pest plant. Generally, selective herbicides will control either broadleaf (eg capeweed), grasses (eg phalaris) or woody weeds (eg broom). These herbicides are useful when the focus may be on controlling a particular weed species (eg phalaris amongst native shrubs). These herbicides may persist as residues in the environment.

Herbicides applied to the edge of a waterbody, or in wetted areas around its edge, must be registered for use in aquatic environments by the Australian Pesticides & Veterinary Medicines Authority (APVMA).

Consider the tools available to mitigate against offsite movement of your pesticide

PIRI-Tas

PIRI-Tas is a simple screen tool that predicts the off-site migration potential of pesticides into surface or ground-water. PIRI-Tas assesses both the likelihood of off-site-migration and the risk to different species based on the toxicity of the pesticide to a range of aquatic organisms.

PIRI-Tas is a risk indicator and uses a risk-based approach to decision making by taking into consideration a range of factors associated with site conditions, soil and environmental scenarios, pesticide properties, application rates and time of spraying as well as considering impacts on target species being protected by receiving environments. PIRI-Tas outputs can also be used to construct annual spray schedules to assist with future planning.

PIRI was first developed by CSIRO and is being used both nationally and internationally by a number of organisations. PIRI-Tas CD's and onsite training are available for free through the DPIPWE to key users of chemical pesticides, including those in the agriculture, forestry, amenity, glasshouse and municipal sectors.

Further information is available at http://www.dpipwe.tas.gov.au/inter.nsf/WebPages/SSKA-7JA3N4?open

Consider integrated pest management (IPM)

Integrated pest management (IPM) is a planned approach that coordinates environmentally acceptable methods of pest control with careful and minimal use of toxic pesticides. IPM programs are based on a comprehensive assessment of local conditions, including factors such as climate, season, the biology of the pest species, and government regulations.

Strategies employed may include the staged removal of weeds, biological control and re-planting of riparian areas with native species to discourage the regeneration of weeds.

Consult and plan

Draw up a calendar for action. The time of year when herbicides will be most effective on the weed should be a major influence on the make-up of this calendar. Herbicides are generally most effective during the growing season of the weed rather than when it is dormant or approaching dormancy. The staged removal of weeds over several seasons may be less disturbing to your aquatic environment and minimise any adverse impact on fauna.

Consult with neighbours who may be affected by your weed control operation, especially if you think there is any risk of spray drift to adjoining properties or downstream. You may also decide to seek advice from experts before taking further action, or approach commercial spray contractors to assess your particular situation.

If the work involves a significant length of river or multiple properties it is advisable to develop a plan that covers all aspects of the weed control work and restoration, including potential risks. You should also be mindful of:

- feasibility/practicability of the work
- physical characteristics of the job site
- optimal pest control method, including alternatives to herbicides
- characteristics of the herbicide (physical, chemical and environmental)
- buffer zones
- the possibility of spray drift and other off-target migration
- weather conditions.

Do you need to spray?

It is recommended that only trained, licensed contractors carry out spraying operations near waterbodies because of the sensitivity of these environments. Check that they have experience and an understanding of the issues around using herbicides near aquatic environments.

The following points are critical to the application of herbicides near waterbodies:

- Always follow the label
- When you are working near the edge of a waterbody, direct the spray away from the waterbody where possible.
- Spray only to the extent of covering foliage with droplets.
- Spray when weather is calm; strong winds may carry herbicide drift into waterbodies.
- Use a flat fan nozzle and a low pump/spray pressure to reduce the likelihood of spray drift.
- Do not spray when rainfall is forecast within four hours as herbicide can be washed off the pest plant and run off into aquatic ecosystems.

Appropriate herbicides and application

The type of weed problem will determine both the type of herbicide and its application method. Table 2 shows recommended herbicide and application methods for some common weeds, along with alternatives to herbicide use. Table 3 illustrates application techniques and equipment need to undertake control works.

Uses described in this table are either covered by the respective product label or Off-label Permit No. 13160 issued by the Australian Pesticides and Veterinary Medicines Authority.

Table 2. Common weeds and recommended treatment and herbicides

Area	Weed	Permitted Herbicide (active ingredient)	Example of commercial product (concentration of active ingredient)	Recommended Herbicide Control Technique	Non-chemical Alternatives
Permanently inundated/ perennial	**Submerged and partially submerged plants**				
	Parrot's feather (*Myriophyllum aquaticum*)	Glyphosate (registered for aquatic use only **Don't add surfactants!**	Roundup Biactive® or Weedmaster Duo®	Foliar spray	Hand removal and excavation (with roots/rhizomes) can be used as part of a well planned approach. Care must be taken to avoid losing fragments
	Egeria (*Egeria densa*)				
	Canadian Pondweed (*Elodea canadensis*)				
	Cumbungi (*Typha* spp)				Hand removal (small plants) Excavation (with roots/rhizomes) Cultivation (expose roots/rhizomes to frosts) Cut into soil surface regularly (to cut rhizomes) Drowning by cutting stems and leaves below water surface
	Glyceria (syn. Poa aquatica or reed sweet grass) (*Glyceria maxima*) NB Take extreme caution not to spread Glyceria seed through soil transport (eg on machinery)			Foliar spray (combine with dense local native species revegetation for long-term results through stream shading) Wiper	Clearance or drainage of growth area (combine with dense re-vegetation of local native species for long-term results through stream shading)
	Woody weeds				
	Blackberry (*Rubus fruticosus*)	Glyphosate (registered for aquatic use only) **Don't add surfactants!**	Roundup Biactive® or Weedmaster Duo®	Cut and paint with Roundup Biactive® or Weedmaster Duo®	Hand removal (small plants) Controlled grazing (goats or sheep only) can be effective Bio-control (eg gorse mite, blackberry rust) where other techniques are not suitable Gorse mulching combined with follow-up grazing and revegetation on mulched sites
	Gorse (*Ulex europaeus*)				
	Trees				
	Hawthorn (*Crataegus monogyna*)	Glyphosate (registered for aquatic use only) **Don't add surfactants!**	Roundup Biactive® or Weedmaster Duo®	Cut and paint Drill or stem injection Axe or frill and paint Foliar spray hawthorn and crack willow (only spray to a height of 2m)	Hand removal (small plants) Controlled grazing can assist in limiting Hawthorn regrowth and thicket density
	Crack Willow (*Salix fragilis*)				
	Sycamore (*Acer pseudoplatanus*)				

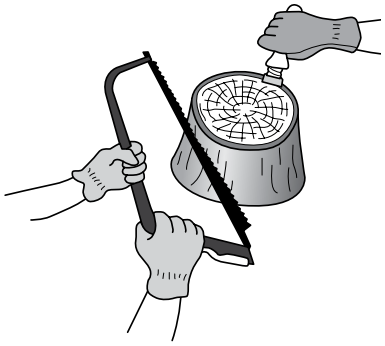
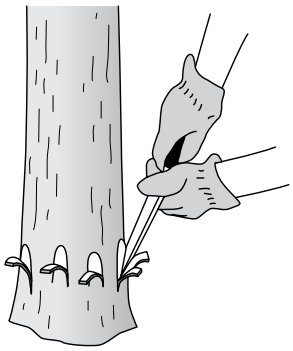
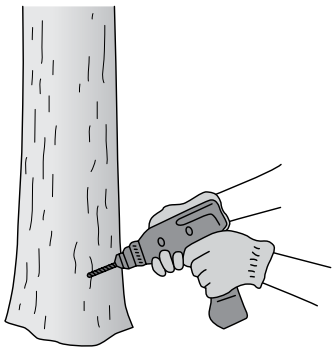
The product trade names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product does not imply endorsement by DPIPWE over any other equivalent product from another manufacturer.

Table 2. Common weeds and recommended treatment and herbicides continued

Area	Weed	Permitted Herbicide (active ingredient)	Example of commercial product (concentration of active ingredient)	Recommended Herbicide Control Technique	Non-chemical Alternatives
Occasionally or rarely inundated sites	**Woody weeds**				
	Blackberry (*Rubus fruticosus*)	Metsulfuron-methyl Triclopyr Triclopyr + Picloram	eg Associate or Brush-Off® eg Garlon 600® eg Grass-up™ or Grazon Extra®)	Foliar spray	Hand removal (small infestations) Controlled grazing by goats can be effective Bulldoze and deep cultivate (in suitable circumstances) Bio-control (a rust with limited impact)
	Gorse (*Ulex europaeus*)	Glyphosate (registered for aquatic use only) Triclopyr Triclopyr + Picloram	eg Roundup Biactive® or Weedmaster Duo® eg Garlon 600® eg Grass-up™ or Grazon Extra®)	Cut and paint Foliar spray, preferably Garlon 600®	Mulching/bulldozing/slashing combined with follow-up grazing and revegetate on mulched sites Bio-control (e.g gorse mite) where other techniques are not suitable
	English Broom (*Cytisus scoparius*) Montpellier Broom (*Genista monspessulana*)	Glyphosate (registered for aquatic use only). Metsulfuron-methyl Triclopyr herbicide Triclopyr + Picloram	eg Roundup Biactive® or Weedmaster Duo® eg Associate or Brush-Off® eg Garlon 600® eg Grass-up™ or Grazon Extra®)	Cut and paint. Foliar spray, preferably Garlon 600® (only if under 2m in height)	Hand removal. Mechanical removal (eg rip or bulldoze) Mulching/bulldozing/slashing of hawthorn combined with follow-up grazing and revegetate on mulched sites
	Trees				
	Hawthorn (*Crataegus monogyna*)	Glyphosate (registered for aquatic use only). Metsulfuron-methyl Triclopyr herbicide Triclopyr + Picloram	eg Roundup Biactive® or Weedmaster Duo® eg Associate or Brush-Off® eg Garlon 600® eg Grass-up™ or Grazon Extra®)	Cut and paint Foliar spray, preferably Garlon 600® (only if under 2m in height)	Hand removal Mechanical removal (eg rip or bulldoze) Mulching/bulldozing/slashing of hawthorn combined with follow-up grazing and revegetate on mulched sites
	Sycamore (*Acer pseudoplatanus*)	Glyphosate (registered for aquatic use only)	eg Roundup Biactive® or Weedmaster Duo®	Stem injection, cut and paint (plus foliar spray for young plants)	Hand removal Bulldoze and revegetate Plough-in small plants
	Herbaceous plants				
	Ragwort (*Senecio jacobaea*) Paterson's curse (*Echium plantagineum*) Thistles (*eg Cirsium arvense*)	MCPA Metsulfuron-methyl	eg MCPA 500 or L.V.E Agritone eg Associate or Brush-Off®	Foliar spray	Hand removal Controlled grazing (sheep) Ploughing/cultivation (combine with dense revegetation of local native plants for long-term results through shading)

More information on weed identification and weed control can be found at **www.dpipwe.tas.gov.au/weeds**

Table 3. Herbicide application techniques

Illustration	Method	Type of weed	Equipment Required	Notes
	Foliar Spray	Herbaceous plants, Woody weeds	Knapsack Vehicle mounted tank Herbicide mix Personal protective equipment (see product label)	Ensure herbicide is being applied at right concentration and rate to cover the foliage of the pest plant with fine droplets and avoid run-off. A flat fan nozzle and low pump pressure will assist in reducing spray drift
	Cut and paint	Woody weeds, shrubs and trees	Saw, chainsaw, loppers Herbicide mix Personal protective equipment (goggles and gloves as a minimun) Bush/sponge for herbicide application	Ensure herbicide is applied quickly to cut stump (within15 seconds in most cases) Apply during active growth period of plant for best results Do not apply herbicide to the point of run-off
	Frilling	Shrubs and trees	Axe, hatchet Herbicide mix Personal protective equipment (goggles and gloves as a minimum) Brush for herbicide application	Frill trunk thoroughly, also treat major surface roots where visible Expose sapwood and apply herbicide to it immediately For deciduous species, apply during active growth period
	Drill and poison	Shrubs and trees	Drill Application bottle, injection gun Herbicide Personal protective equipment (goggles and gloves as a minimun)	Drill to sapwood only and apply herbicide to drill hole immediately Drill and fill major surface roots where appropriate For deciduous species, apply during active growth period

Illustrations: Brett Littleton ILS Design Unit

After Spraying

Clean up

Equipment should always be cleaned in a safe location where spills can be contained and will not result in environmental harm. Using water to clean equipment will further dilute any residual herbicide to low levels, and the resulting solution is best sprayed onto a lawned area or bare ground taking the following precautions:

- Do not apply wash-water to the point of saturation so that run-off occurs.
- Do not apply wash-water along boundary fence lines as this will increase the chance of herbicides escaping from your property.
- Do not dispose of wastewater into areas where children play, or pets have access, as low levels of herbicide are still likely to be present.
- Do not deposit wastewater where it will run into waterways, drainage lines or stormwater systems.

Disposal

If you do happen to have surplus spray mix or herbicide waste, label it with the herbicide name, including any risk and safety information displayed on the original label. Store it safely until it can be disposed of appropriately. Contact a chemical collection organisation eg Chem Clear.

You must follow label directions for the disposal of wastes and herbicide containers. Only dispose of waste herbicides at authorised collection centres, such as licensed waste disposal centres.

Do not dispose herbicide waste:

- through sewerage systems, where it can interfere with the sewage treatment process
- down the drain or gutter, where it can pass through the stormwater system and into waterways
- to landfill via dumping or domestic waste, as it can contaminate soil and leach into groundwater and stormwater.

Monitor, evaluate and follow up

Monitor

Observe and keep records of your weed problems and the impact of any measures you take to control them. This could involve:

- the use of visual records, including property maps, aerial and other photography
- the use of a calendar or diary to record when actions were taken.

Evaluate

Evaluate the success of any weed control program by considering the current extent of the weed problem and reviewing your control measures. Important questions might include:

- Is my weed control work going to plan, or do my goals need reviewing?
- What is the appropriate weed control measure now?
- Is there a need for external (expert) assistance?

Follow up

Re-implement weed control actions following the results of your monitoring and evaluation. Continue to monitor this follow-up work, and so begin an ongoing cycle of weed management.

These guidelines have been updated by Kiowa Fenner and are based on guidelines prepared by Michael Noble and Janice Miller.

Design and layout - ILS Design Unit, DPIPWE

CONTACT DETAILS

Invasive Species Branch

1300 668 550

www.dpipwe.tas.gov.au/weeds

APPENDIX B

TEMPLATE - Weed Spraying Program Spreadsheet Williams Quarry

Date or period of program

Zones on Maps	Weed	Actions required	Responsible person	Estimated start date	Estimated completion date	Tasks conducted	Date Completed	Signed

NOTES

Appendix 5 Williams Quarry Sediment Basin Assessment (Hydrodynamica).

SEDIMENT BASIN FOR QUARRY OPERATIONS ASSESSMENT

FOR VAN DIEMEN CONSULTING

WILLIAMS QUARRY

Rekuna

August 2015

HYDRODYNAMICA
44 PENQUITE ROAD LAUNCESTON TAS 7250
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HYDRODYNAMICA

Project: Williams Quarry Sediment Basin Assessment

Authors: Cameron Oakley

Consulting Engineer

B.Eng (Hons), B.Tech (Env.), MBA

DATE	NATURE OF REVISION	REVISION NUMBER	PREPARED BY	AUTHORISED BY
31/08/2015	Final	1	Cameron Oakley	Cameron Oakley

1. EXISTING SITE & PROPOSAL

The Williams dolerite quarry is located at 1356 Tea Tree Road Rekuna, which is approximately 3.2 km south-west of Campania. It is proposed that existing quarrying operations will be expanded and will include the following activities (Van Diemen Consulting, 2015):

- surface site preparation by soil removal and stockpiling;
- excavation and ripping of rock and gravel material;
- crushing of some rock material to reduce material size;
- stockpiling of material in quarry area;
- loading trucks with wheel loader from stockpile area in quarry; and the
- transport of materials by truck with/without trailer.

Being fractured dolerite stormwater runoff quickly drains through the quarry floor. This will continue to occur with expansion of the quarry. It is anticipated that only during periods of heavy or sustained rainfall that runoff from the quarry floor will occur. If this eventuates it is likely to contain entrained sediment from the quarry.

It is proposed that the existing dam at the north west of the site be used to intercept any potentially sediment-laden runoff and provide protection of downstream waterways from pollution.

It is currently proposed that the existing dam be increased to 0.95 ML in capacity. The following assessment was conducted to determine whether this capacity is suit able using methodology contained in Landom's Blue Book: *Volume 1 Managing Urban Stormwater- Soils and Construction - 4th ed* (2004) and *Volume 2E Managing Urban Stormwater- Soils and Construction – Soils and Construction – Mines and Quarries* (2008).

2. DATA & ASSUMPTIONS

The methodology contained in the *Blue Book* is based on the Revised Universal Soil Loss Equation (RUSLE) to predict the long term, average, annual soil loss from sheet and rill flow under specified management conditions (Landcom, 2004). This enables sedimentation basins to be designed to effectively mitigate sediment pollution to downstream lands and waterways. Table 2 of this report shows the full calculation.

The methodology takes into account the ability of rainfall to cause erosion which has been found to be a function of the 2 year ARI, 6 hour event (5mm/hr). This site specific rainfall intensity was obtained from the Bureau of Meteorology's (BOM) rainfall Intensity-Frequency-Duration (IFD) for the site (refer to Table 1).

For developments which are ongoing for greater than 3 years which discharge to sensitive receiving environments the Blue Book *Volume 2E - Managing Urban Stormwater- Mines and Quarries* (Landcom, 2008) also recommends designing sediment basins to provide adequate volume to retain the 5-day, 95th-percentile rainfall event. That is that the basin will have the capacity to retain the volume of water generated 95% of all 5-day rainfall accumulations.

The BOM has intermittently recorded nearly 55 years of rainfall data at their Campania (The Pines) weather station no. 94009. From this data set the 5-day, 95th-percentile rainfall depth was calculated to be 38.4mm. This value was checked against rainfall record from the Richmond (Brookbank) BOM station no. 94055 which, although 10km from the site, has 91.7 years of data. Using this data the5-day, 95th-percentile rainfall depth was calculated at 33.1mm. The Campania depth was greater and was therefore used for the calculations.

Intensity-Frequency-Duration Table

Location: 42.675S 147.375E NEAR.. Rekuna Issued: 31/8/2015

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

	Average Recurrence Interval						
Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	34.0	46.2	66.7	81.1	100	128	152
6Mins	31.9	43.2	62.2	75.5	93.2	119	141
10Mins	26.6	35.6	49.9	59.7	72.8	91.6	107
20Mins	20.1	26.3	35.0	40.7	48.3	59.0	67.8
30Mins	16.6	21.5	27.8	31.8	37.3	44.9	51.0
1Hr	11.5	14.7	18.4	20.7	23.9	28.3	31.7
2Hrs	7.64	9.78	12.1	13.6	15.6	18.4	20.6
3Hrs	5.96	7.65	9.52	10.7	12.3	14.5	16.2
6Hrs	3.88	5.00	6.30	7.12	8.24	9.78	11.0
12Hrs	2.50	3.24	4.13	4.70	5.47	6.54	7.39
24Hrs	1.57	2.05	2.63	3.00	3.51	4.20	4.76
48Hrs	.951	1.24	1.60	1.83	2.15	2.58	2.93
72Hrs	.689	.901	1.17	1.35	1.59	1.93	2.20

(Raw data: 15.06, 3.32, 0.92, 26, 6.15, 1.8, skew=0.32, F2=3.88, F50=15.38)

Table 1. BOM IFD Data for Rekuna

In addition to rainfall data the RUSLE considers the combined effect of slope length and gradient on soil loss. To inform these calculations it was determined that the maximum distance from the top of the Williams Quarry catchment to the proposed dam is approximately 150m, and the average slope to be at worst 5%.

Finally, Table F3 in Volume 1 of the Blue Book recommends volumetric runoff coefficient (C_v) values based on design rainfall depth and runoff potential based on soil hydrologic groups. From discussions with Dr Richard Barnes it was decided to assume there is low to moderate runoff potential as per soil hydrologic group B defined by Landcom (2004) as:

Water moves into and through these soil materials at a moderate rate when thoroughly wetted. Usually, they consist of well-drained soils with medium, loamy textures or clay loams with moderate structure. They shed runoff only infrequently.

This gives a recommended C_v coefficient of 0.34 (34%).

3. CALCULATIONS

The following table shows the calculations used to determine the minimum dam capacity required to effectively remove sediment. It determines the sediment zone volume of the basin, which is the volume needed to hold captured sediment, and the settling zone volume, which is the volume required to facilitate efficient settling.

Basin Volume = Sediment Zone Volume + Settling Zone Volume

1. Sediment Zone Volume

Blue Book Vol.1 Appendix J Sheet J-5

Site area	Williams Quarry		Remarks
Total catchment area (ha)	1		Data provided by Dr R Barnes
Disturbed catchment area (ha)	0.7		
Rainfall data			
Design rainfall depth (days)	5		Ref Vol.2E Table 6.1
Design rainfall depth (percentile)	95		Assumed 'sensitive' receiving environment and operations ongoing for > 3 years
5-day, 95th-percentile rainfall event (mm)	38.4		Calculated from Campania (The Pines) rainfall record, BOM station 94009
Rainfall intensity: 2-year, 6-hour storm (mm/hr)	5		See IFD data for the site Table 1 of Report
RUSLE Factors			
Rainfall erosivity (*R*-factor)	820		Automatic calculation from above data
Soil erodibility (*K*-factor)	0.05		RUSLE data can be obtained from Vol 1, Appendixes A, B and C
Slope length (m)	150		Data provided by Dr R Barnes
Slope gradient (%)	5		
Length/gradient (*LS*-factor)	1.7		From Vol. 1 Table A 1
Erosion control practice (*P*-factor)	1.3		Default
Ground cover (*C*-factor)	1		Default
Calculations			
Soil loss (t/ha/yr)	91		Calculated
Soil Loss Class	1		See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	70		Calculated
Soil Loss Volume (Sediment Zone Volume) (m^3)	98		Based on clean-out every 2 years

2. Settling Zone Volume

Blue Book Vol.1 Appendix J Page J-4

Site area	Williams Quarry		Remarks
Disturbed catchment area, A (ha)	0.7		
Volumetric runoff coefficient, C_v	0.34		Vol.1 F-3, assume Soil Hydrologic Group B
5-day, 95th-percentile rainfall event	38.4		Campania rainfall record
Settling Zone Volume (m3)	91		Calculated

3. Total Basin Volume = Settling Zone Volume + Sediment Zone Volume

Sediment Zone Volume (m^3)	98	
Settling Zone Volume (m^3)	91	
Total Required Capacity (m^3)	189	

Table 2. Sediment basin capacity calculations

4. CONCLUSION

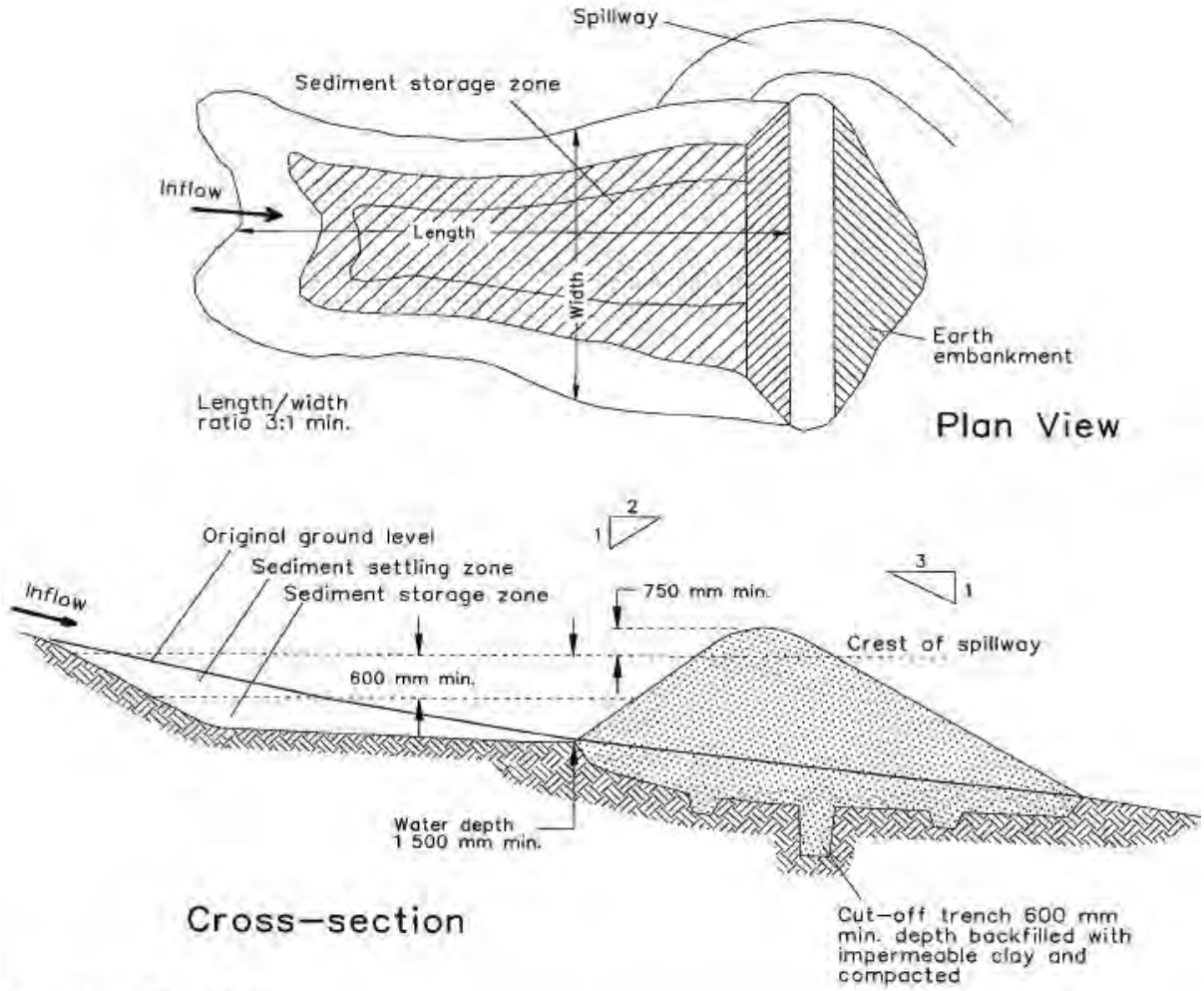
In order to detain and treat stormwater runoff from the 1 ha catchment (assuming at worst 0.7 ha is disturbed) the dam must total 189 kL. A settling zone volume of 98 kL cannot be reduced. The required sediment zone volume of 91 kL is based on a 2 year cleanout period; as such it can be increased or decreased if shorter or longer duration between cleanouts is preferred.

As it stands the proposed 0.95 ML dam has sufficient capacity to require the removal of collected sediment from it after approximately 17 years. In addition the quarry floor will retain and discharge a majority of stormwater through its floor. Therefore there will be sufficient capacity in the quarry pit and the dam to retain sediment onsite and protect the receiving environment.

Minimum basin dimensions are detailed in the Blue Book is shown in Appendix A.

APPENDIX A

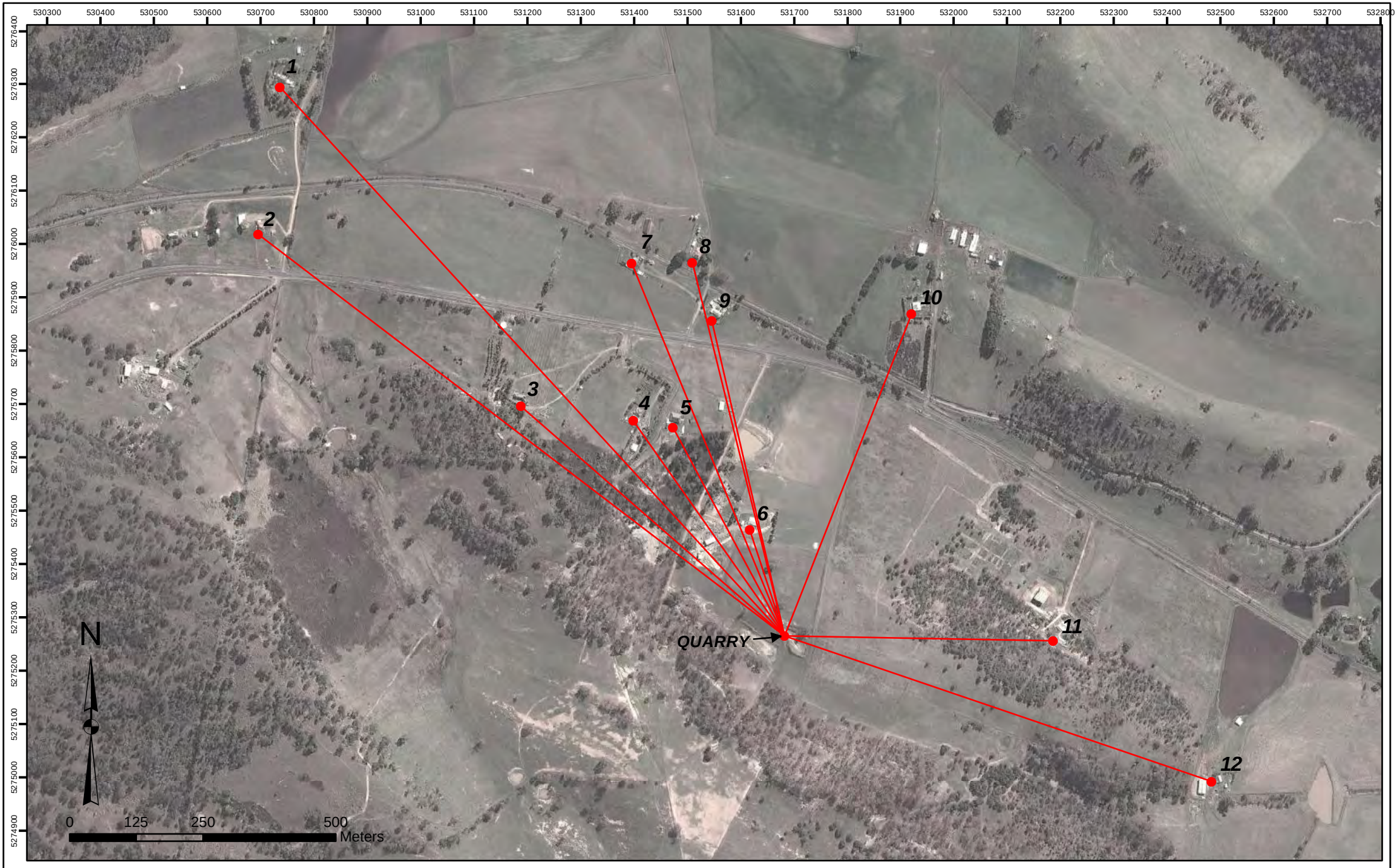
SEDIMENT BASIN CONCEPT DESIGN



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.

Appendix 6 Noise Topographical Profiles



Williams Quarry

Location of Nearest Neighbours

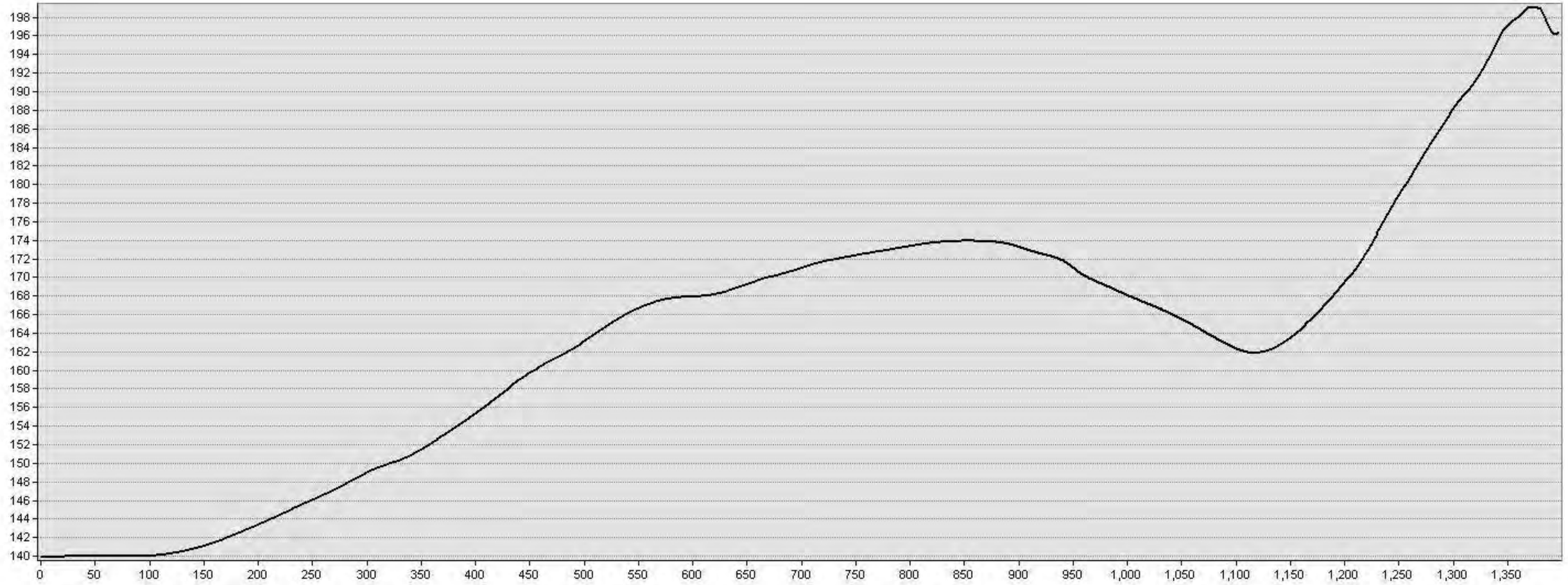
Van Diemen Consulting

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA Zone 55

TASMAP: TEA TREE
CLIENT: CRAIG WILLIAMS

DATE: 22nd JULY 2014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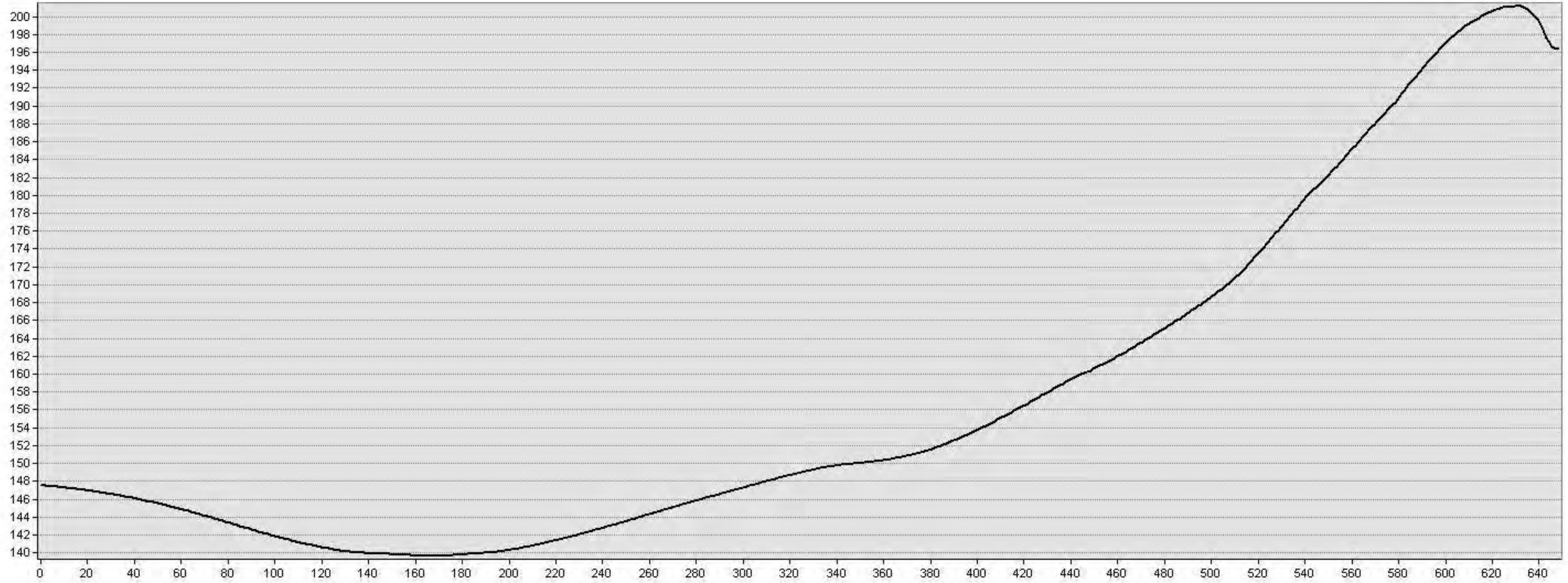
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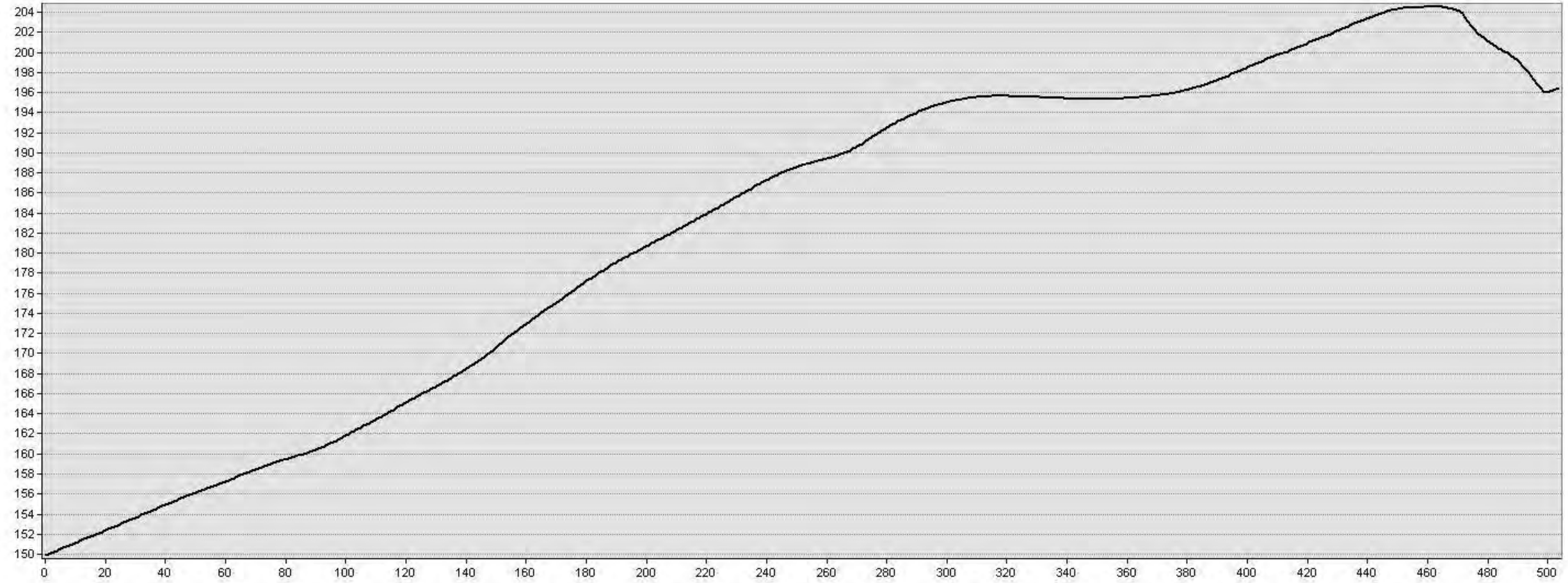
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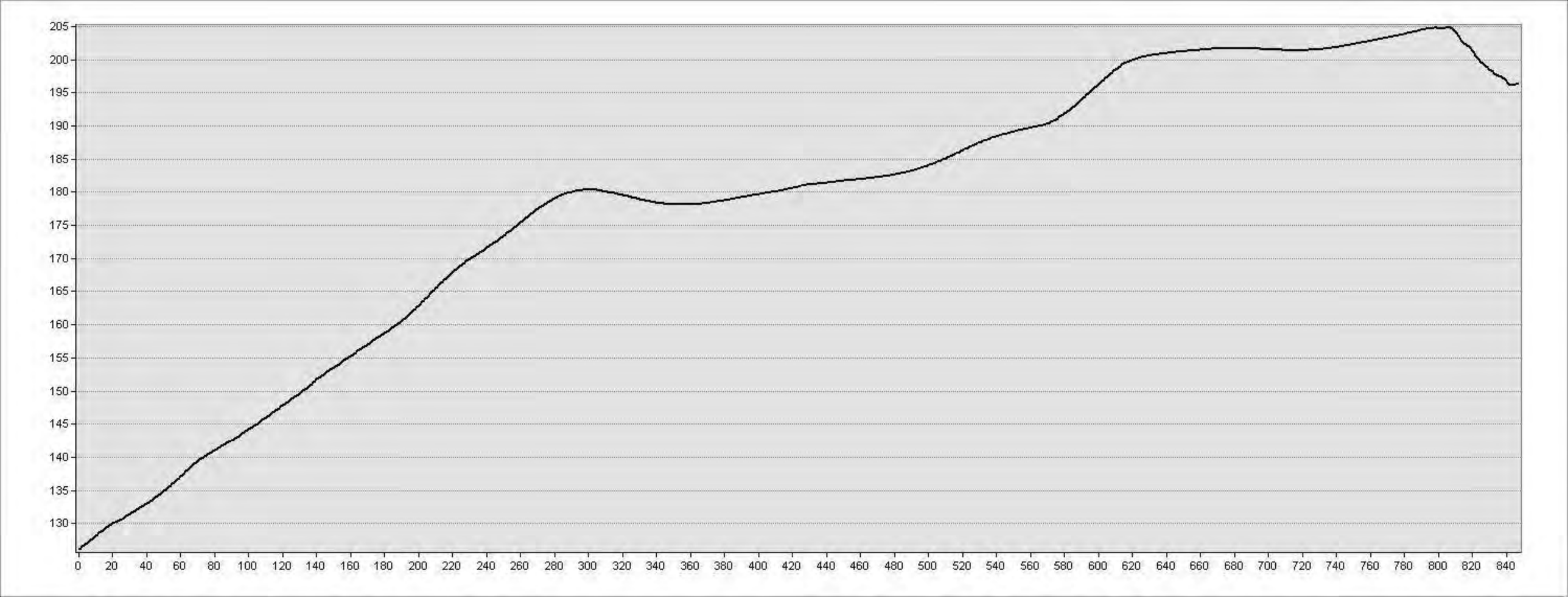
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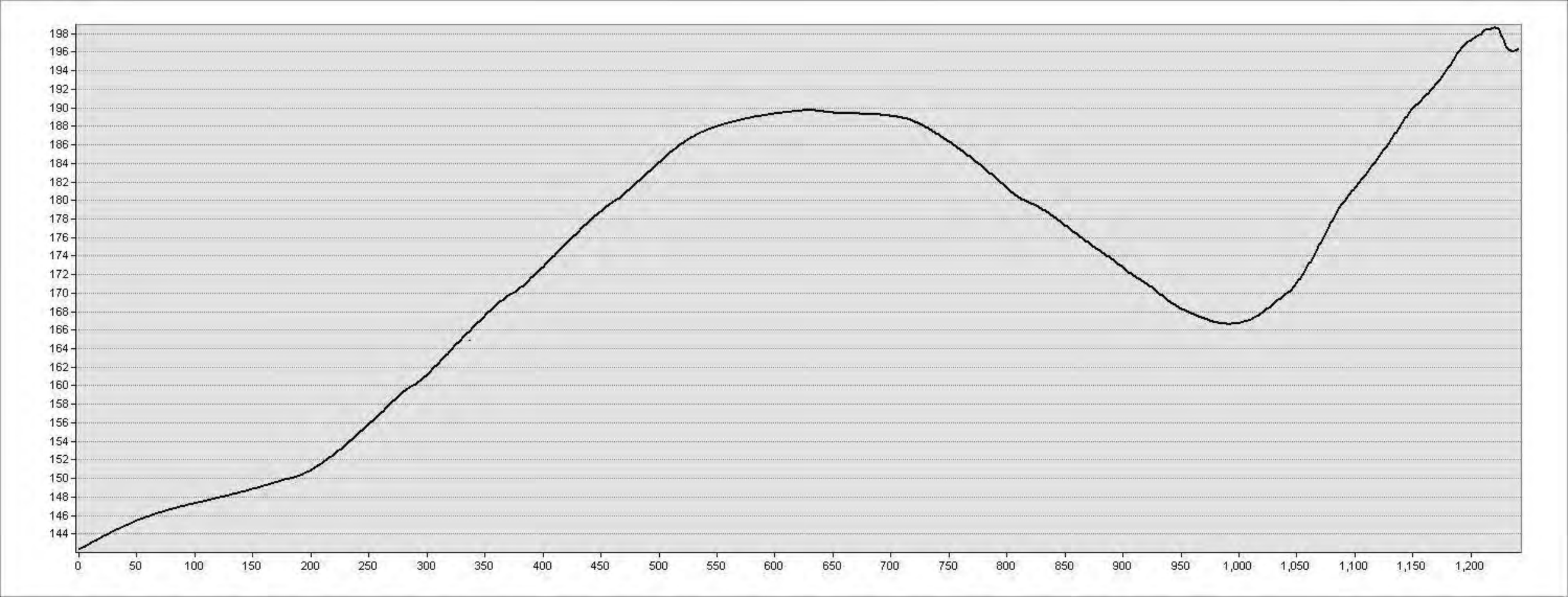
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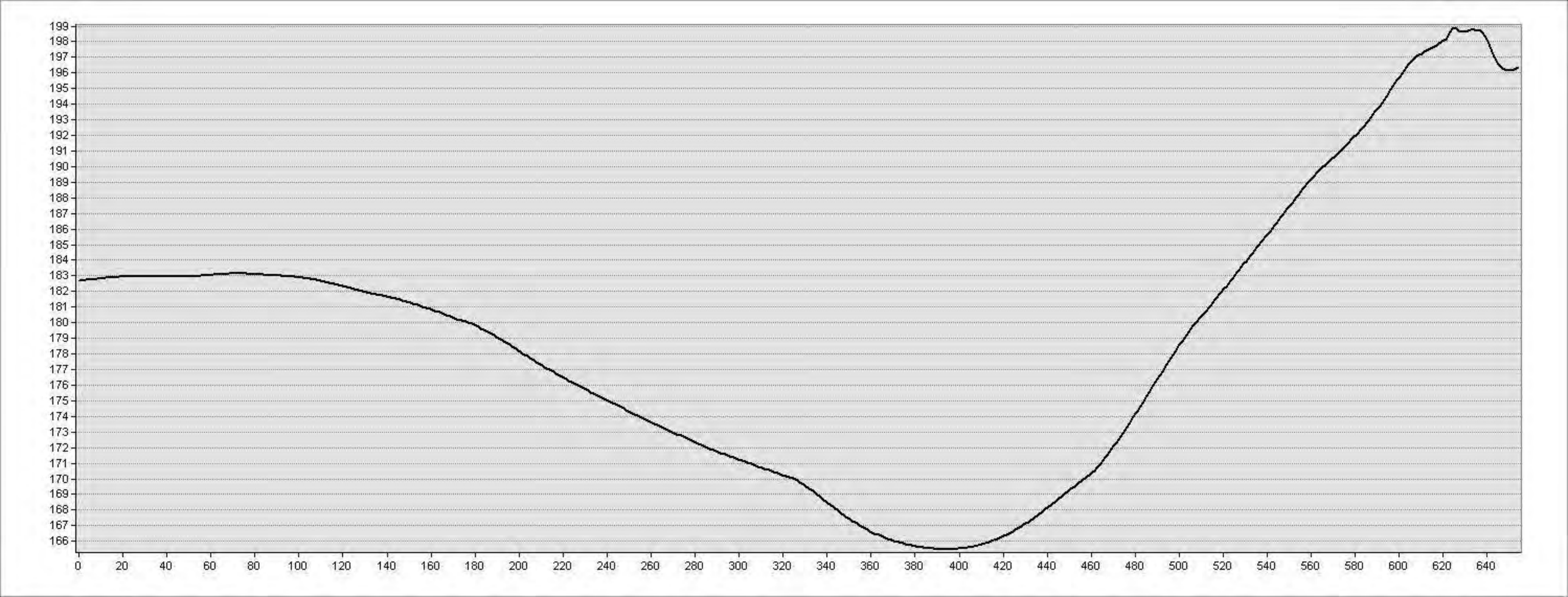
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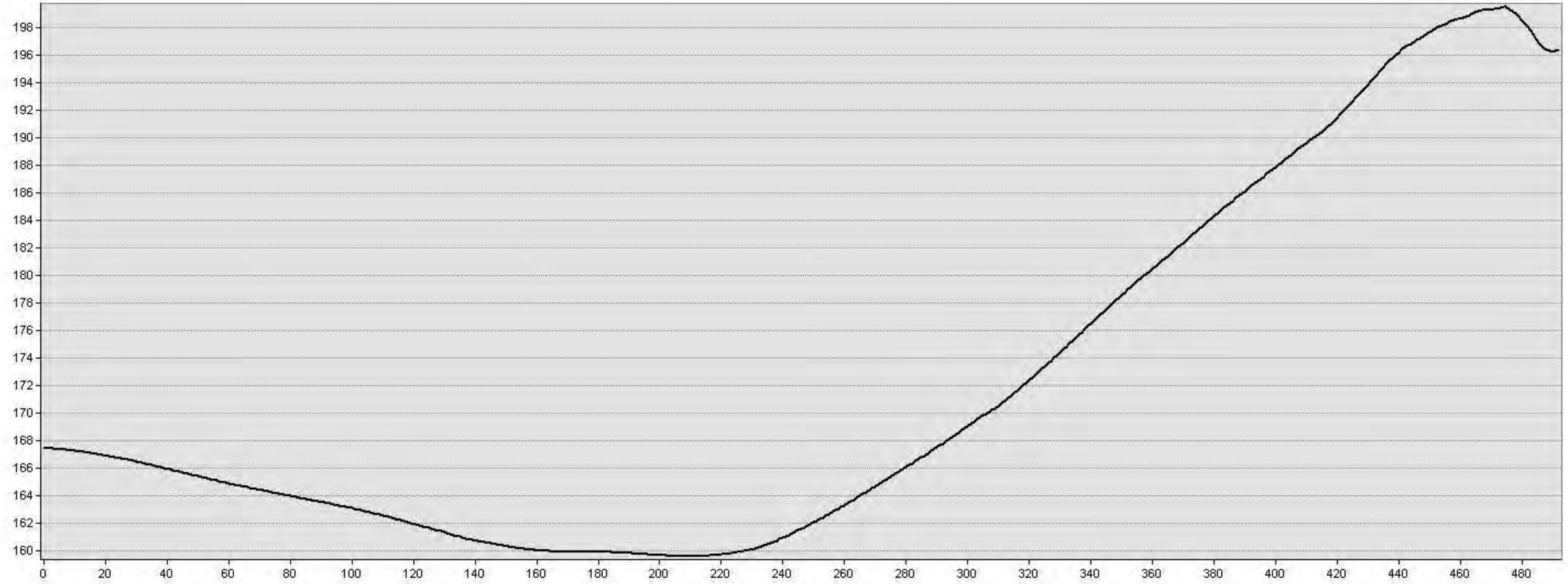
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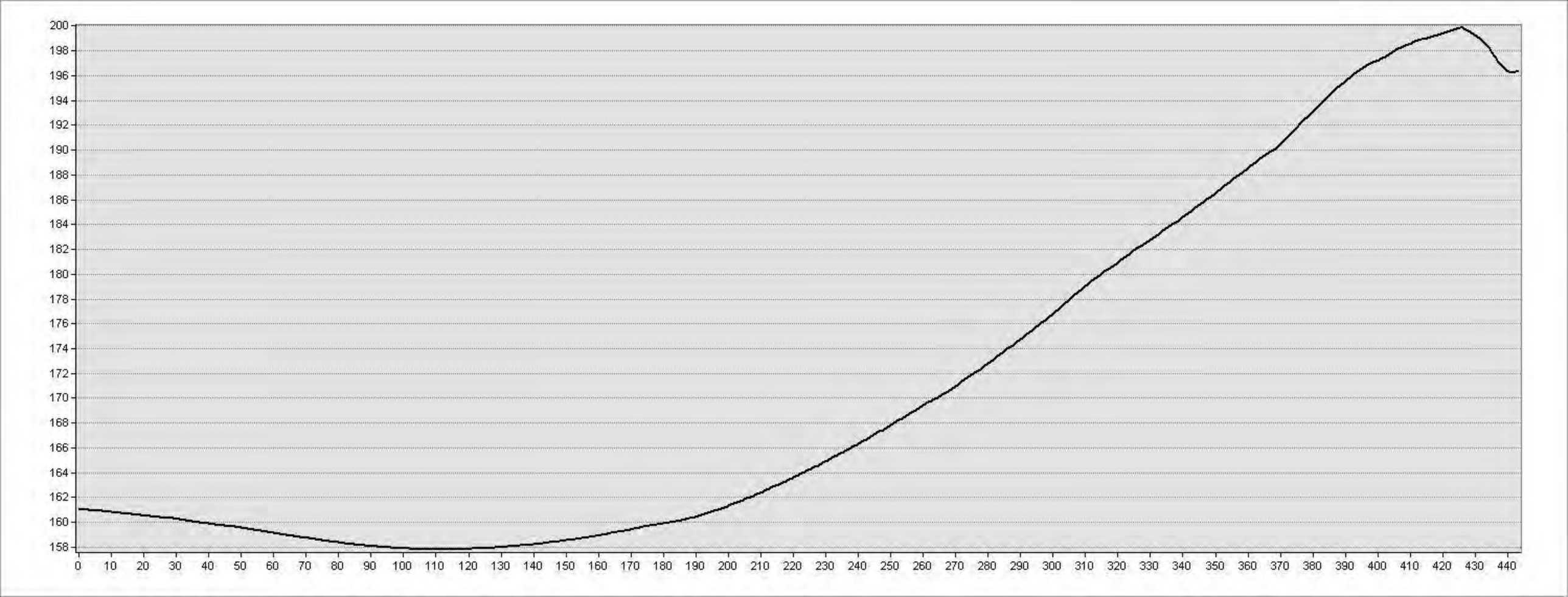
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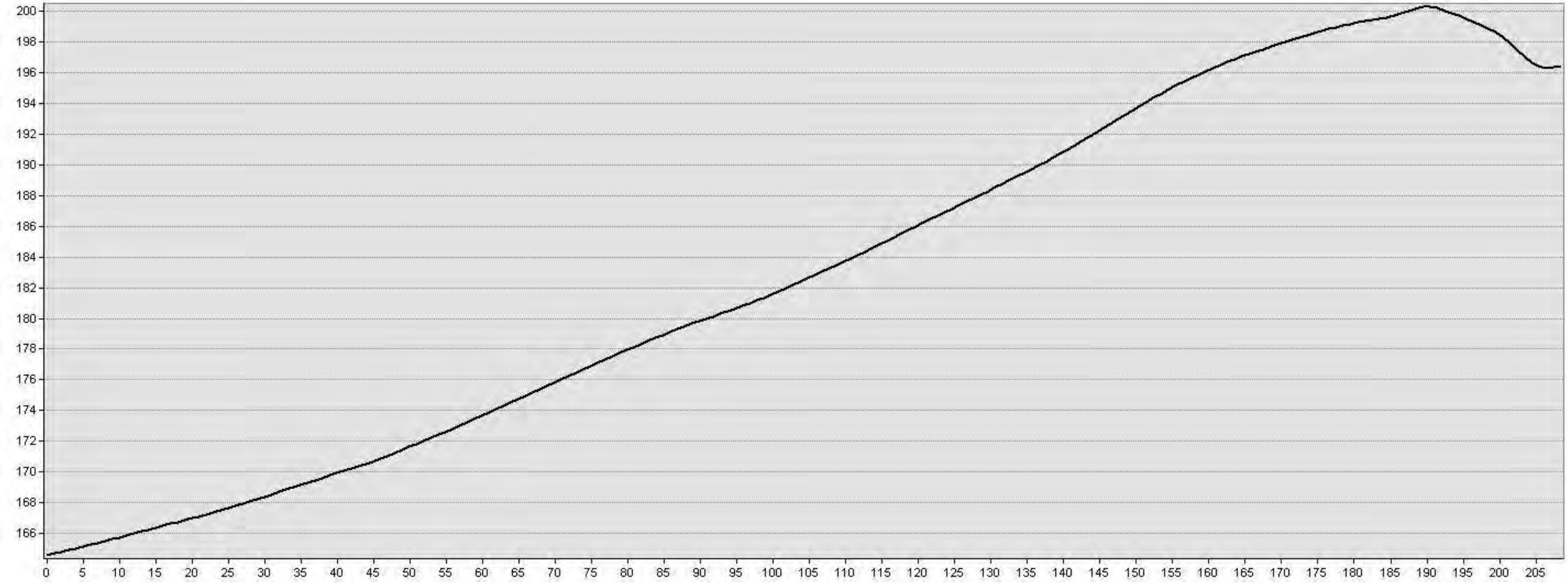
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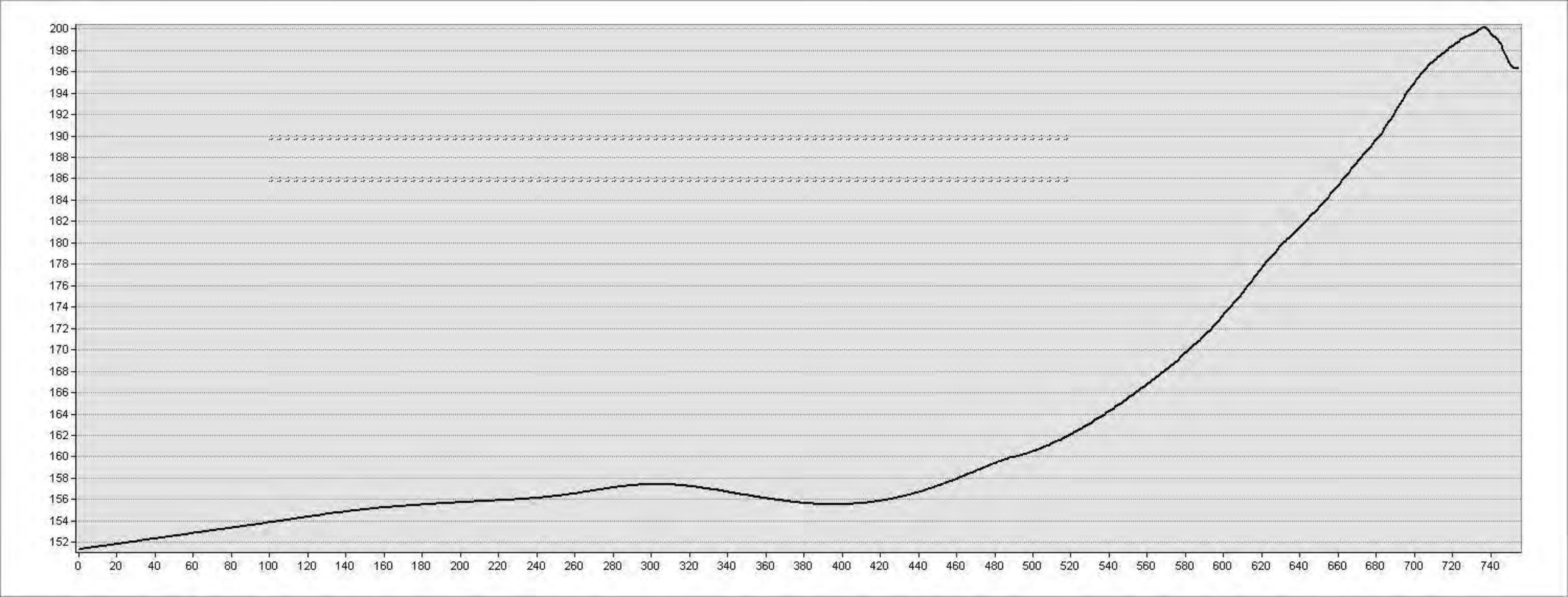
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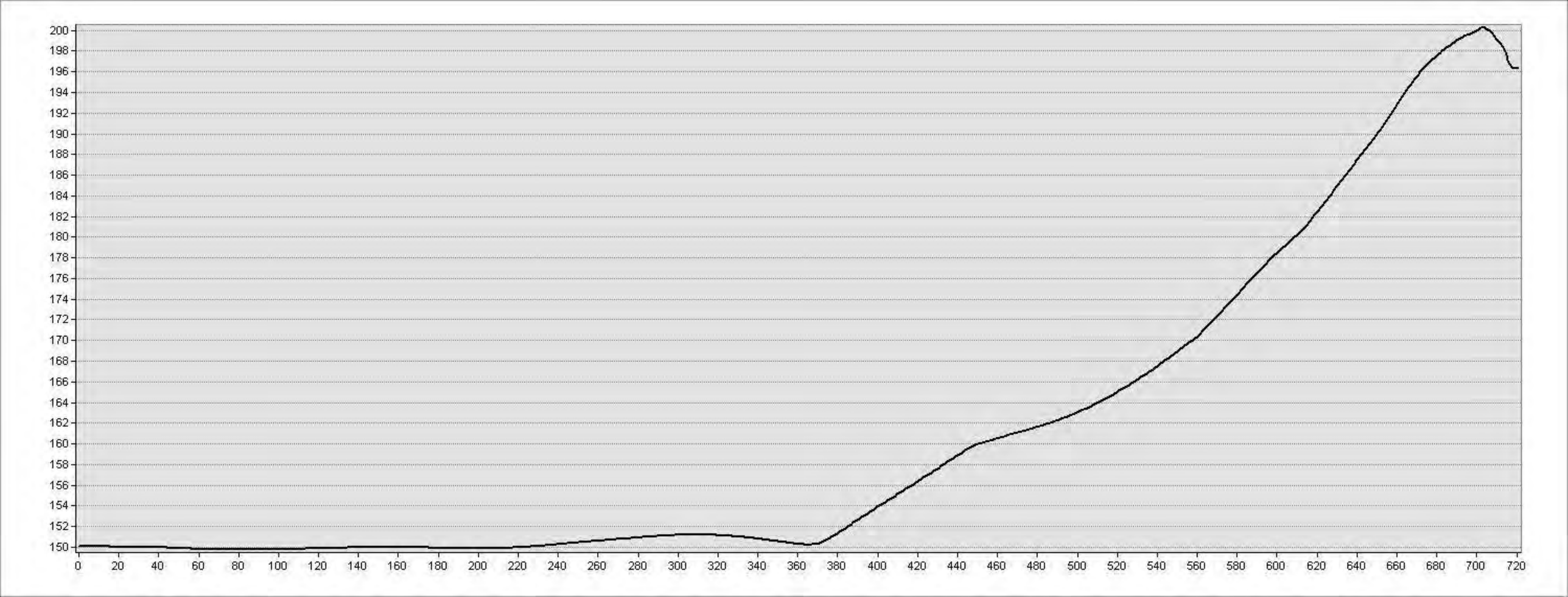
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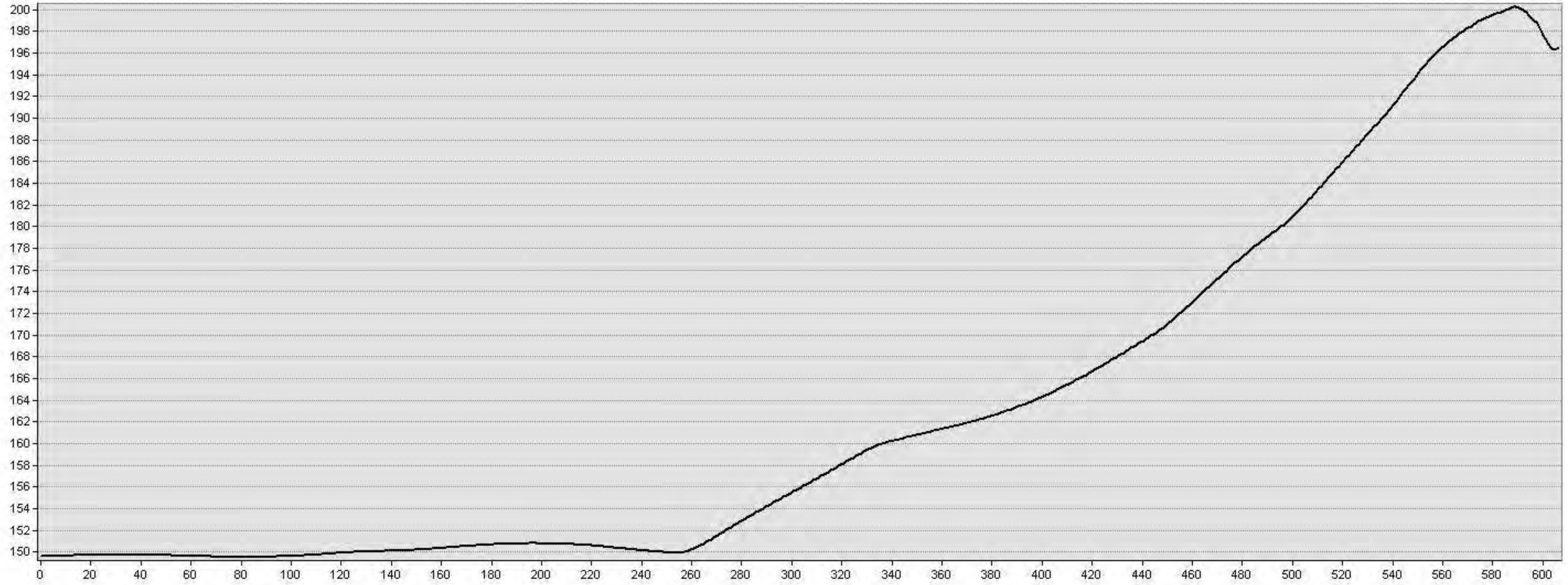
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Appendix 7 Crushing and Quarry Noise Assessment (Mr Pearu Terts)

PEARU TERTS
BA, Grad. Dip. Env. Stud. (Hons.), MIE Aust., CPENG, MAAS
Consulting Engineer

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Claremont 7011
Tasmania AUSTRALIA

ARCHITECTURAL ACOUSTICS
NOISE CONTROL

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Fax 03 6249 1296
Email pterts@southcom.com.au

Proposed Quarry, 1356 Tea Tree Road, Rekuna

S U M M A R Y.

1. The crusher and general quarry noise at the nearest residence 440 m away is estimated to be 35 dB(A) with no or little wind and 45.0 dB(A) with wind towards the nearest residence.
2. The ambient noise level near the boundary of the nearest neighbour, with the quarry shut is 39 dB(A) and the background L90 noise level was 30 dB(A) during the day.
3 The proposed quarry is likely to meet the noise requirements of the Tasmanian Quarry Code of Practice.

CLIENT: Mr. Craig Williams
1356 Tea Tree Road,
Rekuna, Tea Tree
Tasmania 7017
Tel. 62604404

INTRODUCTION:

Noise annoyance depends on the following factors:

1. the level of the existing ambient noise
2. the level of the new noise with the quarry in operation
3. whether the new noise has tonal components
4. whether the new noise has impulsive components
5. the time of the day the new noise occurs
6. whether the new noise carries unwanted intelligence such as waning announcements
7. noise annoyance is also dependent on the listener's perception of whether the noise is regretfully caused, imposed in ignorance or inflicted as an act of aggression.

The Tasmania Quarry Code of Practice (June 1999), page 10 states: "With the exception of blasting where permitted, noise from activities in a quarry affecting residential premises, must not exceed 10 dB(A) above the normal ambient noise levels during daytime operations".

For interest, in relation to blasting, the Code states on page 12, "Blasting must be carried out such that, when measured at the curtilage of the nearest residence (or sensitive use) in other occupation or ownership, air blast and ground vibration comply with the following:

a) for 95 % of the blasts, air blast overpressure must not exceed 115 dB(Lin, peak);
b) air blast overpressure must not exceed 120 dB(Lin, peak) at all; and
c) ground vibration must not exceed 5 mm/s peak particle velocity".

However, blasting will not take place in this quarry.

Noise measurements were conducted on 17/8/2014 at two locations, with the quarry not operating, to obtain ambient and background noise levels.

RESULTS:

Pages A 1 to A9 give the results of field measurements.

The main results are shown on page A 8 and A 9. In the table, Ln is the noise level exceeded for n % of the time. Hence, L90 is a good descriptor of the base or background noise level. L90 = 30.5 dB(A) means that for 90 % of the 10 minute sample, that is, 9 minutes, the noise level was 30.5 dB(A) or more. Similarly, L10 is a good descriptor of the average of the higher noise events encountered. L10 = 45.3 dB(A) means that for 10 % or 1 minute, the noise level was 45.3 dB(A) or more.

Leq is the equivalent 'A' weighted noise level. A fluctuating noise having an Leq = 43.7 dB(A) has the same acoustic energy as a steady noise of 43.7 dB(A).

Pages B 1 and B 6 show calculations of likely noise levels at the nearest neighbours, the nearest being 440 m away.

They include effects of meteorological effects such as gentle winds blowing from the quarry towards the nearest house as well as the geometric spreading of noise from a crusher. The calculations considered the noise barrier effect due to the topography but did not include the excess attenuation over grasslands.

The calculations are based on actual measurements of noise generated by an impact crusher and shifter located at the Clives Hill quarry, Old Beach.

The crusher is usually the loudest noise source in a quarry Crusher and shifter noise is calculated at the nearest neighbour (loc. 5) to be 35.3 dB(A) with no wind and 45.0 dB(A) with a gentle breeze towards the residence. See page B 3. The noise levels at the other neighbours are shown on pages B 4 to B 6 and they are less than at the predicted noise levels at the nearest neighbour.

The crusher is used, for about 14 days a year and is likely to generate during those 14 days at the nearest neighbour, a noise level between about 35dB(A) with no wind and 45 dB(A) with a gentle breeze. Stronger winds increase the background noise level because of the wind in trees and bushes.

Pages C 1 and C 6 give the topographic profiles from the quarry to the neighbours at locations 5,9,10 and 11 as shown on page B 2. Page C 7 gives the wind roses for Campania. These give an indication of wind directions likely at the quarry.

DISCUSSION:

The quarry and quarry activities are not seen from the nearest residence due to the topography and trees. Consequently any received quarry activity noise is not the direct sound but attenuated sound.

The quarry operates during daylight and does not operate on Sundays.

The measured noise levels in terms of Leq indicate that the 10 dB(A) differential requirement of the Quarry Code of Practice, between the noise level with the quarry operating and when shut down, is likely to be met 440 m away. The Leq noise levels are generally higher near residential premises due to human activities and equipment such as pumps or heat pumps.

The World Health Organization's (WHO) Guideline for noise levels outside bedrooms is that with the window open, Leq = 45 dB(A) and Lmax = 60 dB(A). These conditions too, are likely to be met.

The calculated noise levels at the nearest neighbour, with no wind is 35 dB(A) which increases to 45 dB(A) with a gentle breeze from the quarry to the neighbour. The day time ambient noise level is about 39 dB(A). The noise was due to bird life, farm animals, distant traffic, aeroplanes and dog barks. The difference between the ambient noise of 39 dB(A) and the predicted quarry noise of 45 dB(A) (wind from quarry to neighbour) is 45 – 39 = 6 dB(A) which meets the Tasmanian Quarry Code of Practice requirement of an exceedance of no greater than 10 dB(A).

Yours sincerely,

Pearu Terts

31-10-2014

1356 Tea Tree Rd, Rekuna – Data report 31 October 2014

Appendix C to be read in conjunction with main report and Appendices A and B

General

The owner, Mr Williams, seeks to operate an existing quarry within the property of 1356 Tea Tree Rd. Neighbour locations and topographic profiles from quarry to four key receivers are shown as well as wind roses for nearby Campania.

Acknowledgements

Source for plot of neighbourhood on airphoto, and topographic profiles: courtesy, Mr Barnes, Van Diemen Consulting Pty Ltd, provided 7/9/2014.

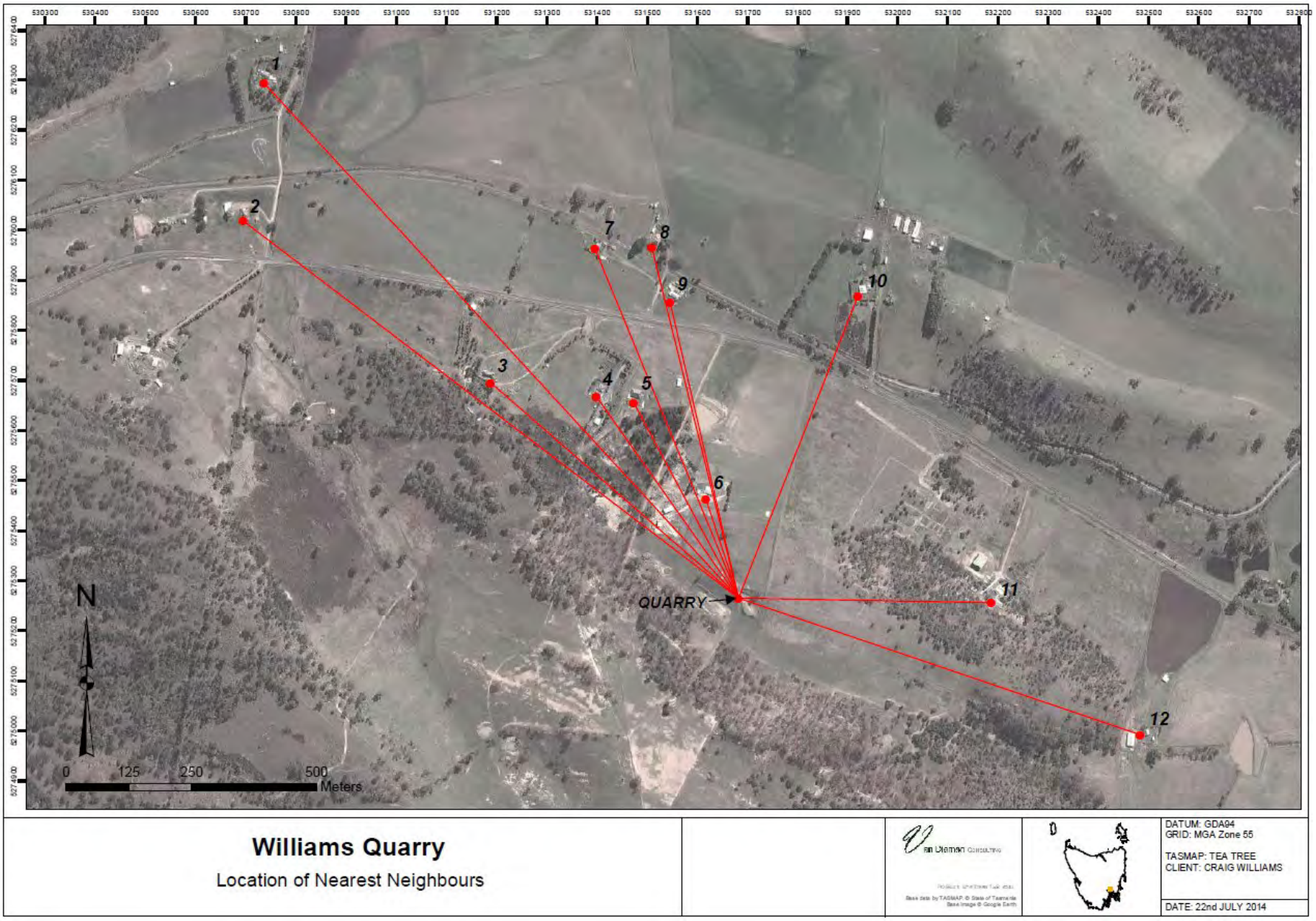
Source for Campania Wind Roses: Australian Bureau of Meteorology website, extracted 31/10/2014.

Comments

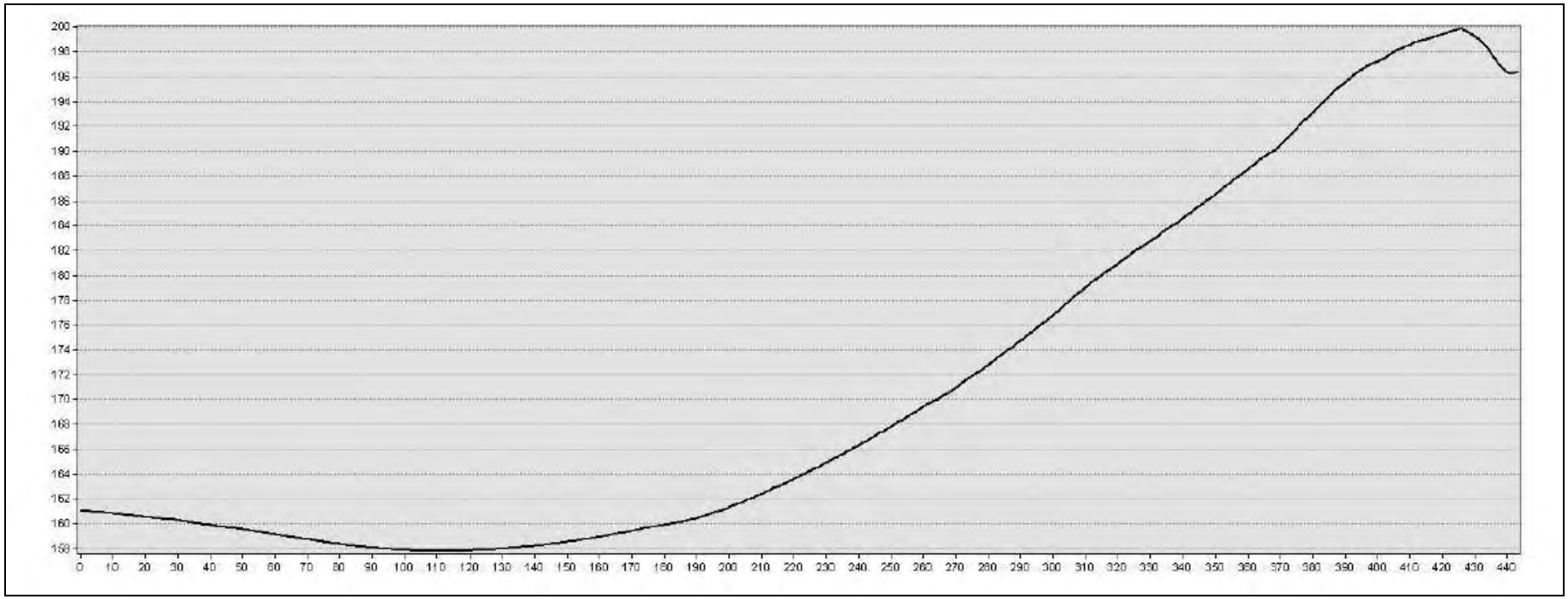
- Receiver Locations (page C2) 5, 9, 10, 11 are used in modelling for nearest neighbours, and labelled as such in Appendix B.
- Monitoring Locations 1 and 2 (described in Appendix A page 1) are very different positions from Receiver Locations 1 and 2, and should not be confused. However, Monitoring Location 1 is close to Receiver Location 6 (client's own dwelling).
- Comparing pages A2 with C2 makes the distinct identifications of Locations clear.

[Last revised 31/10/2014]

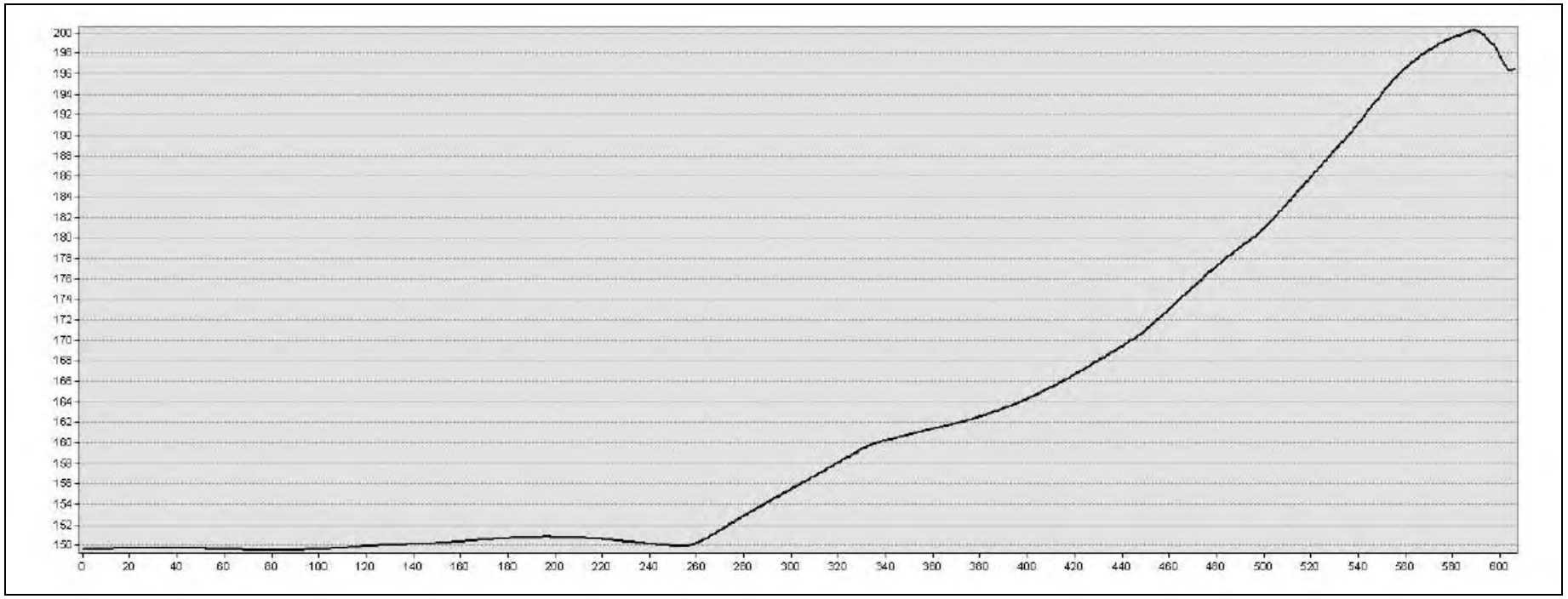
Locations – plotted airphoto indicating receiver positions at nearby dwellings in relation to quarry



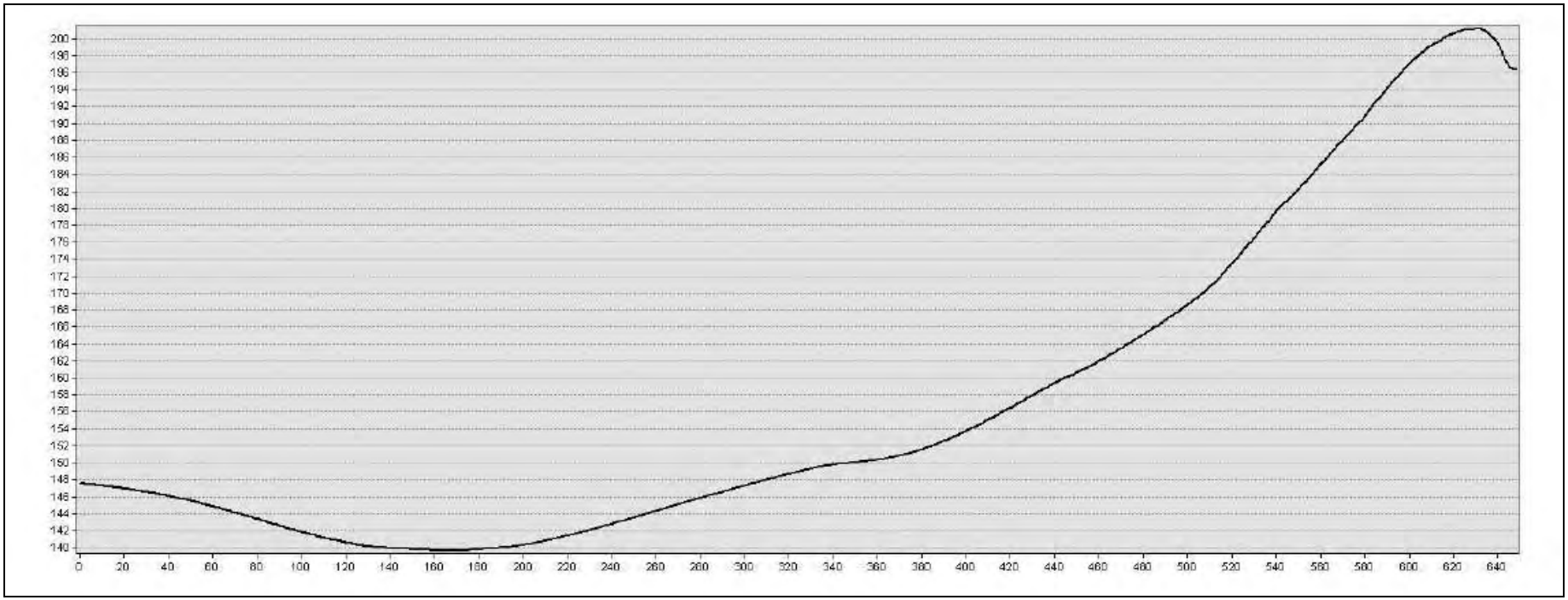
Topographic profile from Location 5 to Quarry



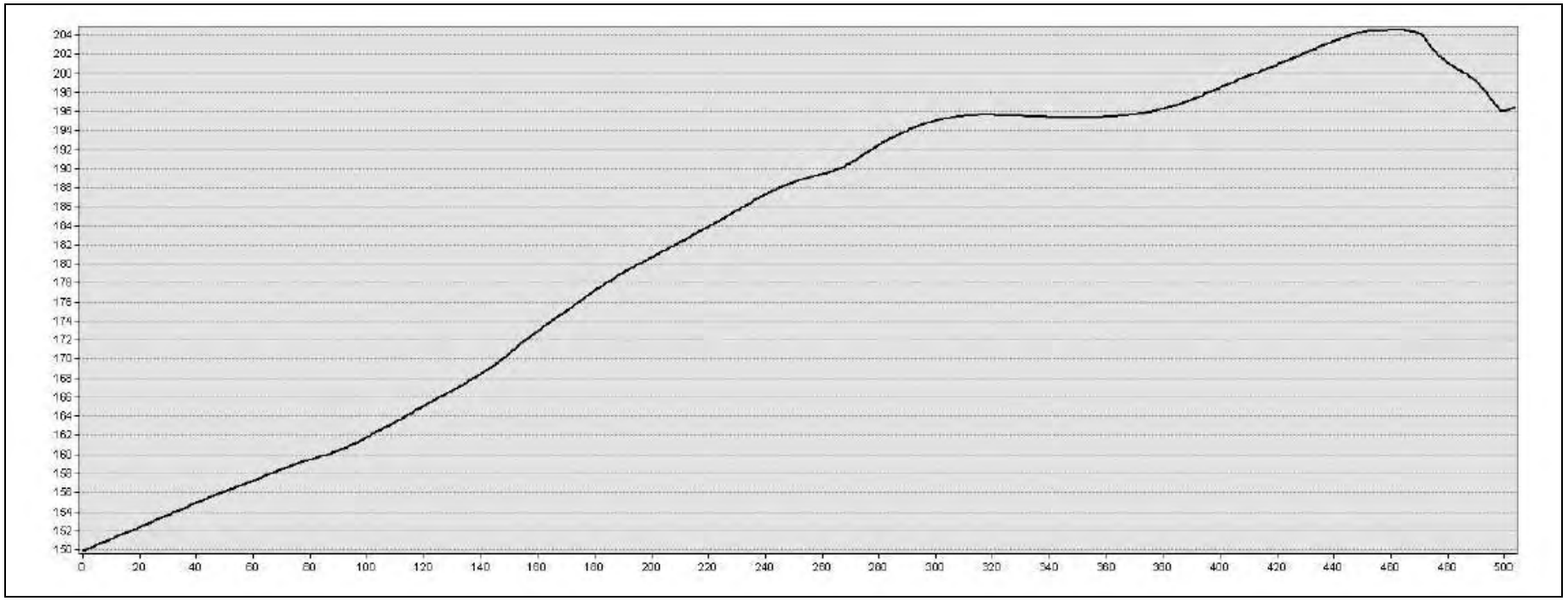
Topographic profile from Location 9 to Quarry



Topographic profile from Location 10 to Quarry



Topographic profile from Location 11 to Quarry



Wind roses for 9am and 3pm at Campania - 10 years

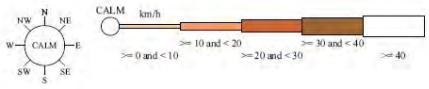
Rose of Wind direction versus Wind speed in km/h (12 Apr 2000 to 30 Sep 2010)

Custom times selected, refer to attached note for details

CAMPANIA (KINCORA)

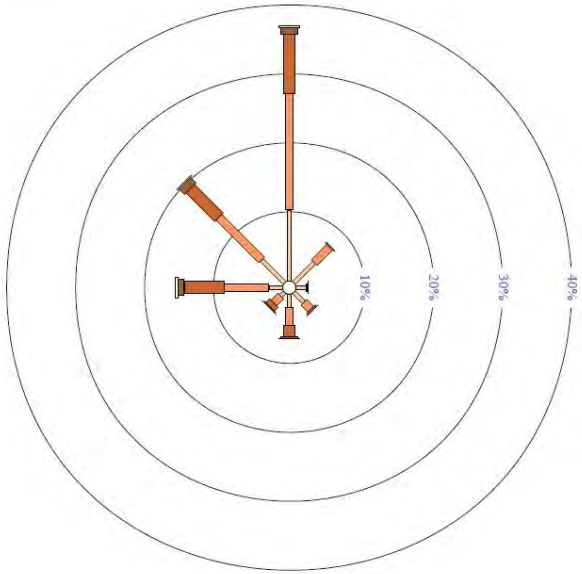
Site No: 094212 • Opened Apr 2000 • Still Open • Latitude: -42.6867° • Longitude: 147.4258° • Elevation 45m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
3788 Total Observations

Calm 5%



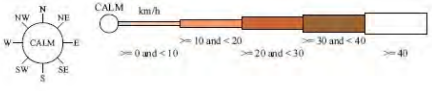
Rose of Wind direction versus Wind speed in km/h (12 Apr 2000 to 30 Sep 2010)

Custom times selected, refer to attached note for details

CAMPANIA (KINCORA)

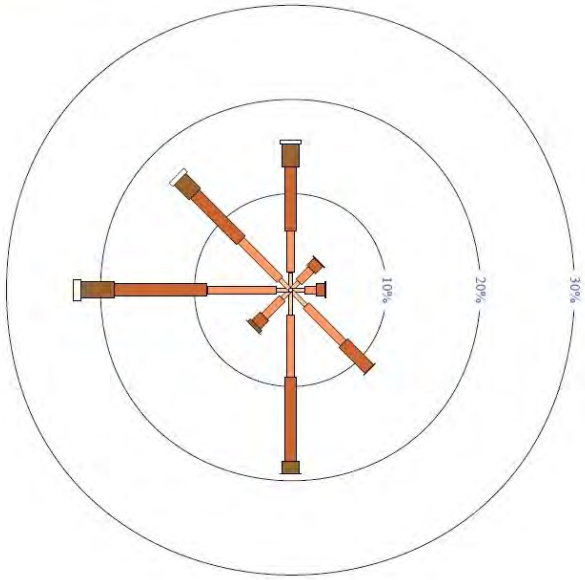
Site No: 094212 • Opened Apr 2000 • Still Open • Latitude: -42.6867° • Longitude: 147.4258° • Elevation 45m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
3793 Total Observations

Calm 1%



1356 Tea Tree Rd, Rekuna – Field report from site visit 17 August 2014

Appendix A to be read in conjunction with main report

General

The owner, Mr Williams, seeks to operate an existing quarry within the property of 1356 Tea Tree Rd. The site was visited 12:00-15:00, Sunday 17/8/2014 for noise measurements and observations during the daytime.

Instruments used

- Brűel & Kjær Sound Level Calibrator Type 4230 s/n s/n 1169836, Laboratory Certified December 2013;
- Rion Precision Integrating Sound Level Meter Model NL-11, s/n 150321, with Rion Octave Band Filter Model NX-01A, s/n 10851228;
- Brűel & Kjær Statistical Noise Analyser Type 4426 s/n 957489,
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);
- Hema Navigator 5" GPS, s/n HN5A1209001368,

Location definitions

The locations for measurements were defined as follows:

GPS datum AMG 1966 - 55G				Definition/Comments
Loc #	Location	m East	m North	
1	Owners house	531513	5275268	Beside clothes line to the rear of the house, Microphone at 1.2 m height
2	Dam	531452	5275402	By driveway, adjacent top of small dam, Microphone at 1.2 m height

Position plotted on aerial photo and photographs of location are on the following pages.

Weather observations

Conditions suitable for noise measurements.
Details are shown alongside.

Weather observations	
Date	17/8/2014
Location	Loc 2
Time	13:20
Temp °C	12
Relative Humidity %	57
Pressure hPa	1005
Wind speed average m/s	0.9
Wind speed max m/s	4
Wind direction	W
Cloud cover x/8	4

[Last revised 30/10/2014]

Location – plotted airphoto indicating monitoring positions

Monitoring location plotted approximately. Base image sourced from TheList 23/7/2014.
Included overlay of boundary lines, 10 m contours and 100 m scale bar. Note: changes have occurred since this image was captured by satellite

Panorama photograph

Panorama of Location 1 showing wide northern arc. 17/8/2014.
Note the 2-photo composite has some join error and distortion.

Panorama photograph

Panorama of Location 2 showing wide northern arc. Neighbour house in left background. 17/8/2014.
Note the 2-photo composite has some join error and distortion.

Panorama photograph

Panorama of existing quarry showing wide western arc. 17/8/2014.
Note the 3-photo composite has some join error and distortion.

Site photographs

View northeast at Location 2, 17/8/2014.

View to north from quarry, 17/8/2014.

Noise descriptions

For each location, ambient noise by source noted during the site visit is listed (in descending order of significance by loudness, noticeability, duration and incidence):

Location 1

- Birds, including noisy mynas, crow
- Tea Tree Rd traffic, 100 km/h zone, including cars, motorbikes, truck
- Aircraft, including jet airliners and light aircraft
- Dog (neighbour)
- Crickets
- Cow

Location 2

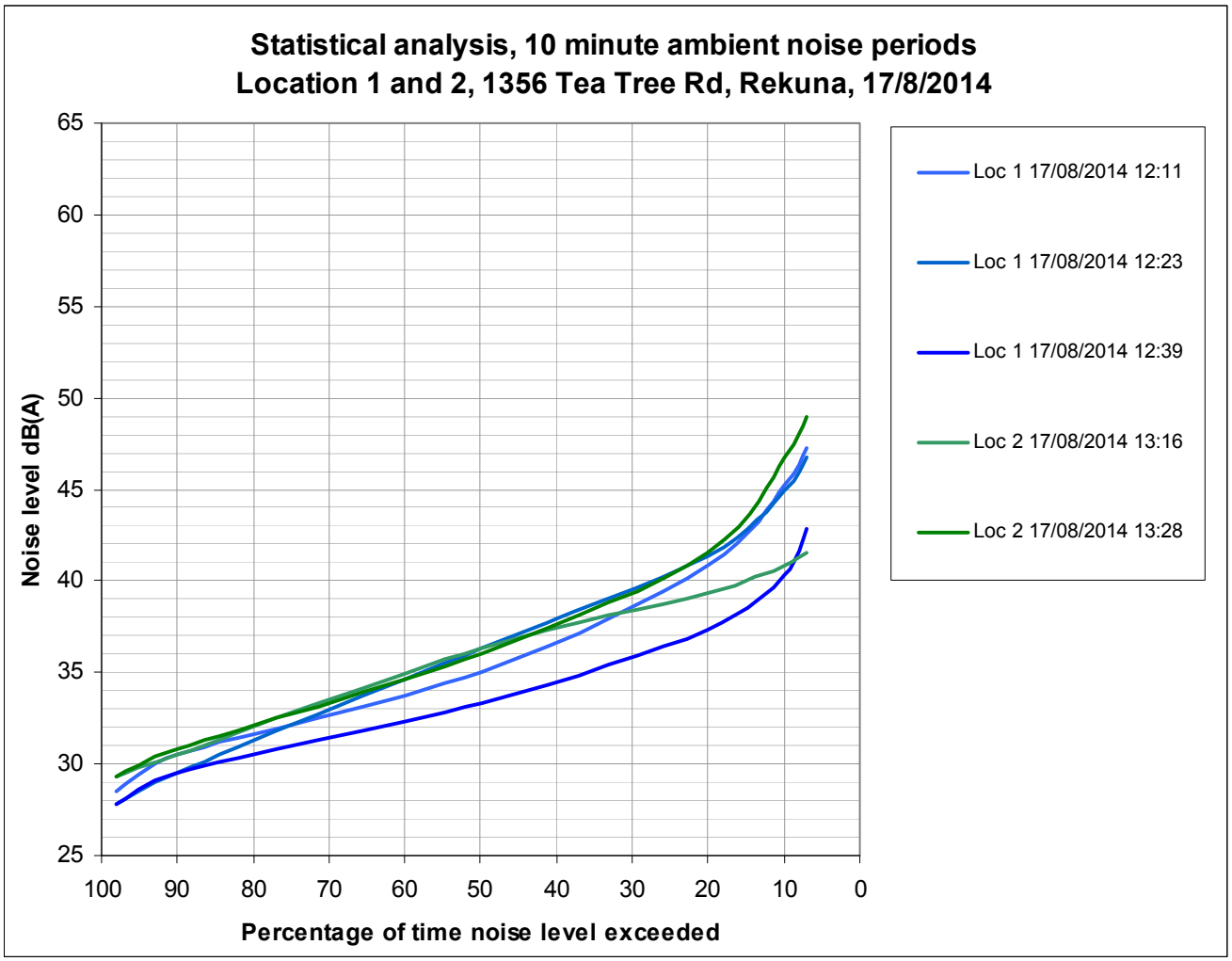
- Dog (neighbour)
- Tea Tree Rd traffic, 100 km/h zone, including cars, motorbikes, truck
- Birds, including crows, mynas, magpie
- Aircraft, including jet airliners and light aircraft
- Frogs
- Sheep

Comments

- Daytime noise measurements were conducted under suitable conditions.
- Beside Tea Tree Rd is the Hobart-Launceston railway, with substantial grade rising to the west.
- Quarry depth is currently 3-5 m, with a landing area a short distance to WSW.

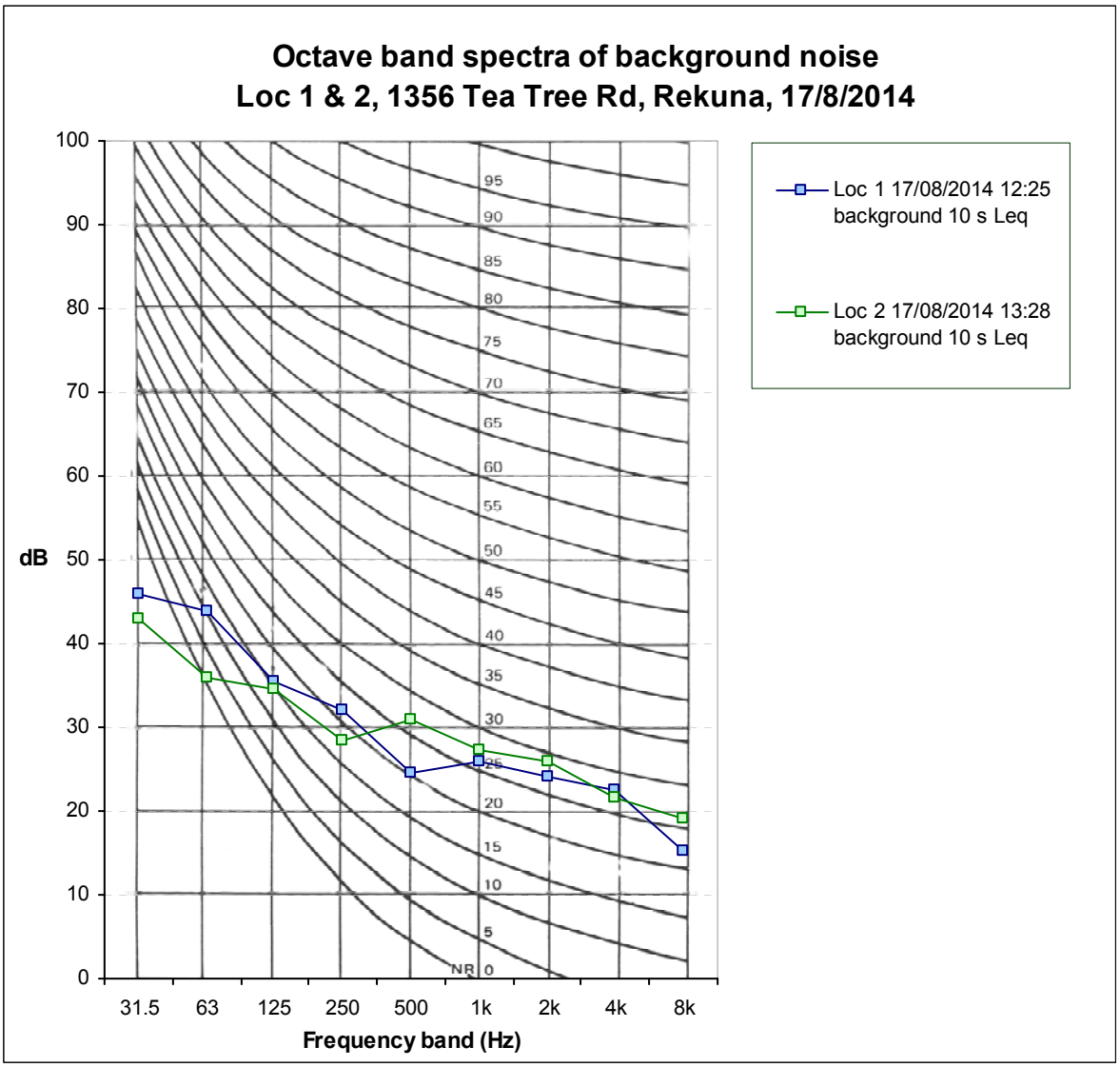
Measurements and statistical analysis of noise over 10 minute periods

Location	Loc 1	Loc 1	Loc 1	Loc 2	Loc 2
Date	17/08/2014	17/08/2014	17/08/2014	17/08/2014	17/08/2014
Time	12:11	12:23	12:39	13:16	13:28
Duration	10	10	10	10	10
Samples	6000	6000	6000	6000	6000
Noise	ambient	ambient	ambient	ambient	ambient
Cars	15	14	15	17	12
Trucks	0	0	0	0	1
Motorbikes	1	1	0	1	5
Comment	birds	birds	-	-	neighbour dog
L10	45.3	45.0	40.3	40.8	46.8
L20	40.8	41.3	37.3	39.3	41.5
L50	35.0	36.3	33.3	36.3	36.0
L90	30.5	29.5	29.5	30.5	30.8
Leq A	43.7	41.2	41.6	38.8	44.2



Spectral analysis of background noise

Location	Loc 1	Loc 2
Date	17/08/2014	17/08/2014
Start time	12:25	13:28
Noise	background	background
Duration	10 s Leq	10 s Leq
Octave band Hz 31.5	45.9	43.0
63	43.9	35.9
125	35.5	34.5
250	32.1	28.3
500	24.6	30.8
1k	25.9	27.3
2k	24.0	25.8
4k	22.6	21.5
8k	15.3	19.2



1356 Tea Tree Rd, Rekuna – Prediction report 23 October 2014

Appendix B to be read in conjunction with main report and Appendix A

General

The owner, Mr Williams, seeks to operate an existing quarry within the property of 1356 Tea Tree Rd. Site background measurements are compared with quarry noise received at neighbouring locations modelled for topography and distance based on quarry crusher measurements from Old Beach.

Instruments used

- Brűel & Kjær Sound Level Calibrator Type 4230 s/n s/n 1169836, Laboratory Certified December 2013;
- Rion Precision Integrating Sound Level Meter Model NL-11, s/n 150321, with Rion Octave Band Filter Model NX-01A, s/n 10851228;
- Brűel & Kjær Statistical Noise Analyser Type 4426 s/n 957489,
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);

Location definitions

The locations for measurements were defined as follows:

GPS datum AMG 1966 - 55G				Definition/Comments
Loc #	Location	m East	m North	
1	Owners house	531513	5275268	Beside clothes line to the rear of owners house, Microphone at 1.2 m height
2	Dam	531452	5275402	By driveway, adjacent top of small dam, Microphone at 1.2 m height
A	Old Beach quarry	Off site		38 m from crusher, direct line of sight. Clive Hill, Baskerville Rd, Old Beach

Positions of onsite and receiver locations are plotted on aerial photo on following page.

Comments

- Spectral data measured at Location 2 is BACKGROUND noise in absence of traffic. It is expected that background noise is similar around the neighbourhood, unless localised continuous noise is present, such as heat pump operation.
- Ambient noise at Locations 1 and 2, shown on page A8, is significantly above background levels, dominated by traffic, and hence is influenced by distance from Tea Tree Rd. Ambient noise at neighbour locations would vary with distance from Tea Tree Rd, and perhaps influenced by local sources such as dogs.
- Clive Hill Quarry, Old Beach: Jakes crusher noise measured over 1 minute, at a position in direct line of sight at 38 m distance.
- Predictions were undertaken for receivers at the nearest neighbour dwellings. Predictions include modelling for distance, topography, under for neutral calm conditions, and for light breeze towards quarry (favourable) and light breeze towards receiver (unfavourable).

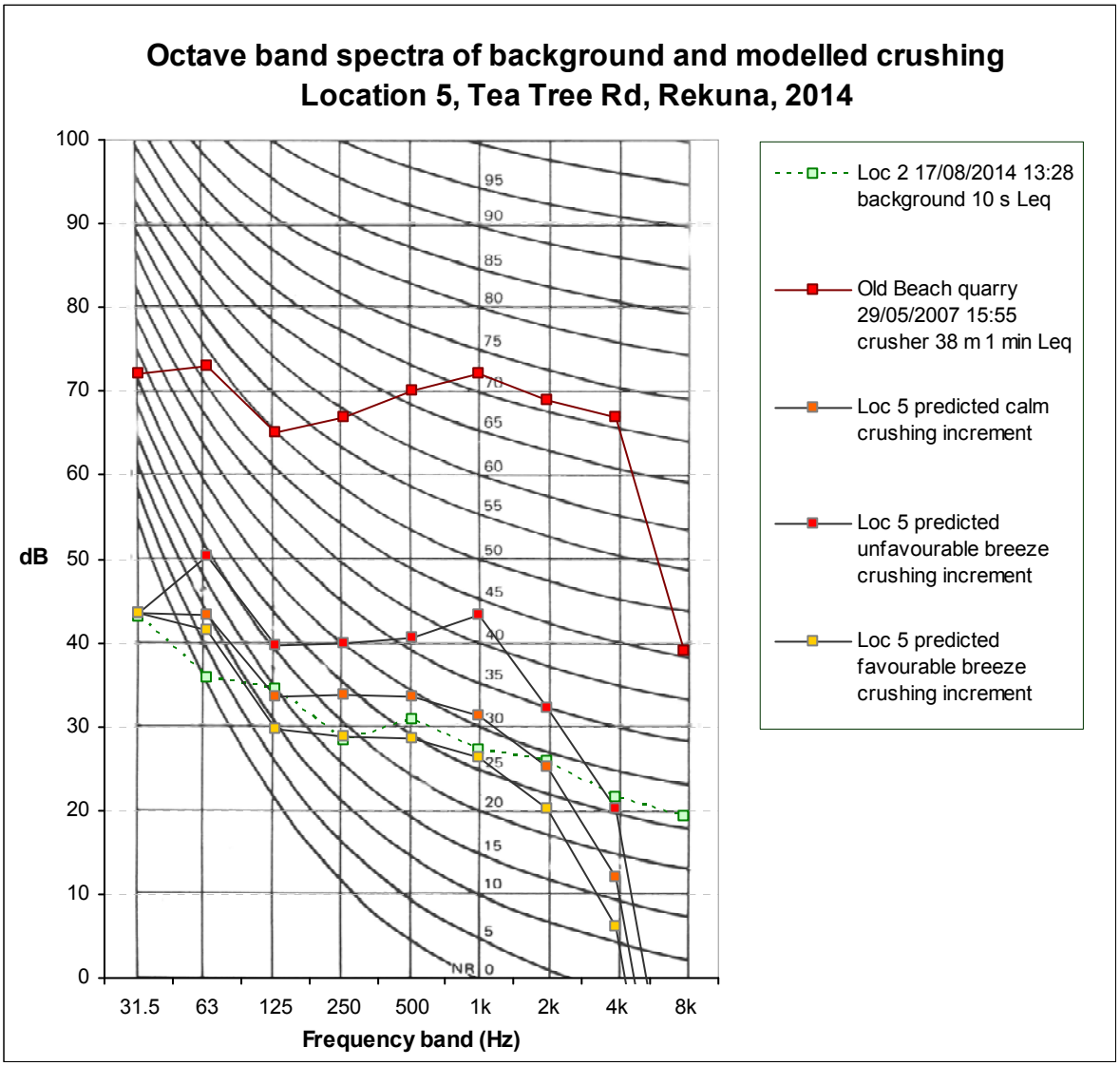
[Last revised 31/10/2014]

Location – plotted airphoto indicating monitoring positions

Monitoring and modelling locations plotted approximately. Base image sourced from TheList 23/7/2014.
Included overlay of boundary lines, 10 m contours and 100 m scale bar. Note: changes have occurred since this image was captured by satellite

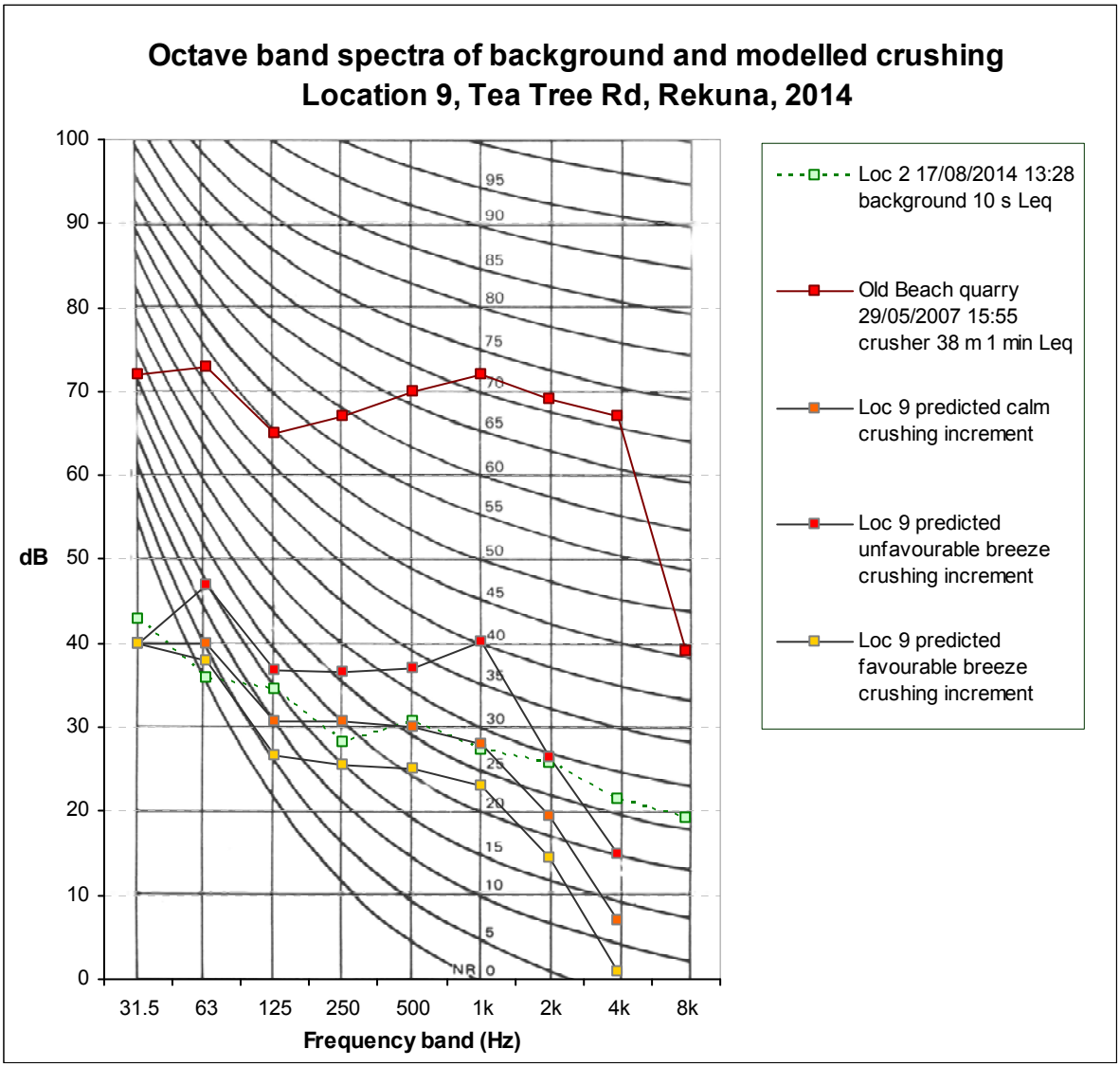
Spectral analysis of background, source model and predicted noise for Loc 5

Location	Loc 2	Old Beach quarry	Loc 5	Loc 5	Loc 5
Date	17/8/2014	29/5/2007	predicted	predicted	predicted
Start time	13:28	15:55			
Noise	background	crusher 38 m	crushing increment	crushing increment	crushing increment
Duration/condition	10 s Leq	1 min Leq	calm	unfavourable breeze	favourable breeze
A	33.1	75.8	35.3	45.0	30.4
C	42.8	78.4	45.7	51.8	44.0
Octave band Hz 31.5	43.0	72.0	43.6	43.6	43.6
63	35.9	73.0	43.4	50.4	41.4
125	34.5	65.0	33.6	39.6	29.6
250	28.3	67.0	33.8	39.8	28.8
500	30.8	70.0	33.6	40.6	28.6
1k	27.3	72.0	31.4	43.4	26.4
2k	25.8	69.0	25.2	32.2	20.2
4k	21.5	67.0	12.1	20.1	6.1
8k	19.2	39.0	-	-	-



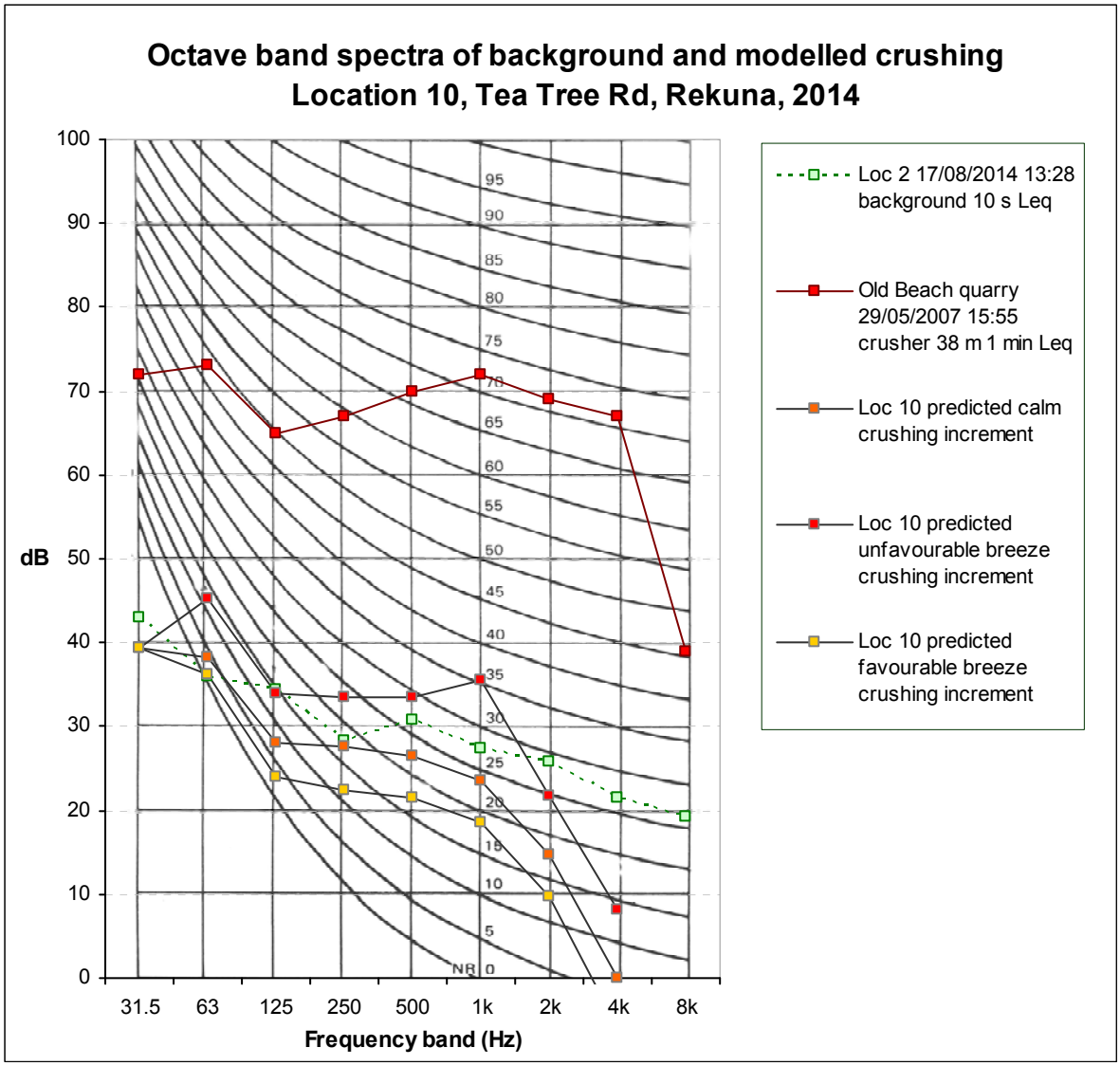
Spectral analysis of background, source model and predicted noise for Loc 9

Location	Loc 2	Old Beach quarry	Loc 9	Loc 9	Loc 9
Date	17/8/2014	29/5/2007	predicted	predicted	predicted
Start time	13:28	15:55			
Noise	background	crusher 38 m	crushing increment	crushing increment	crushing increment
Duration/condition	10 s Leq	1 min Leq	calm	unfavourable breeze	favourable breeze
A	33.1	75.8	31.7	41.5	26.8
C	42.8	78.4	42.2	48.4	40.5
Octave band Hz 31.5	43.0	72.0	39.9	39.9	39.9
63	35.9	73.0	39.9	46.9	37.9
125	34.5	65.0	30.7	36.7	26.7
250	28.3	67.0	30.6	36.6	25.6
500	30.8	70.0	30.1	37.1	25.1
1k	27.3	72.0	28.1	40.1	23.1
2k	25.8	69.0	19.4	26.4	14.4
4k	21.5	67.0	6.9	14.9	0.9
8k	19.2	39.0	-	-	-



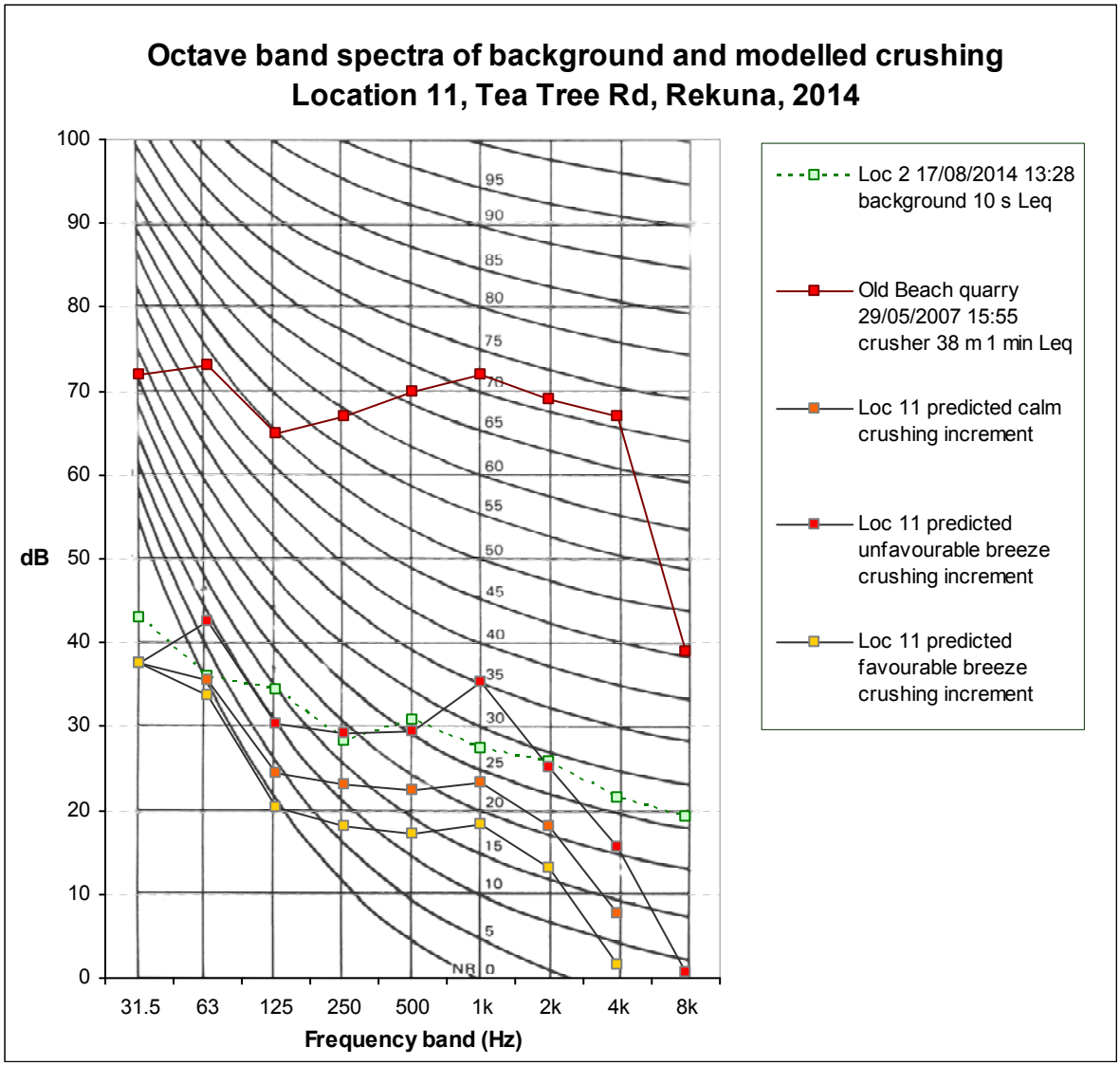
Spectral analysis of background, source model and predicted noise for Loc 10

Location	Loc 2	Old Beach quarry	Loc 10	Loc 10	Loc 10
Date	17/8/2014	29/5/2007	predicted	predicted	predicted
Start time	13:28	15:55			
Noise	background	crusher 38 m	crushing increment	crushing increment	crushing increment
Duration/condition	10 s Leq	1 min Leq	calm	unfavourable breeze	favourable breeze
A	33.1	75.8	27.8	37.3	22.9
C	42.8	78.4	40.6	46.2	39.2
Octave band Hz 31.5	43.0	72.0	39.3	39.3	39.3
63	35.9	73.0	38.3	45.3	36.3
125	34.5	65.0	28.0	34.0	24.0
250	28.3	67.0	27.5	33.5	22.5
500	30.8	70.0	26.5	33.5	21.5
1k	27.3	72.0	23.6	35.6	18.6
2k	25.8	69.0	14.8	21.8	9.8
4k	21.5	67.0	0.1	8.1	-
8k	19.2	39.0	-	-	-



Spectral analysis of background, source model and predicted noise for Loc 11

Location	Loc 2	Old Beach quarry	Loc 11	Loc 11	Loc 11
Date	17/8/2014	29/5/2007	predicted	predicted	predicted
Start time	13:28	15:55			
Noise	background	crusher 38 m	crushing increment	crushing increment	crushing increment
Duration/condition	10 s Leq	1 min Leq	calm	unfavourable breeze	favourable breeze
A	33.1	75.8	26.3	36.5	21.5
C	42.8	78.4	38.3	43.8	37.0
Octave band Hz 31.5	43.0	72.0	37.6	37.6	37.6
63	35.9	73.0	35.6	42.6	33.6
125	34.5	65.0	24.4	30.4	20.4
250	28.3	67.0	23.1	29.1	18.1
500	30.8	70.0	22.3	29.3	17.3
1k	27.3	72.0	23.3	35.3	18.3
2k	25.8	69.0	18.1	25.1	13.1
4k	21.5	67.0	7.6	15.6	1.6
8k	19.2	39.0	-	0.6	-



Appendix 8 Truck Noise Survey

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Proposed Quarry, 1356 Tea Tree Road, Rekuna 23/3/2015
Response to EPA queries

S U M M A R Y.

1. Empty and loaded trucks travelling on the quarry access road gave the following noise levels at 84 m:

	Leq (10 min) dB(A)	
Loaded from quarry	Empty to quarry	Ambient
44.8	47.0	46.2
48.6	47.4	43.6
46.6	45.3	45.7

The results included Tea Tree Rd. traffic.

2. The maximum noise levels at 84 m were as follows:

	dB(A)	
Loaded	Empty	Tea Tree Rd traffic
60.1	58.5	63.1

3. We estimate that at the nearest house (# 5 on page C 2 of previous report),the access road is 111 m away and therefore there will be a reduction of truck noise by 2.4 dB(A) and possibly more because the road/tyre interaction is not visible because of the embankment. The Tea Tree Road is closer than our measuring location near the dam and therefore the Tea Tree Rd. traffic is about 1 dB or more louder. The quarry truck noise levels are acceptable.

4. The reflection effect off the irregular quarry face is likely to increase the noise level by no more than 2.5 dB(A). There are no sensitive areas south of the quarry face on which the noise can impinge. and therefore it does not cause environmental nuisance.

5. The acoustic climate near the nearest residence is not tranquil. The Tea Tree Rd., traffic noise dominates with high speed heavy vehicles and large tyred 4 WD vehicles. In addition there are jet air liners, motor bikes and goods trains blowing their warning horns twice near each railway crossing.

CLIENT: Mr. Craig Williams
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Rekuna, Tea Tree
Tasmania 7017
Tel. 62604404
Cc Dr R. Barnes, e-mail: rwbarnes@gmail.com

INTRODUCTION:

On Friday 20/3/2015 we set up sound level measuring instruments to record the noise made by empty and loaded quarry trucks on the quarry access road. The measuring station was 84 m from the access road, near Mr Williams' dam and approximately 220 m from Tea Tree Road.
Two trucks were used.

Truck No 1 was a 1998 Mack, model CH, Reg. No B 25 Q 3, powered by a 6 cylinder diesel engine of 400 HP. It was rated at 21.5 t gross.

Truck No 2 was a Volvo, Model NH 12, VIN YV5B4B 3D9WD 120350, powered by a 6 cylinder diesel turbo engine of 420 HP. It is rated at 21.5 t gross.

The weather was windy at times but there was no rain and the road surface was dry. The wind was WNW, that is, blowing from the access road towards the measuring station.

We did not measure any train noise during the period but did record jet air liners and Tea Tree Rd. traffic.

On one occasion, the Tea Tree Rd. traffic noise dominated our truck noise tests and the test had to be repeated.

RESULTS:

The results are given in appendix D, consisting of paged D 1 to D 19.

The main results are shown on page D 6. In the table, Ln is the noise level exceeded for n % of the time. Hence, L90 is a good descriptor of the base or background noise level. L90 = 36.9 dB(A) means that for 90 % of the 10 minute sample, that is, 9 minutes, the noise level was 36.9 dB(A) or more. Similarly, L10 is a good descriptor of the average of the higher noise events encountered. L10 = 48.4 dB(A) means that for 10 % or 1 minute, the noise level was 48.4 dB(A) or more.

Leq is the equivalent 'A' weighted noise level. A fluctuating noise having an Leq = 44.8 dB(A) has the same acoustic energy as a steady noise of 44.8 dB(A).

Pages D 8 and D 9 show the spectral content of the measured noise. The slight increase in the 1000 Hz frequency band is due to the road/tyre interaction noise from Tea Tree Rd. high speed traffic.

Pages D 10 to D 19 show time recordings of test truck and other ambient noise events.
The empty and loaded trucks travelling on the quarry access road gave the following noise levels at 84 m:

	Leq (10 min) dB(A)		
	loaded from quarry	empty to quarry	ambient
	44.8	47.0	46.2
	48.6	47.4	43.6
	46.6	45.3	45.7
Mean	46.7	46.6	45.2

The above results included Tea Tree Rd. traffic noise

The maximum noise levels at 84 m were as follows:

	dB(A)	
Loaded	Empty	Tea Tree Rd. traffic noise
60.1	58.5	63.1

The nearest house (# 5 on page C 2 of previous report) is 111 m from the access road and 200 m from Tea tree Road. Consequently, the quarry truck noise is reduced by 10 log (111/84) = 2.4 dB(A) or possibly more because the quarry road/tyre interaction is not visible at the house because of the embankment The Tea Tree Rd. traffic noise is increased by 20 log (200/220) = 0.9 dB(A) or possibly more because house # 5 (220 m) is closer to Tea Tree Rd than was our measuring location at about 200 m.

Consequently, the quarry truck noise is likely to be 2.4 dB(A) or more lower than the measured noise levels in the above table and the Tea Tree Rd traffic noise is likely to be slightly higher than shown in the above table.

REFLECTIVE NOISE OFF THE QUARRY FACE

The quarry face has a surface that is irregular and somewhat curved. Noise reflecting off a flat surface increases the sound pressure level 1 m from such a surface by 3 dB but in practice, about 2.5 dB. The quarry face has protrusions and recesses that help to diffuse the sound, particularly mid and high frequency sound. Low frequency sound having a wavelength much larger than the length of the protrusions will reflect and possibly focus at an area in front of the quarry but to the south of the quarry on Mr Williams' land. There are no sensitive areas or buildings in front of the quarry face and any increase in noise is unlikely to cause an environmental nuisance.

DISCUSSION:

The quarry operates during daylight and does not operate on Sundays.

The noise climate near the nearest neighbour is not tranquil because of high speed Tea Tree Rd. traffic, jet airliners and proximity to a railway that carries goods trains that have to legally blow their warning horns twice at each railway crossing.

On an average there will be 3 quarry truck movements per hour. The difference between the quarry truck noise and the ambient noise from the above tests is only 46.7 – 45.2 = 1.5 dB(A) This difference is marginal and may be within experimental error The octave band spectra on page D 8 shows that for all the measurements, the variation in the 1000 Hz octave band centre frequency levels was least, implying that the dominant steady noise was the Tea Tree Road tyre/road interaction noise.

The maximum noise level generated by the quarry truck was 60.1 dB(A). At the nearest house this is likely to be 60.1 – 2.4 = 57.7 dB(A). To this we add the façade effect of 2.5 dB(A) making a total of 60.2 dB(A). Such a noise event, perhaps once every 20 minutes is not intrusive. To put it into context, a traffic noise criterion often used by road authorities is that L10 (18 h) = 63 dB(A). When this is exceeded, noise complaints start gradually to increase. L10 is the 10^{th} percentile and this is measured and averaged over 18 hours from 0600 to mid night.

The World Health Organization's (WHO) Guideline for noise levels outside bedrooms at night with the window open is 45 dB(A) and the maximum noise level (Lmax) should not exceed 60 dB(A).These conditions are likely to be met as the quarry is inoperative at night.

Yours sincerely,

Pearu Terts

1356 Tea Tree Rd, Rekuna – Field report from site visit 20 March 2015

Appendix D to be read in conjunction with main report

General

The owner, Mr Williams, seeks to operate an existing quarry within the property of 1356 Tea Tree Rd. The site was visited 10:15-14:15, Friday 20/3/2015 for noise measurements and observations during the daytime, with a focus on measuring noise of test truck movements.

Instruments used

- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1169836, Laboratory Certified February 2014;
- Norsonic Precision Sound Level Meter Nor131, s/n 1312829, Laboratory Certified December 2014;
- Rion Precision Integrating Sound Level Meter Model NL-11, s/n 150321, with Rion Octave Band Filter Model NX-01A, s/n 10851228,
- Brűel & Kjær Precision Sound Level Meter Type 2232 s/n 1129761;
- Brűel & Kjær Precision Sound Level Meter and Octave Analyser Type 2215 s/n 1010392,
- Brűel & Kjær Level Recorder Type 2306;
- Standard Sound Level Meter/Datalogger ST8852, s/n 12104155
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);
- 100 m fiberglass tape

Location definitions

The locations for measurements were defined as follows:

#	Location	Definition/Comments
3	Field opposite neighbour	84 m from main driveway along inter-dam & farm service track, Approximately opposite the adjacent neighbour dwelling Microphone at 1.2 m height

Position plotted on aerial photo and photographs of location are on the following pages.

Weather observations

Conditions suitable for noise measurements.
Gusts of wind raised ambient noise at times.
Details are shown alongside.

Weather observations	
Date	20/03/2015
Location	Loc 3
Time	11:00
Temp ℃	16
Relative Humidity %	54
Pressure hPa	1000
Wind speed average m/s	3.1
Wind speed maximum m/s	9.8
Wind direction	WNW
Cloud cover x/8	3

[Last revised 23/3/2015]

Location – plotted airphoto indicating monitoring positions

Monitoring location plotted approximately. Base image sourced from TheList 23/7/2014.
Included overlay of boundary lines, 10 m contours and 100 m scale bar. Note: changes have occurred since this image was captured by satellite

Site photographs

View of loaded test truck passing downhill at Location 3, 20/3/2015.

View of empty test truck passing downhill at Location 3, 20/3/2015.

Noise descriptions

For each location, ambient noise by source noted during the site visit is listed (in descending order of significance by loudness, noticeability, duration and incidence):

Location 3

- Tea Tree Rd traffic, 100 km/h zone, including cars, trucks, motorbike,
- Test truck movements
- Birds, including crows, magpies, cockatoos
- Aircraft, including jet airliners
- Dog (neighbour)
- Crickets (persistent)

Test details

- Location 3 is 84.0 m from the access road where it rises at 3° gradient from Tea Tree Rd.
  Tea Tree Rd passes approximately 250 m from Location 3
- Loaded test truck: Mack CH (1998) dump truck, 400 HP, 21.5 GVM with 12 t gravel, Reg B25Q3, driven 20 km/h.
- Prime mover only: Volvo NH12 (1998), 420 HP, 21.5 GVM, VIN YV5B4B3D9WD, driven 30 km/h
- Empty test truck: Volvo as above, fitted with dump tray, driven 30 km/h

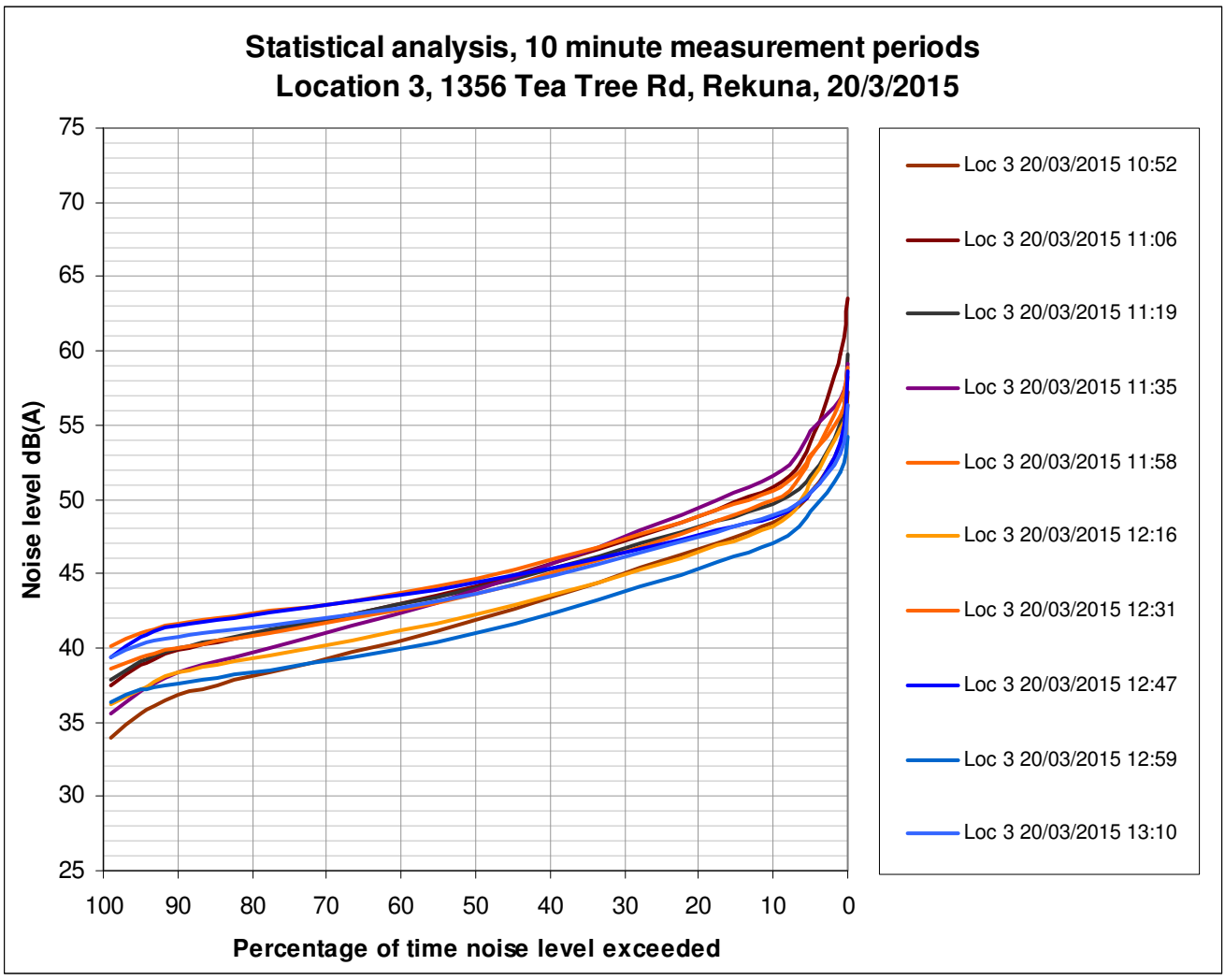
Comments

- Daytime noise measurements were conducted under suitable conditions.
- Ambient noise is dominated by traffic on Tea Tree Rd, 100 km/h zone, including trucks.
- Noise increment of test truck pass was of marginal significance over 10 minute measurement periods. The major factor determining noise variation among measurement periods was fluctuation in traffic numbers and vehicle mix passing Tea Tree Rd.
- Beside Tea Tree Rd is the Hobart-Launceston railway, with substantial grade rising to the west. No trains passed during the visit.

Measurements and statistical analysis of noise over 10 minute periods

Location	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3
Date	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015
Time	10:52	11:06	11:19	11:35	11:58	12:16	12:31	12:47	12:59	13:10
Duration	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Samples	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Test	Loaded UP	Loaded DOWN	Loaded DOWN	Prime DOWN + UP	Empty UP	Empty DOWN	Empty UP	Ambient	Ambient	Ambient
LAmax	58.1	64.7	62.3	61.9	63.7	61.8	59.3	61.5	56.1	57.8
LA0.1	57.2	63.5	59.8	59.1	58.9	56.3	58.3	58.6	54.2	56.3
LA1	53.7	59.8	55.1	56.8	56.6	54.7	55.6	53.8	51.8	53.1
LA5	50.5	53.9	51.6	54.6	52.8	51.2	53.0	50.5	49.2	50.4
LA10	48.4	50.8	49.7	51.6	50.0	48.2	50.6	48.8	47.1	48.9
LA50	41.9	44.2	44.0	43.9	43.6	42.3	44.6	44.4	41.0	43.7
LA90	36.9	39.9	40.0	38.4	40.0	38.4	41.6	41.5	37.6	40.8
LA95	35.6	38.9	39.1	37.1	39.4	37.2	41.0	40.7	37.2	40.3
LA99	33.9	37.5	37.9	35.6	38.6	36.2	40.1	39.4	36.3	39.4
LAmin	32.1	36.1	36.2	33.6	37.6	35.0	39.2	38.6	34.7	37.6
Leq A	44.8	48.6	46.6	47.7	47.0	45.3	47.4	46.2	43.6	45.7
Leq C	62.4	71.2	70.3	66.4	70.8	65.3	68.1	68.7	61.2	66.3

Statistical analysis of noise over 10 minute periods

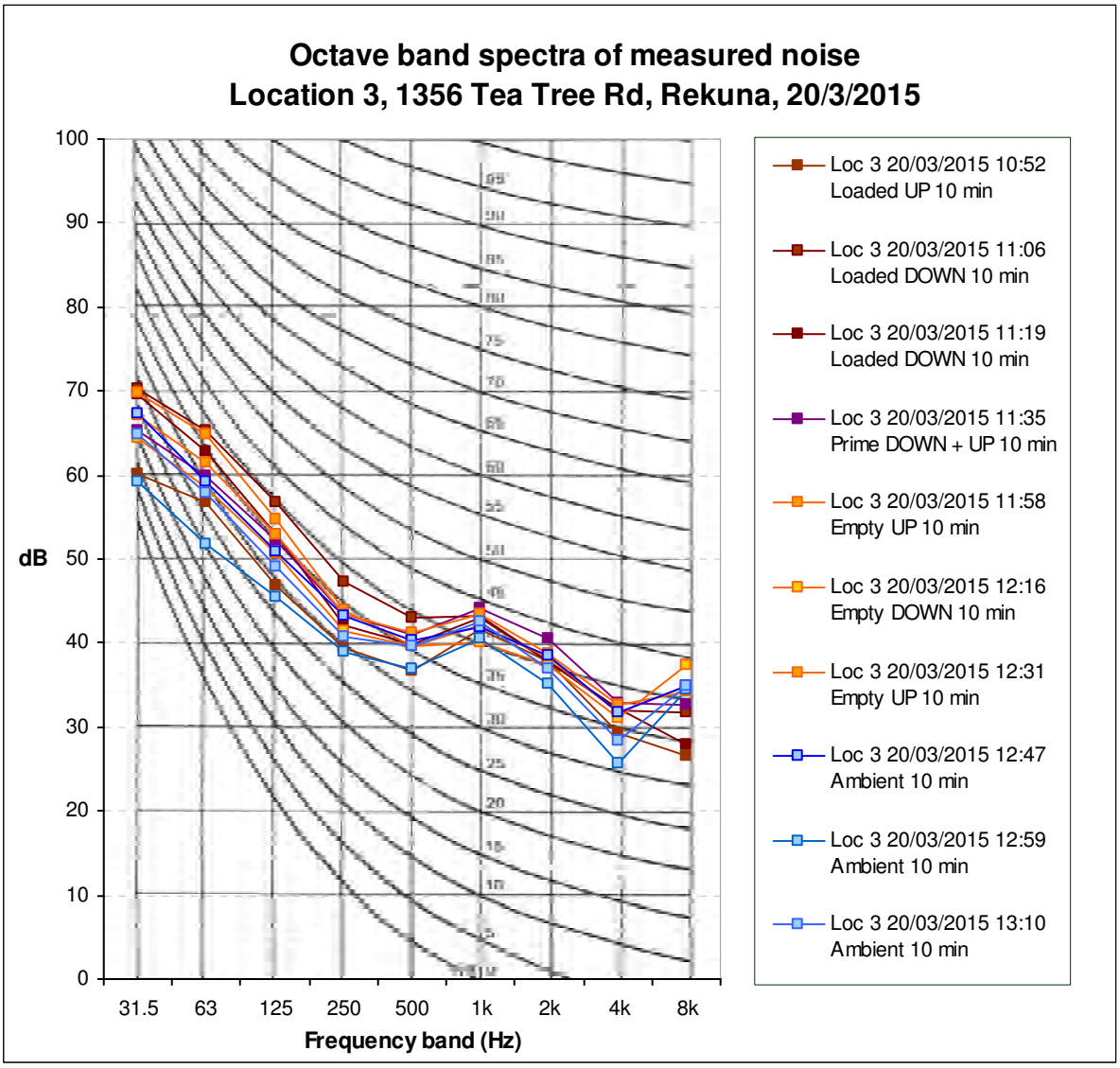


The statistical curves of all tests and ambient measurements fall within a 5 dB envelope

Spectral analysis of ambient and test noise periods

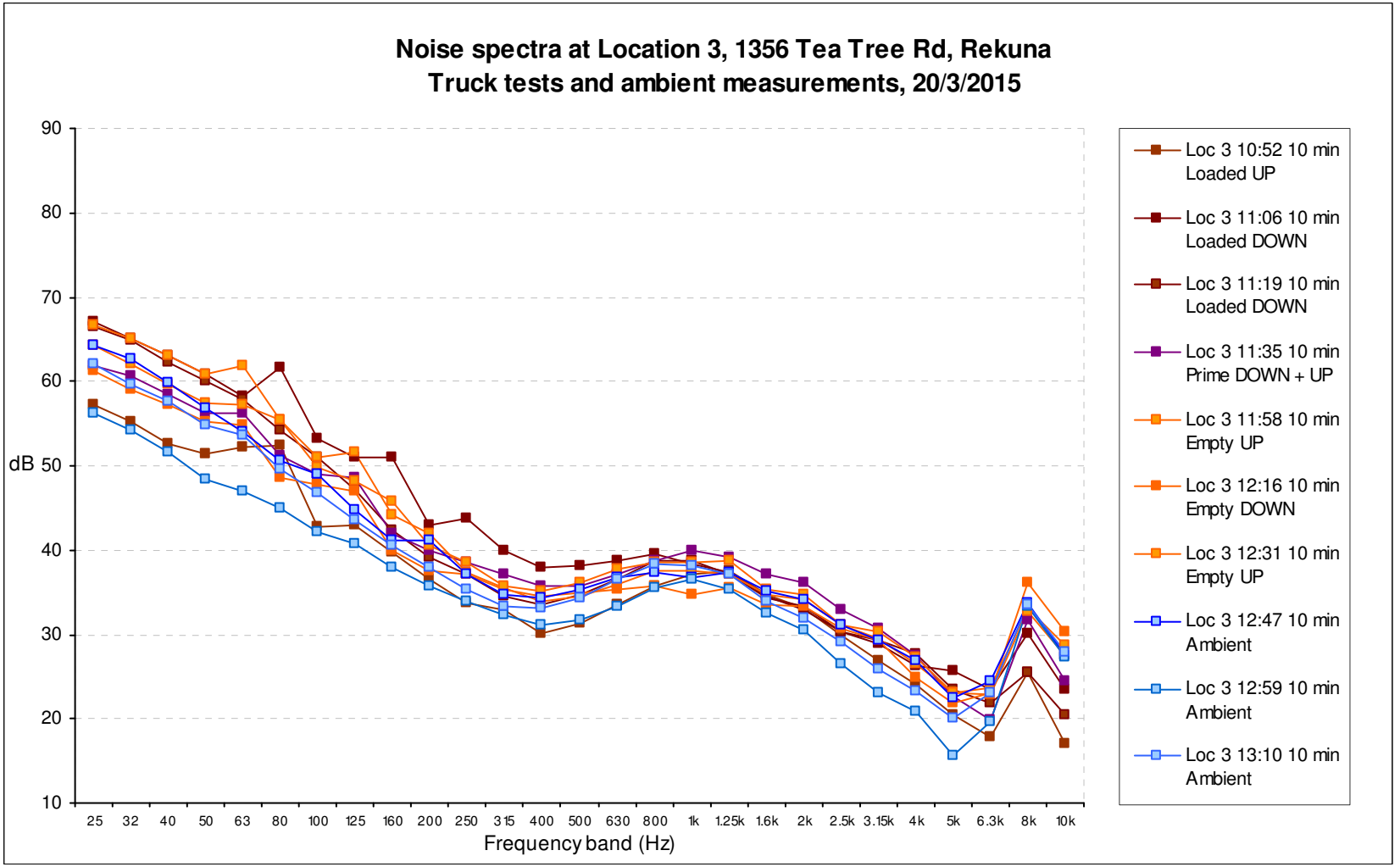
Location	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3	Loc 3
Date	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015	20/03/2015
Start time	10:52	11:06	11:19	11:35	11:58	12:16	12:31	12:47	12:59	13:10
Test	Loaded UP	Loaded DOWN	Loaded DOWN	Prime DOWN + UP	Empty UP	Empty DOWN	Empty UP	Ambient	Ambient	Ambient
Duration	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Measured A	44.8	48.6	46.6	47.7	47.0	45.3	47.4	46.2	43.6	45.7
C	62.4	71.2	70.3	66.4	70.8	65.3	68.1	68.7	61.2	66.3
Octave Hz 31.5	60.2	70.2	69.7	65.3	69.9	64.3	67.1	67.3	59.2	64.9
63	56.8	65.2	62.8	59.9	64.9	58.6	61.6	59.3	51.8	58.0
125	46.8	56.7	53.0	52.2	54.8	50.8	53.0	50.8	45.4	49.1
250	39.4	47.3	42.1	43.5	43.9	41.5	43.5	43.2	39.0	40.8
500	36.6	43.0	39.9	41.1	39.7	39.7	41.3	40.4	37.0	39.7
1k	41.6	43.3	43.0	44.1	42.1	40.2	43.4	41.9	40.6	42.7
2k	37.8	37.7	37.8	40.5	38.4	37.4	38.8	38.5	35.2	36.9
4k	29.3	32.0	32.2	32.9	31.8	31.1	32.6	31.7	25.6	28.4
8k	26.6	31.7	27.9	32.8	34.9	37.4	34.2	35.0	34.4	34.9

Spectral analysis of ambient and test noise periods



The spectral curves of all tests and ambient measurements form a tight cluster broadly reflecting variation in traffic on Tea Tree Rd

Third octave spectral analysis of measured noise

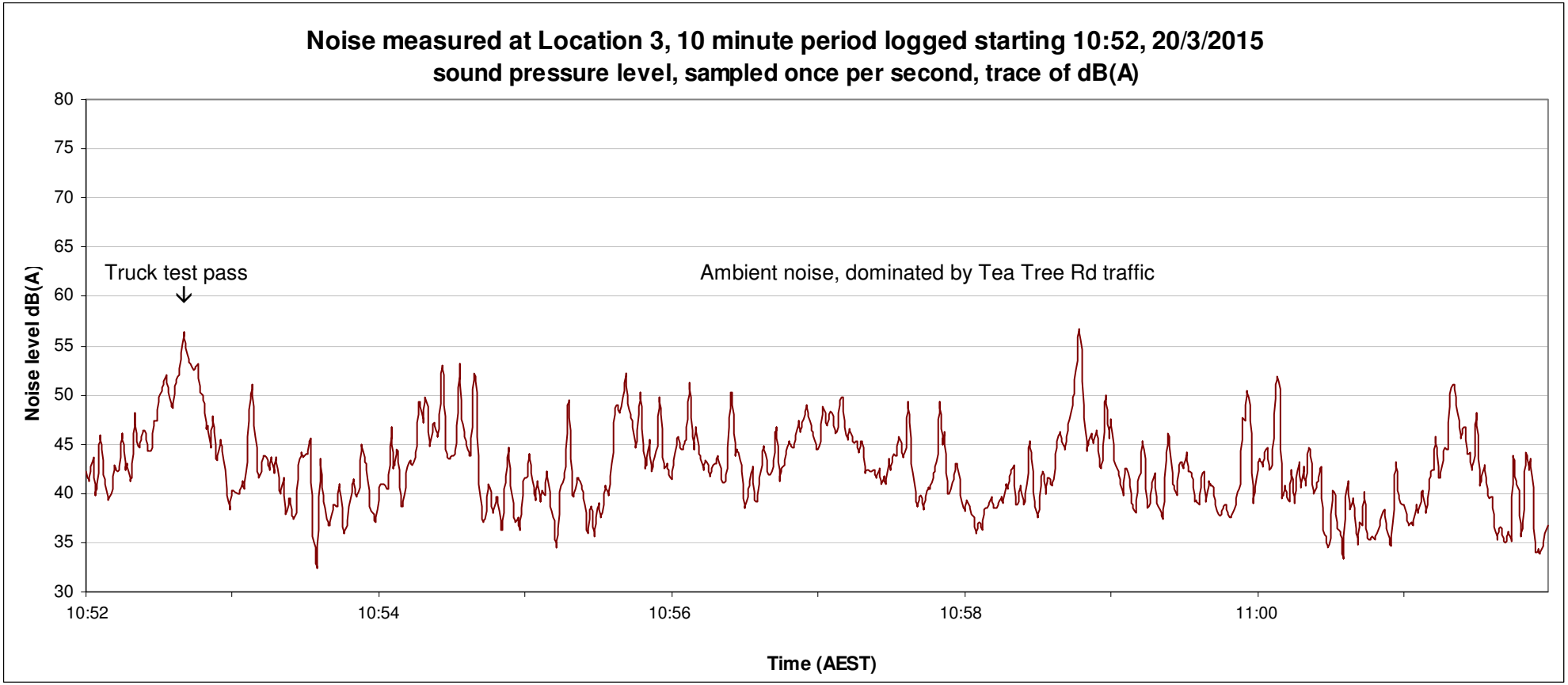


Notes: Very low frequency noise due to wind and buffeting

Traffic and test truck generates 63-250 Hz from engine noise whereas the 1 kHz peak is from road-tyre noise at 100 km/h

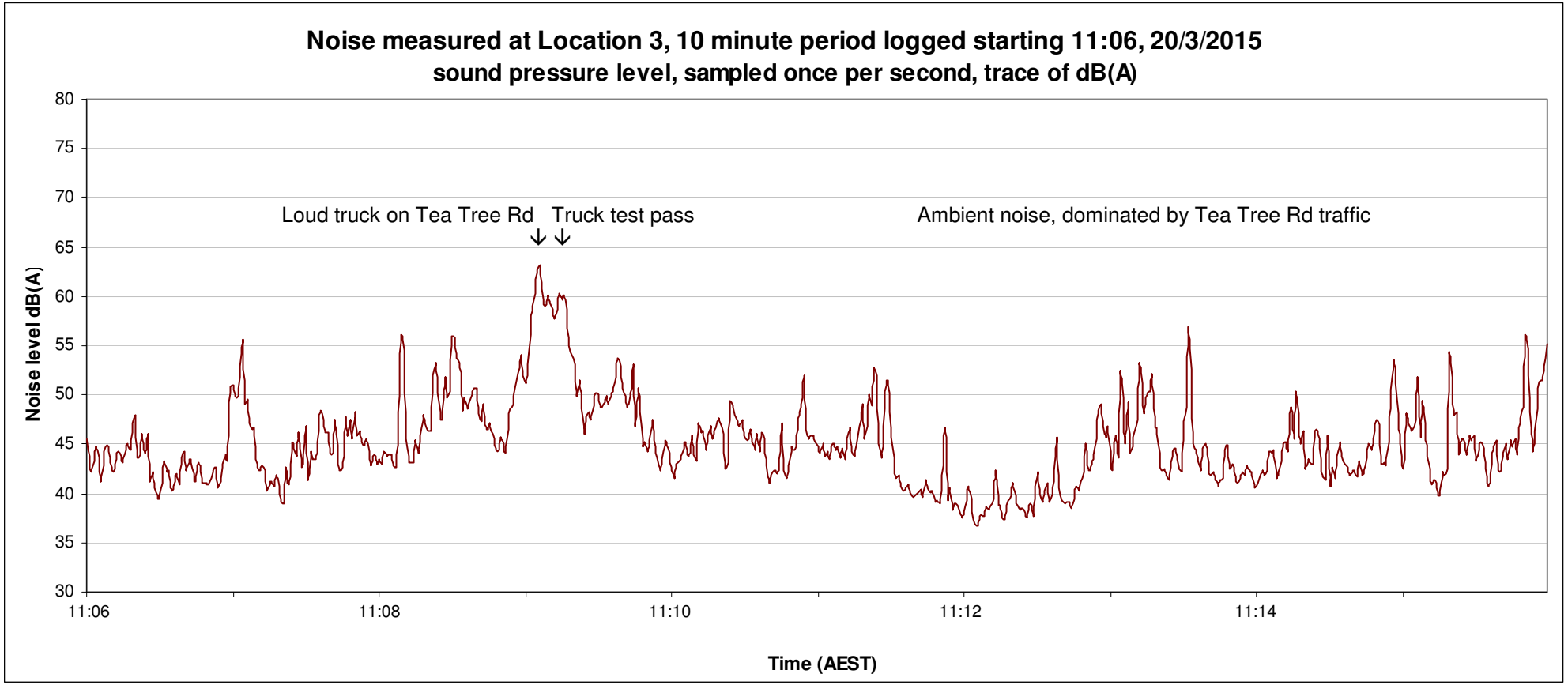
The 8 kHz spike is due to crickets.

Logged noise at Location 3



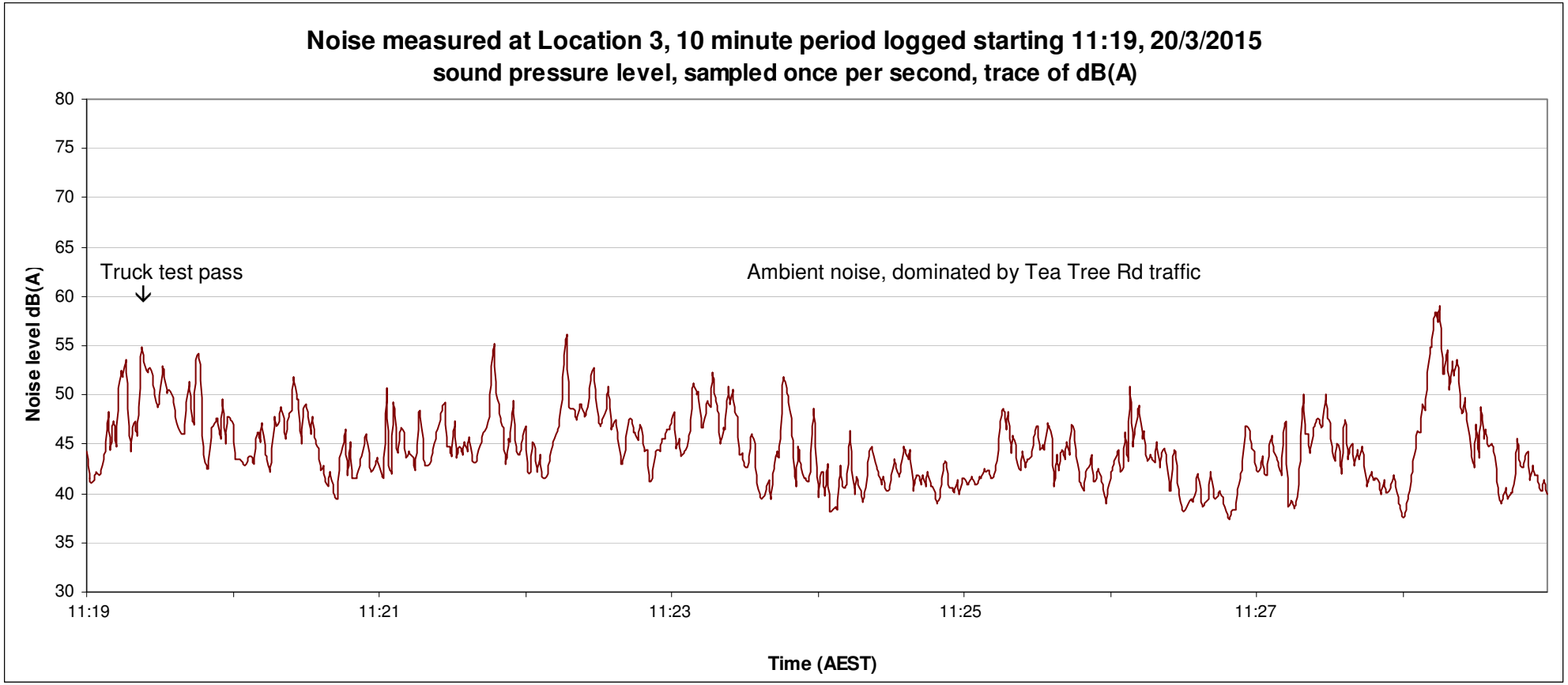
Test pass: Loaded Mack dump truck, up hill 20 km/h, Lmax = 56.3 dB(A).

Logged noise at Location 3



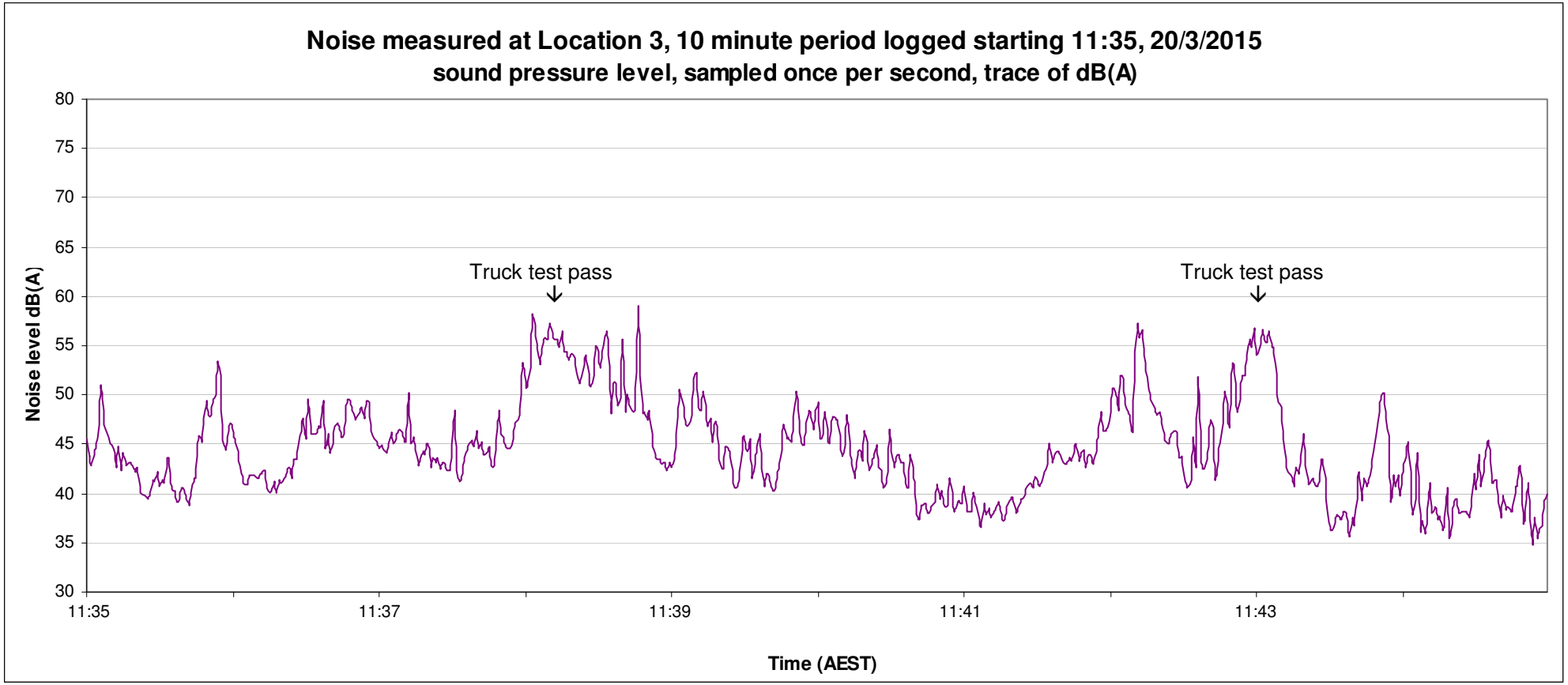
Test pass: Loaded Mack dump truck, down hill 20 km/h, Lmax = 60.1 dB(A).

Logged noise at Location 3



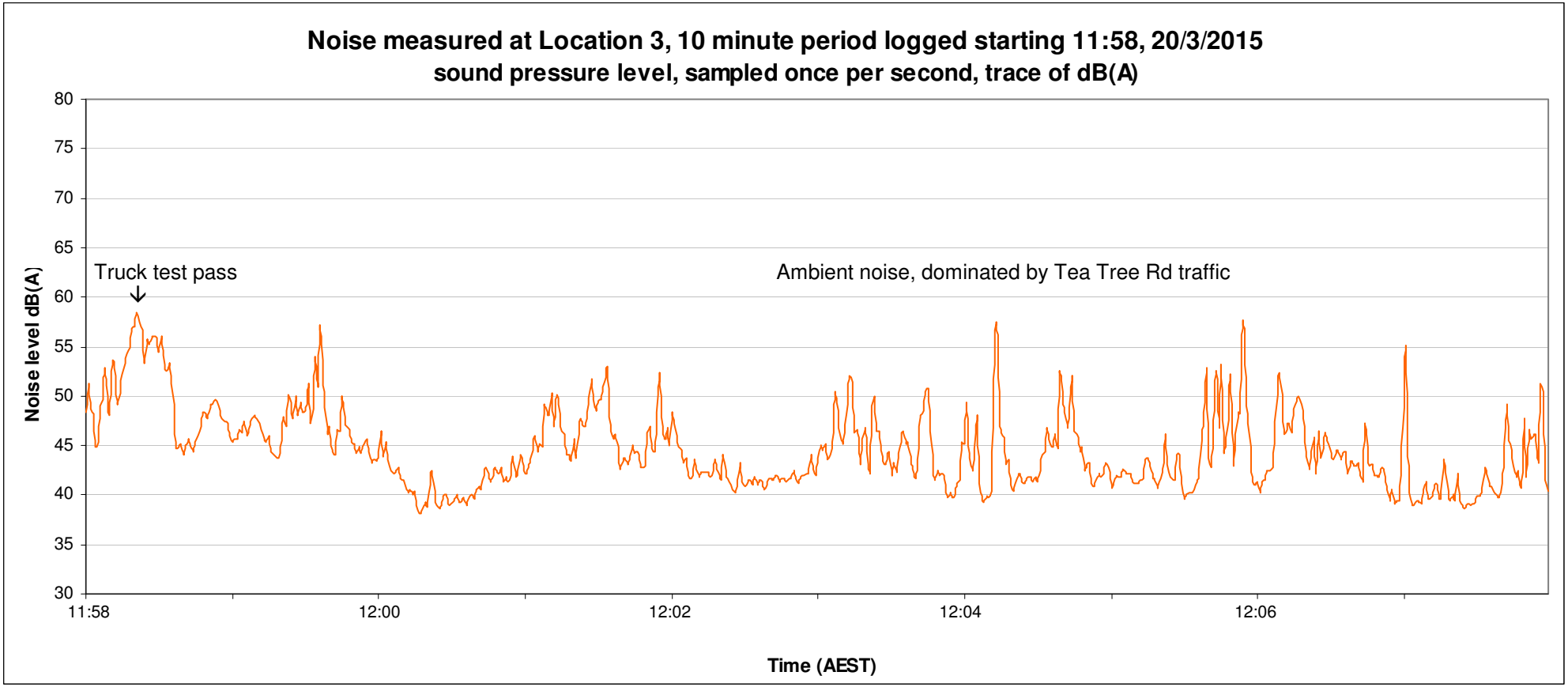
Test pass: Loaded Mack dump truck, down hill 20 km/h, Lmax = 54.8 dB(A).

Logged noise at Location 3



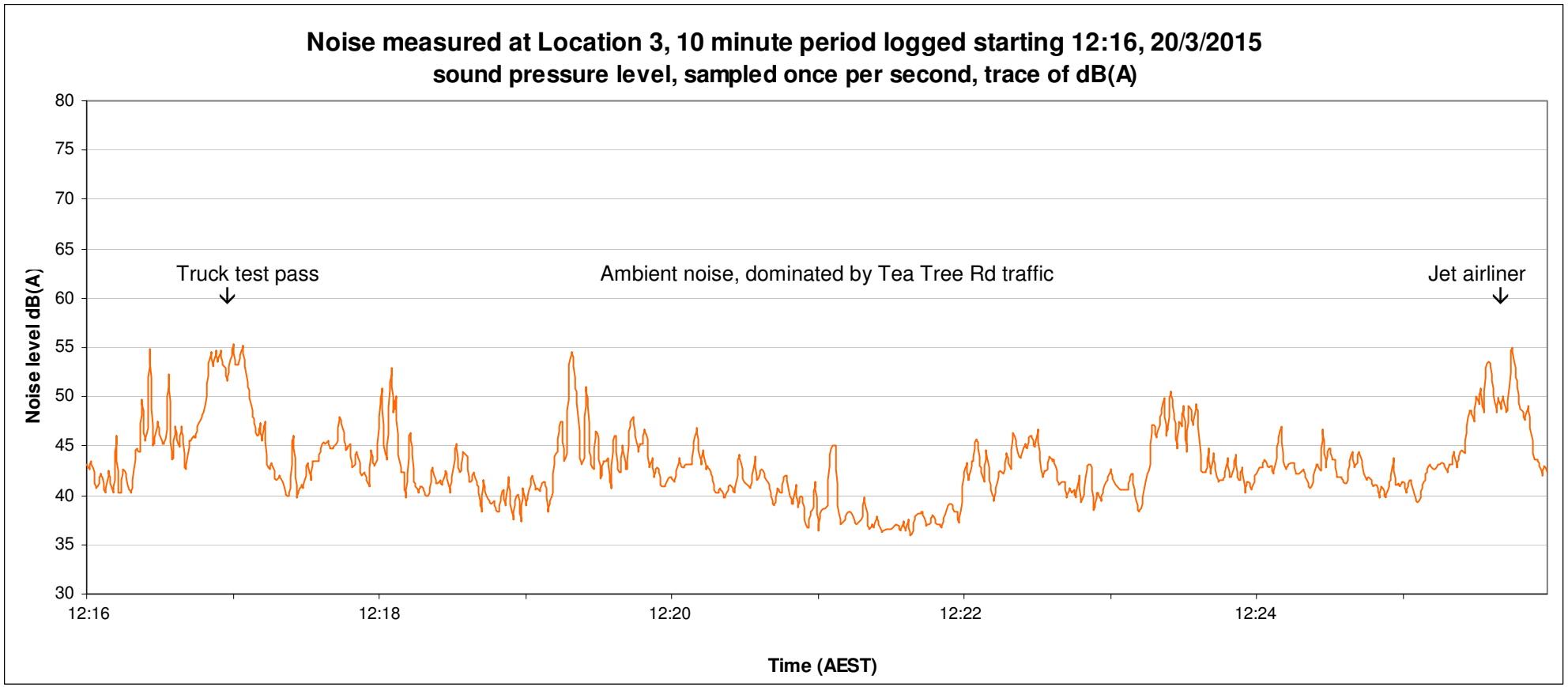
Test pass: Volvo prime mover, down hill 30 km/h, Lmax = 57.2 dB(A), and up hill 30 km/h, Lmax = 56.7 dB(A).

Logged noise at Location 3



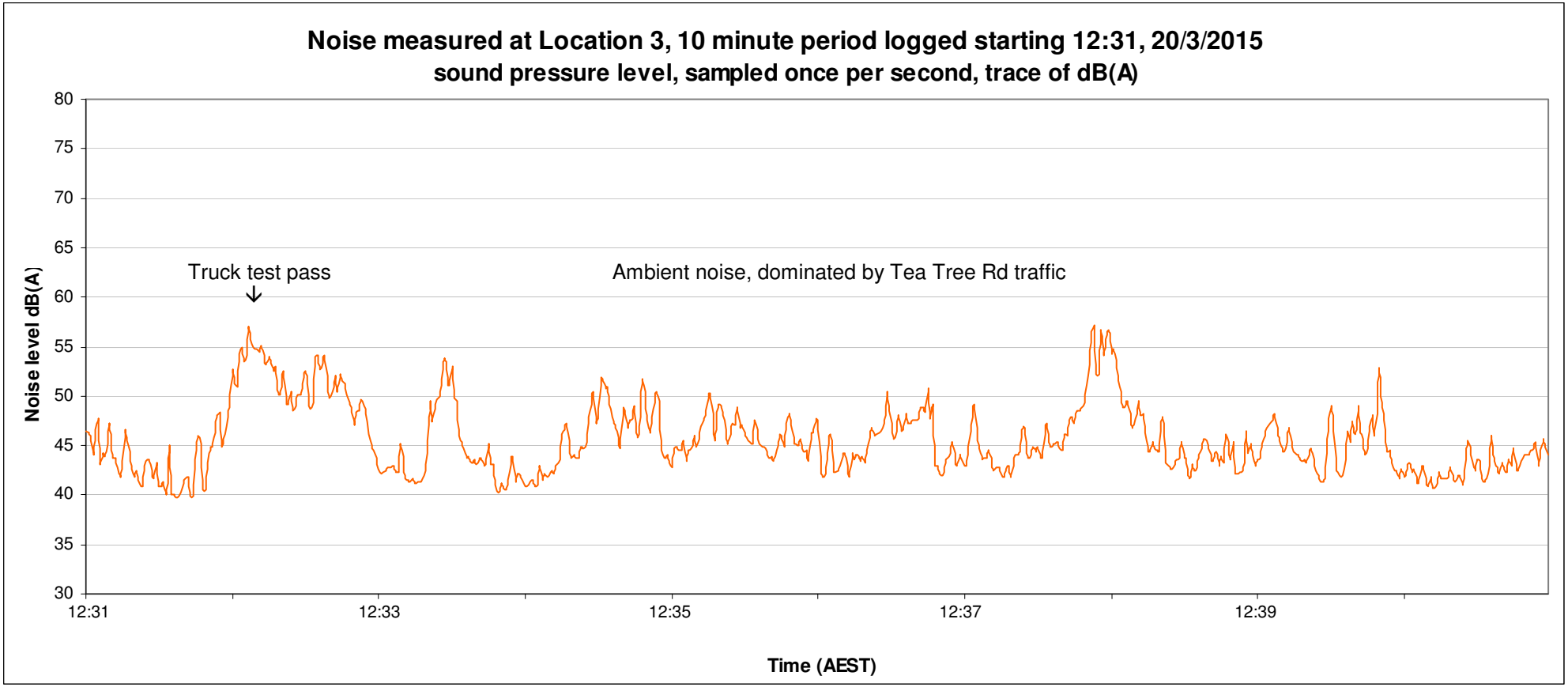
Test pass: Volvo with empty tray, up hill 30 km/h, Lmax = 58.5 dB(A).

Logged noise at Location 3



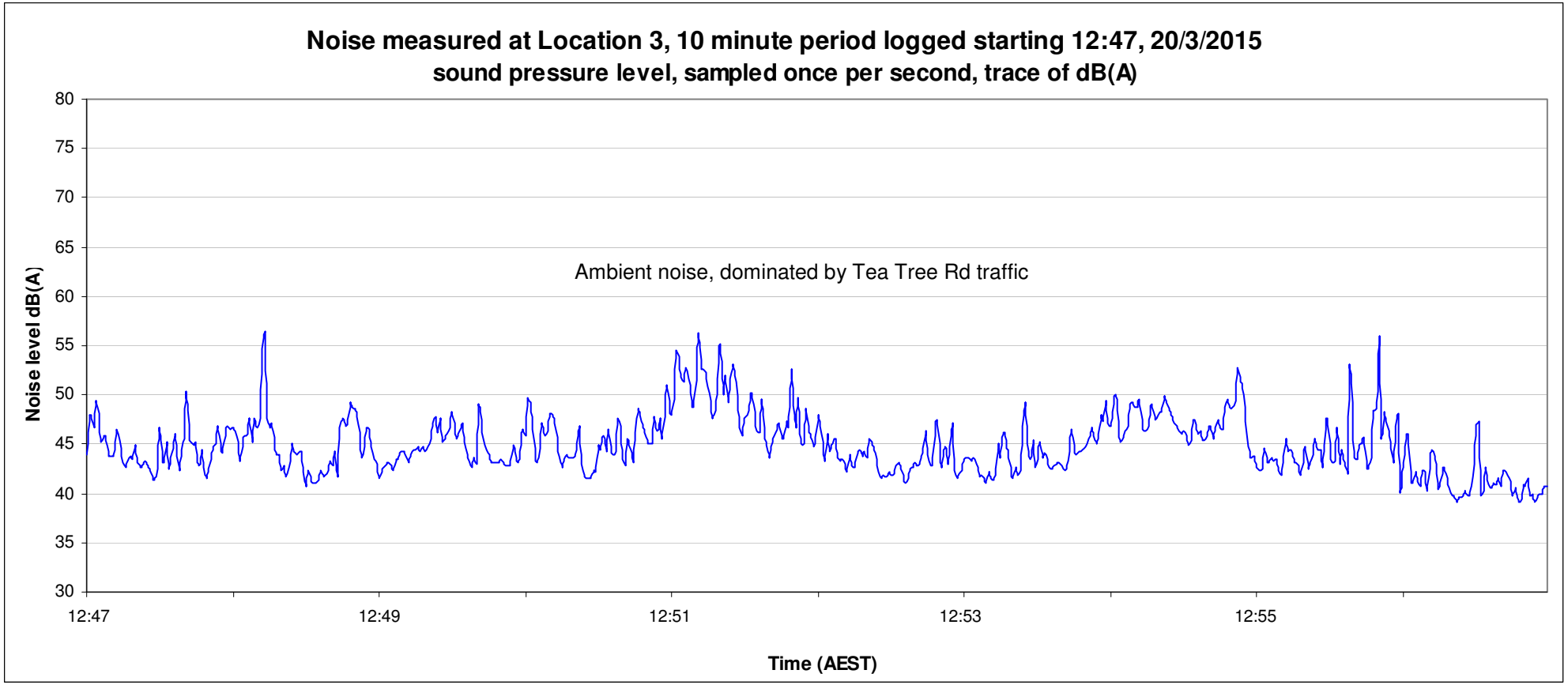
Test pass: Volvo with empty tray, down hill 30 km/h, Lmax = 55.4 dB(A).

Logged noise at Location 3



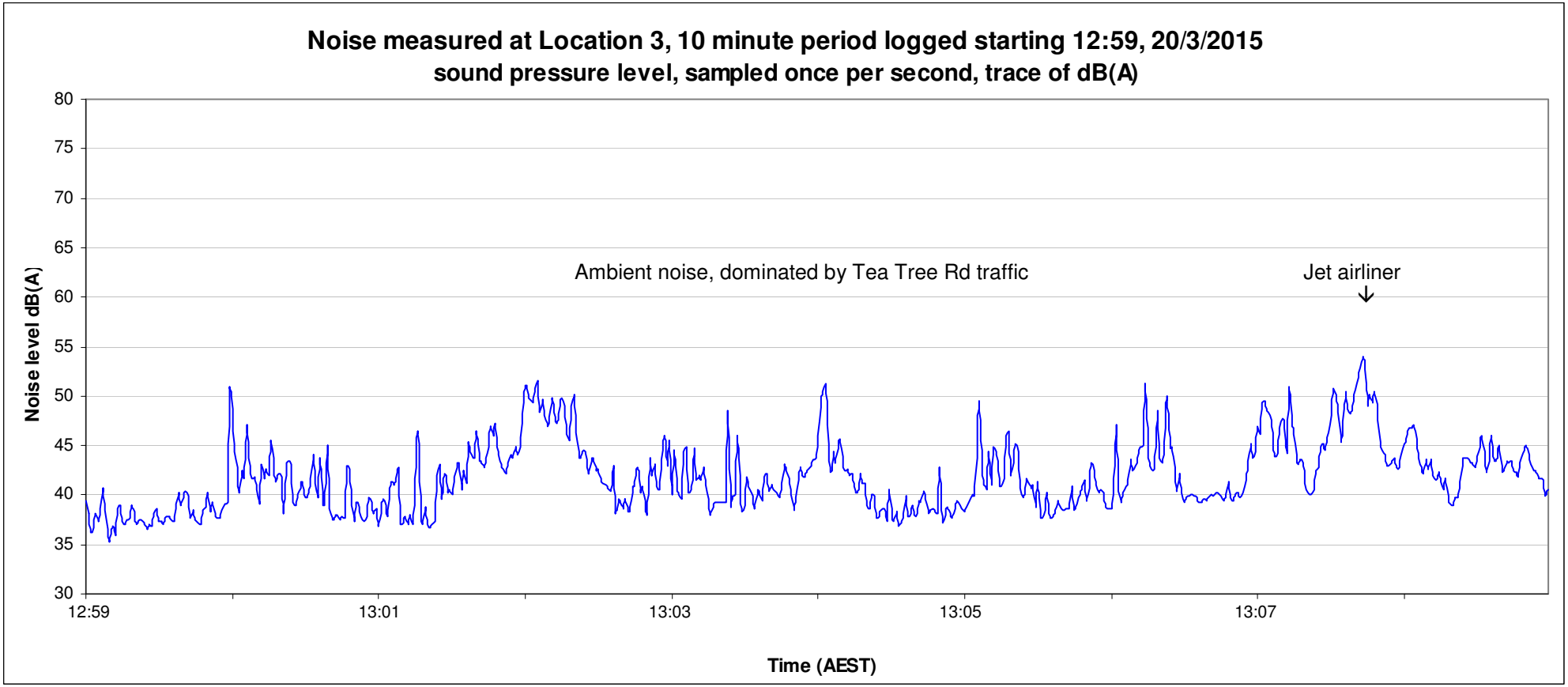
Test pass: Volvo with empty tray, up hill 30 km/h, Lmax = 57.0 dB(A).

Logged noise at Location 3



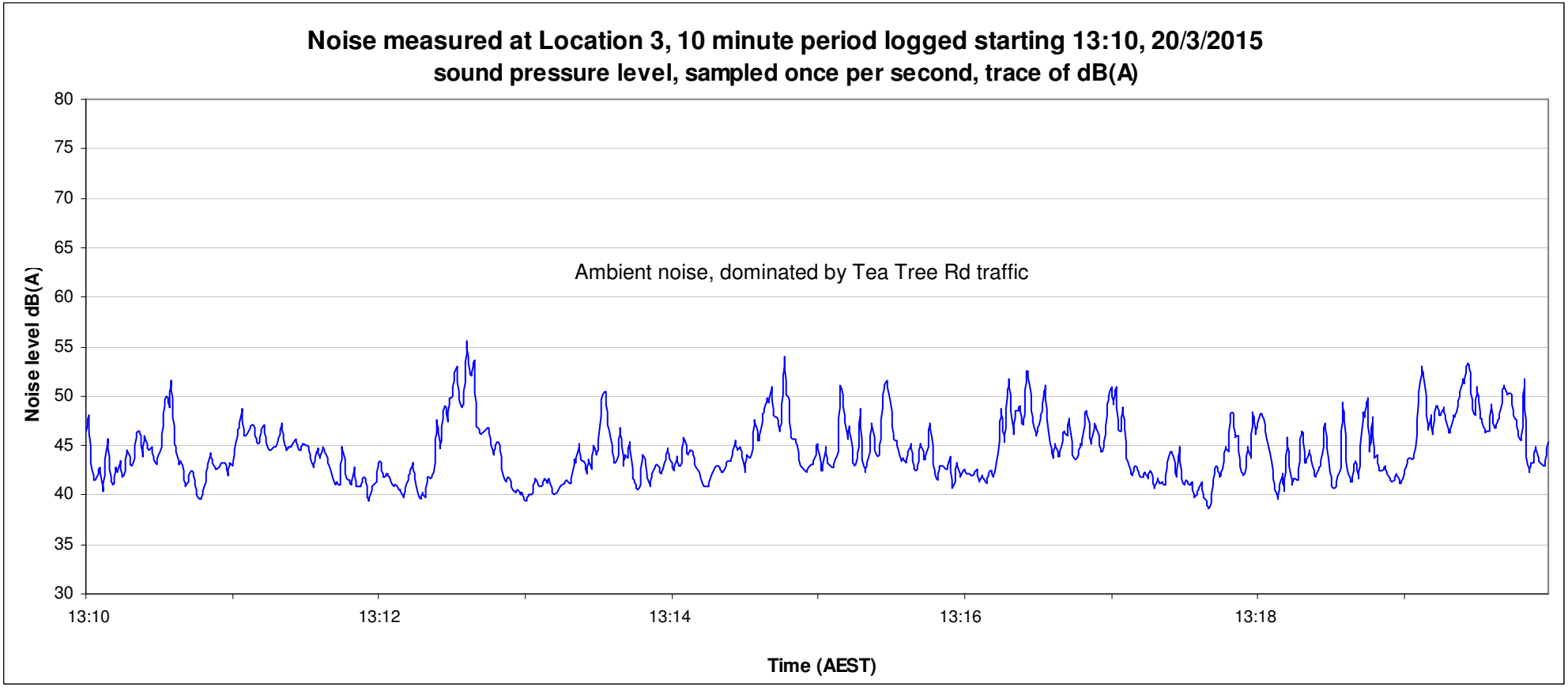
Ambient noise in absence of test truck

Logged noise at Location 3



Ambient noise in absence of test truck (

Logged noise at Location 3



Ambient noise in absence of test truck

Appendix 9 Unanticipated Discovery Plan (Aboriginal Heritage)

Unanticipated Discovery Plan

For proponents and consultants dealing with Aboriginal Heritage in Tasmania

This paper provides a Plan that should be followed when dealing with unanticipated discoveries of Aboriginal Cultural Heritage such as sites and objects. The plan provides guidance to project personnel so that they may meet their obligations with respect to Aboriginal heritage in accordance with the *Aboriginal Relics Act 1975* and the *Coroners Act 1995*.

The Unanticipated Discovery Plan is in two sections. The first section primarily explains mitigation strategies that should be employed when any Aboriginal Cultural Heritage sites or items are discovered excluding skeletal remains (burials), while the second process deals specifically with skeletal remains (burials).

Discovery of Cultural Heritage Items

Step 1: Any person who believes they have uncovered Aboriginal Cultural Heritage material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 2: A temporary 'no-go' or buffer zone of at least 10m x 10m should be implemented to protect the suspected Aboriginal Cultural Heritage site or relics. No unauthorised entry or works will be allowed within this 'no-go' zone until the suspected Aboriginal Cultural Heritage relics have been assessed by a recognised Aboriginal Heritage Officer or Archaeologist.

Step 3: Aboriginal Heritage Tasmania (AHT) in Hobart (ph 6233 6613) needs to be notified and consulted as soon as possible and informed of the discovery. AHT will then provide further advice in accordance with the *Aboriginal Relics Act 1975*.

Discovery of Skeletal Material

Step 1: Call the Police immediately. Under no circumstances should the suspected skeletal remains be touched or disturbed. The area must now be considered a crime scene. It is a criminal offence to interfere with a crime scene.

Step 2: Any person who believes they have uncovered skeletal material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 3: A temporary 'no-go' or buffer zone of at least 50m x 50m should be implemented to protect the suspected skeletal remains. No unauthorised entry or works will be allowed within this no-go' zone until the suspected skeletal remains have been assessed by the Police and or Coroner.

Step 4: Should the skeletal remains be determined to be of Aboriginal origin, the Coroner will contact the Tasmanian Aboriginal Land and Sea Council (TALSC) to arrange for repatriation of the remains, as per the *Coroners Act 1995.*

Guide to the most common sites of Aboriginal Significance

Stone Artefact Scatters

Stone artefacts are the tangible evidence found in regard to past Aboriginal lifeways. Stone artefacts indicate areas that were used by Aboriginal People, either for camping, hunting or other activities such as the manufacture of stone tools. Archaeologists can also determine the duration a site may have been occupied, the amount of times that the site may have been occupied, and the number of people that the area may have supported at any given time.

Some stone artefacts are the result of Aboriginal People fracturing or 'flaking' fine-grained rocks to produce sharp cutting or scraping implements. These were then used, for example, for cutting up animals and then scraping the hides. Volcanic rocks such as basalt were flaked and then ground down to form axes for a number of chopping and cutting tasks. The results of such activities can be seen in the archaeological record (i.e. scatters) in the form of modified stones such as cores, retouched flakes, hammerstones and flaked pieces. From these scatters, by understanding site density and frequency patterns, inferences can be made in relation to past Aboriginal lifeways.

Shell Middens

Shell middens by definition are prehistoric refuse pits. They are the leftover waste of resources exploited which formed the basis of Aboriginal diet. Midden sites can range in size from large mounds to small scatters of shell. Middens usually also contain as well as shell, the remains of animals exploited for food as well as artefacts of stone, bone and shell. These sites are usually found near waterways and coastal areas.

Rockshelters

Rockshelters can either be shelters which contain archaeological deposits from living floors or art rock shelters, and may occur in any area of rocky terrain. Sediments on the floor of the rockshelter can contain preserved stratified deposits of archaeological material. Art types found in rockshelters can vary greatly. It can be in the form of painting, stencils of body parts, tools and equipment, or engravings. Style variations in painting can cover animal or human figurines, supernatural beings, and geometric patterns. Engravings can have similar variations as they can depict tools, humans, human parts, animals and birds and their tracks, geometric patterns and supernatural beings. Pecking is also a form of engraving.

Quarries or Stone Procurement Sites

Quarry sites occur where outliers of suitable tool-making stone appear. A quarry can be generally recognised by evidence of human manipulation and extraction of suitable material and the debris left by the processing of the suitable material. Some quarries can cover vast areas with extremely high amounts of lithic discard. Ochre or pigment was also quarried.

Burials

Burials can occur anywhere, though they are generally found close to areas where there was a high population concentration. Burials can occur where there are soft sediments such as sand hills, they can be found in caves and rockshelters and sometimes they can be associated with hollow trees.

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To the best of VDC's knowledge, the report presented herein represents the Client's intentions at the time of completing the document. However, the passage of time, manifestation of latent conditions or impacts of future events may result in changes to matters that are otherwise described in this document. In preparing this document VDC has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this document, VDC has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

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Document Status

Revision	Author	Review	Date
1	R Barnes C McCoull	C Williams	31-08-2015
2	R Barnes C McCoull	R Barnes	16-09-2015
3	R Barnes C McCoull	R Barnes	11-10-2015
4	R Barnes C McCoull	R Barnes	4-12-2015

ENVIRONMENTAL EFFECTS REPORT SUPPLEMENT

WILLIAMS' QUARRY, REKUNA

Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

BACKGROUND INFORMATION

SCOPE

This EER Supplement has been prepared in response to a request for a Supplement issued by the Environment Protection Authority for the Williams Quarry located at 1356 Tea Tree Rd Rekuna in the Southern Midlands Municipality.

Two separate requests for information were made by the EPA for information; 29 January 2016 and 10 February 2016.

Table 1 lists the issues raised during the public consultation period (excepting certain issues raised by Southern Midlands Council) that the EPA Board requires further information from the applicant for the purpose of assisting the Board in its determination of the application.

Table 2 lists the issues raised by Southern Midlands Council submission that the EPA Board requires further information from the applicant for the purpose of assisting the Board in its determination of the application

While due care has been taken to provide information in good faith for this process, the applicant and their consultant have at the time that this Supplement was prepared were not privy to the particulars of the representations which relate to the items listed in Table 1. The context within which the comments have been made in the respective representation is therefore unknown to the applicant and their consultant.

The Council kindly provided their submission, after being formally requested by the applicant, which comprised by a letter drafted by Mr Damian Mackey (Manager Development and Environmental Services) and associated noise report by the mainland Australian consultancy firm Renzo Tonin (*William's Quarry, Rekuna – Level 2 Development Application Acoustic Review* prepared by Renzo Tonin & Associates dated 15 January 2016).

Table 1. Additional information required by the EPA Board from representations

Item no.	EER section no.	EER Page no.	Comments and issues	Additional information required
1	D.8	29-35	No discussion in EER of variation in carrying of sound across hills.	Provide information on whether or not the estimated/modelled sound levels at receptors (Appendix 7) took the general topography of the area into account (topography other than the quarry "lip").
2	D.8	29-35	The EER has only selective discussion of noise impacts. No reference to impacts on representor's property (1216 Tea Tree Road).	This property appears to include house #3 as shown on Figure 9. Provide specific information on predicted noise levels and impacts at house #3 and information on how noise impacts will be minimised in relation to that particular receptor.
3	D.8	29-35	The applicant parks and services heavy machinery around his house/workshop. Noise generated there, and when moving to and from the quarry, has not been considered in the application or noise reports.	Provide information on the number, frequency, times and route(s) of machinery movements (if any) between the quarry and the house/workshop, and the likely impact of associated noise emissions on neighbours.

4	D.8	29-35	Ground vibration from quarrying and crushing presents a risk to the six statues being erected at 1384 Tea Tree Road.	Provide information on the likely level of risk to the statues from the proposed activity.

Table 2. Additional information required by the EPA Board from the Council's submission

Item	Renzo Tonin Report item no.	Renzo Tonin Report page no.	Issue raised	Additional information required by the EPA Board
5	6 to 11	1 to 2	The suitability of the Leq for measuring the pre-existing 'ambient' noise (for the purposes of the *Quarry Code of Practice*) is considered at length. 10-minute Leq levels measured at about midday on 17/08/2014 were used for the noise assessment.	Discuss the likely range of 10-minute Leq levels over the normal working day and the resulting influence this would have on the ultimate noise limits for the quarry, based on the 10 dB(A) margin in the Quarry Code of Practice.
6	27	5	Modelling methodologies	Provide details of the noise level prediction/modelling methods.
7	29	5	Tonal, impulsive or modulation penalties	Discuss the importance of dominant or intrusive noise characteristics from the proposed activity.
8	32	5	Proposed crusher may not be substantially quieter that the impact crusher that was used for the assessment.	Provide objective evidence to support the assertion that the intended crusher will be quieter than the measured crusher at Clives Hill Quarry.
9	35	5	The number of days per year that crushing is to occur.	Identify the maximum number of days per year that crushing is to occur.

Item 1

The noise assessment conducted by Mr Terts considered the topography of the property and surrounds, as evident by the topographic profiles of the report prepared by Mr Terts (Appendix 7 of the EER). Specifically, Mr Terts noted that 'The reflection effect off the irregular quarry face is likely to increase the noise level by no more than 2.5 dB(A). There are no sensitive areas south of the quarry face on which the noise can impinge and therefore it does not cause environmental nuisance.'

Item 2

The QCP lists some solutions to noise management and mitigation, including solid barriers, such as bund walls and topographical features. Earthen bunds provide high performance noise mitigation services to quarries, especially when they prevent inline of sight of the receiving feature (eg a house). Reliance on a barrier of vegetation alone will result in only marginal reduction in noise levels.

The bunding along the northern side of the pit, which will be made slightly higher and pastured down (to address erosion and amenity matters), will enhance the noise shielding of the crusher which will be located within the pit. The location of the crusher has been identified in Figure 5b of the EER, with bunding also shown. The lip of the quarry will be enhanced by the stockpiling of topsoil which will be protected for remedial works in the future. The higher the lip becomes relative to the base of the pit the better the noise attenuation offered by the earthen bund. The noise assessment by Mr Terts is based on the current size of the earthen bund (quarry lip) which is a worse-case scenario in terms of the noise mitigation performance it will/does offer. Line-of-sight to house #3 will be avoided by the establishment and maintenance of an earthen bund of sufficient height to provide an in-line visual screen (the best form of feature to mitigate noise) to house #3. Bunding is a cheap and effective means to mitigate noise and is a commonly used feature of quarries and for other developments (eg along highways that bisect residential zones).

With the bunding installed, and given the house is at greater distance to the quarry than house #2 (1220 Tea Tree Road – 443.2 m from quarry location cf. 654m for house #3 – Figure 9 of the EER), the noise levels at that house would be less than those calculated for house #2.

Mr Terts notes that in his report (Appendix 7 of the EER) – 'The crusher and general quarry noise at the nearest residence 440 m away is estimated to be 35 dB(A) with no or little wind and 45.0 dB(A) with wind towards the nearest residence.' Furthermore, house #3 is closer to Tea Tree Road than 1220 Tea Tree Road and consequently the results of the most recent work by Mr Terts (ie further assessment of the influence of the road noise on amenity in the local area) applies to house #3 as it does to 1220 Tea Tree Road.

Also of note is that Commitment 10 states –

> A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.

It is likely that the EPA will include in any permit conditions the need to have a survey methodology designed and approved prior to the noise survey being conducted under Commitment 10 – as it has done for comparable activities via permit conditions such as those below –

> N3 Noise survey requirements
> 1 Unless otherwise approved by the Director, a noise survey must be carried out:
> 1.1 within three (3) months from the date on which these conditions take effect; and
> 1.2 within three (3) months of any change to the activity which is likely to substantially alter the character or increase the volume of noise emitted from The Land.

N4 Noise survey method and reporting requirements

1 Noise surveys must be undertaken in accordance with a survey method approved in writing by the Director, as may be amended from time to time with written approval of the Director.

2 Without limitation, the survey method must address the following:

2.1 measurements must be carried out at day, evening and night times (where applicable) at each location; and

2.2 measurement locations, and the number thereof, must be specified, with one location established as a control location (noise).

3 Measurements and data recorded during the survey must include:

3.1 operational status of noise producing equipment and throughput of the activity;

3.2 subjective descriptions of the sound at each location;

3.3 details of meteorological conditions relevant to the propagation of noise;

3.4 the equivalent continuous (L_{eq}) and L_1, L_{10}, L_{50}, L_{90} and L_{99} A-weighted sound pressure levels measured over a period of 10 minutes or an alternative time interval approved by the Director;

3.5 one-third octave spectra over suitably representative periods of not less than 1 minute; and

3.6 narrow-band spectra over suitably representative periods of not less than 1 minute.

4 A noise survey report must be forwarded to the Director within 30 days from the date on which the noise survey is completed.

5 The noise survey report must include the following:

5.1 the results and interpretation of the measurements required by these conditions;

5.2 a map of the area surrounding the activity with the boundary of The Land, measurement locations, and noise sensitive premises clearly marked on the map;

5.3 any other information that will assist with interpreting the results and whether the activity is in compliance with these conditions and EMPCA; and

5.4 recommendations of appropriate mitigation measures to manage any noise problems identified by the noise survey.

The applicant is expecting the EPA to insert such conditions within the permit conditions they may ask the Council to insert into a planning permit if the Council decides to issue one.

As part of the noise survey, the applicant would be pleased to have the opportunity for their consulting engineer to measure noise values within one or two of the nearest dwellings, such as house #3, but the applicant obviously cannot do so without the occupants' permission.

Item 3

The workshop on the property is an approved Level 1 activity that is not part of this application.

Machinery from the quarry may be serviced at the workshop, irrespective of where it has come from or going to on the property. The act of servicing machinery is not part of this application nor would it occur on the area of land where the Level 2 activity is proposed to occur. Furthermore, Commitment 14 states 'Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling'. It is not unusual for machinery at a quarry or comparable activity to be serviced at a shed or facility on the same land or adjoining land as the quarry. For comparable quarry activities the EPA have been accepting of machinery being taken off the site of the activity [noting that despite what occurs within the area defined as The Land by the EPA it is the activity that is occurring on that land which is regulated] which they regulate.

Consistent with Commitment 1, the operating hours of the quarry dictate when the machinery used in the quarrying activity can be used for the purpose of quarrying.

The act of farming or other activity related with the Level 1 workshop is not part of the activity for which a permit is being sought, even though it may be conducted using the same machinery. For example, the carting of gravel will be conducted with a truck owned by the applicant, however that same truck is used to cart other materials not related to the quarry (eg agricultural materials), and are therefore beyond the reach of the EPA to regulate. It is not unusual for a sole trader to utilise the same machinery for several activities, the cost of owning and operating machinery is otherwise prohibitive (ie. It is nonsense to purchase two or three trucks with each performing a sole purpose).

Item 4

The quarry is located in Jurassic dolerite, one of the most stable geologies in Tasmania.

The construction of the statues, which are decorative only based on the fact that the application for those statues was approved as a miscellaneous use rather than a place of worship etc, seems to be underway. They were presented in the development application as being comparable to art, like the silhouettes dotted around the Southern Midlands municipality and the '42-degree' signage north of Ross but south of Campbell Town. They could be considered as ornaments for the private enjoyment of the owners erecting them.

Ornaments (in an art context) means, for example -

> 'an accessory, article, or detail used to beautify the appearance of something to which it is added or of which it is a part');
>
> and
>
> 'Something that decorates or adorns; an embellishment.'

Figure 1 shows the dimensions of the development (components thereof, but not including some burial ground mentioned on the plans) on 1384 Tea Tree Road, assuming that there have not been any amendments or modifications to what was approved by Council. Figure 1 shows that the pad of the nearest ornament is 185m (see section of the plan within the box) away from the property boundary let along the edge of the quarry which is more distant than this.

Figure 2 illustrates the distance between the quarry and the assumed construction site for the ornaments *on-ground*.

The activities in the quarry are not likely to affect the integrity of the ornaments (eg concrete base) as the dolerite geology is stable and is not recognised as being a high transmitter of vibration. Furthermore, the onus is on the developer of the ornaments to ensure that their construction works are built to a suitable standard for the conditions in the area, including whatever geology those structures are being constructed upon (ie geotechnical works that may be required, soil tests etc).

Figure 1. Plan of the layout of the ornaments on 1384 Tea Tree Road

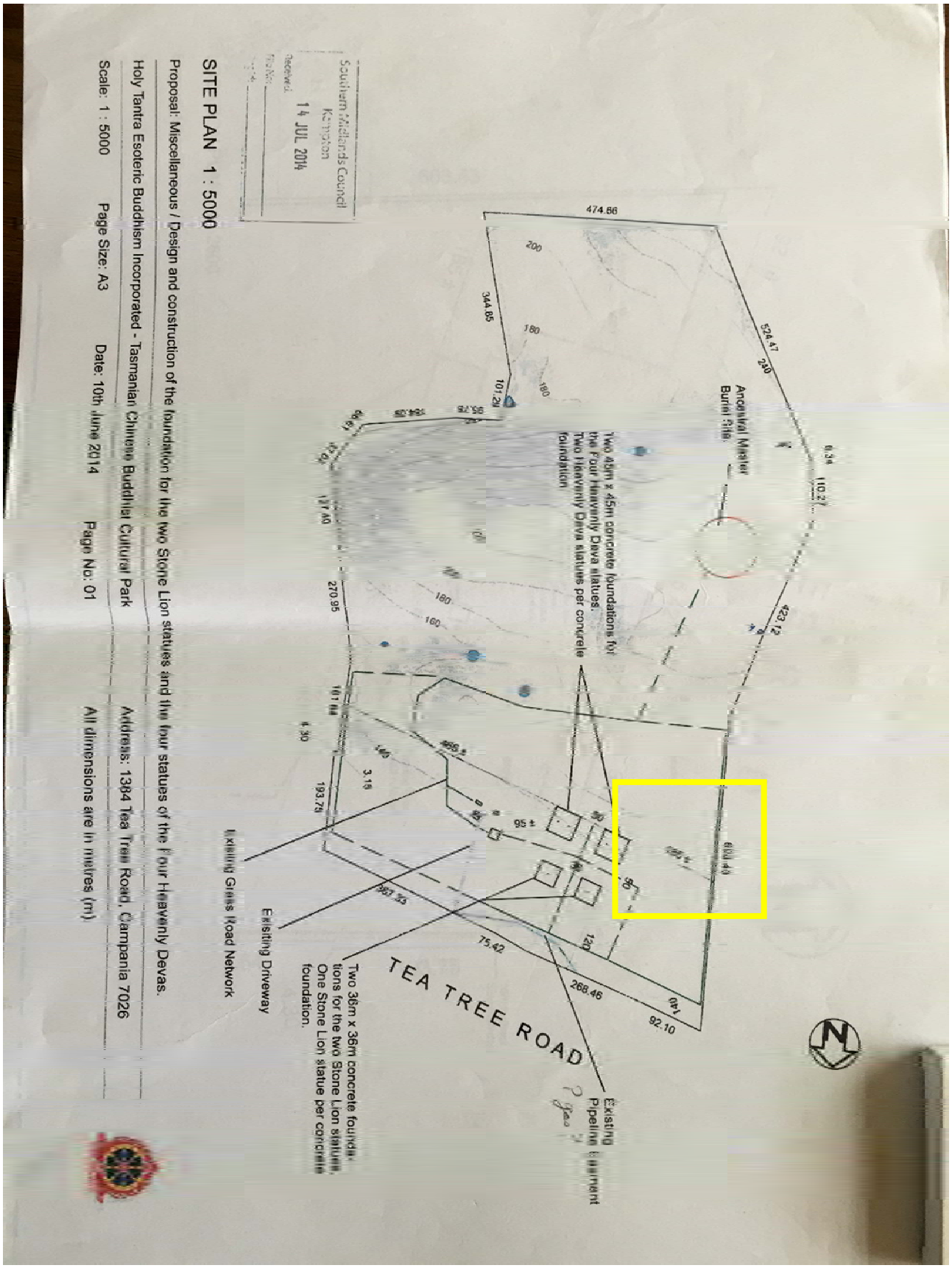
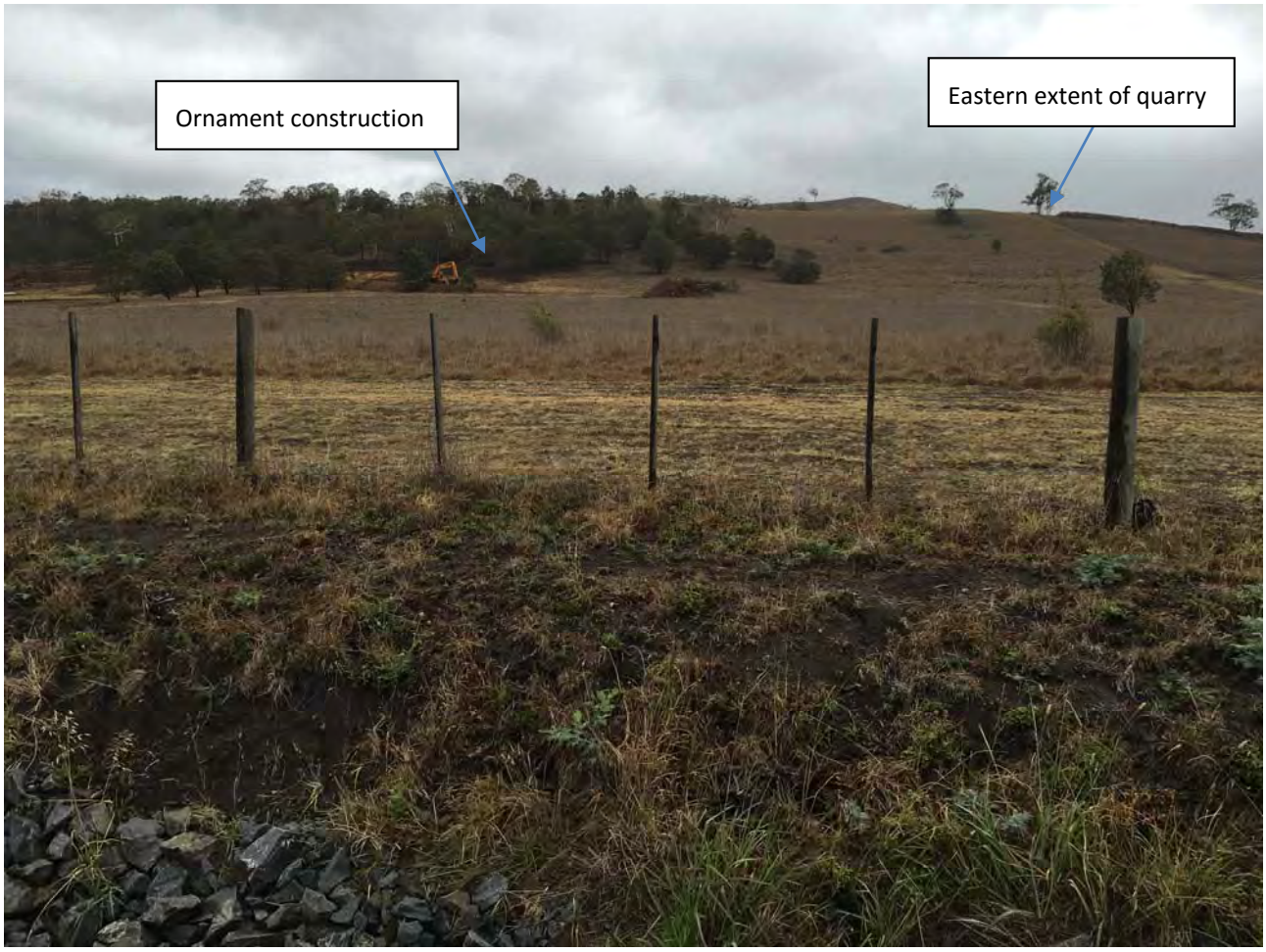


Figure 2. Williams Quarry relative to the ornaments being constructed on 1384 Tea Tree Road



Items 5, 6, 7 and 8

Responses are provided in the report prepared by Mr Pearu Terts (Consulting Engineer – acoustics specialist) which forms part of this Supplement.

The figure and locations of houses referenced in the Attachment 1 are those identified in Appendix 7 of the EER (Noise Survey Report).

Also of relevance and part of the report is the information provided in Attachment 2 – a road statistic summary provided by the Department of State Growth. The pertinent data in Attachment 2 are the AADT for the Tea Tree Road which identifies an AADT of 2,152 with a AAWT of 2,203 which comprised 11.5% CV (commercial vehicles). These figures are consistent with the Tea Tree Road being a designated Regional Freight Route.

Item 9

See information below and also the responses provided in the report prepared by Mr Pearu Terts (Consulting Engineer – acoustics specialist) which forms part of this Supplement.

The use of the crusher will be restricted in accordance with Commitment 2 and the Operating Hours section of the Planning Report (the description of the activity) -

> Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners

within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.

While the noise assessment and surveys conducted as part of the application form part of the application, they are ancilliary information for the purposes of assessment. The contents of the project description (Part B of the Planning Report lodged with Council – note Operating Hours), the Commitments made by the proponent and permit conditions imposed by the regulatory authorities as part of the approval process (if any are imposed) prevail in relation to the manner in which the activity is to be conducted.

MANAGEMENT COMMITMENTS

Best practice quarry management remains important to the quarry operator to minimise the risk of environmental nuisance/harm to the local community whilst providing a reliable source of high quality gravel/rock product to clients.

Commitments made by the applicant for the management of the quarry were provided in Table 2 of the EER. These are reiterated here (Table 2) without any change, as part of responding to those listed in Table 1.

Table 3. Summary of management commitments

Number	Commitment
1	Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.
2	Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.
3	A Weed Management Plan is implemented at the quarry operation.
4	One sediment pond (0.95ML) will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events.
5	Sediment trapped by the pond will be removed annually. The collected sediment will be mixed with stockpiled top soil for progressive rehabilitation of disused quarry areas.
6	As a dust suppression measure, during periods of dry weather the Access Road surface, areas near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the nearby sediment pond or on-site water cart truck.
7	Waste generated by the servicing of machinery is disposed of in accordance with best practice principles.
8	Waste generated by workers from general refuse (eg lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling.
9	The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum).

10	A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.
11	Trucks will avoid entering and leaving the quarry in the period 20 minutes either side of the school bus collection and drop-off time, as advised by the school bus operator.
12	The following measures will be applied to mitigate potential impacts of unreasonable levels of dust and noise caused to the residence at 1220 Tea Tree Road – • Ensure compliance with the operating hours and days for the quarry; • Maintain the existing Complaints Register to record and address any complaints received in relation to Access Road usage by quarry related vehicles; • Provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and • Ensure trucks carrying gravel limit their speed to 20km/hr when using the Access Road.
13	There is no permanent storage of fuels, oils, lubricants or any other dangerous good in the quarry.
14	Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling.
15	When in the quarry, fuel and oil containers are stored at least 10 m from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container.
16	One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage.
17	An *Unanticipated Discovery Plan* (Attachment 2 to these Guidelines) will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered.
18	'Progressive rehabilitation' will occur in those areas that have been quarried and are no longer needed or used for the operation of the quarry.
19	To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be prepared and maintained for the activity.

PEARU TERTS
BA, Grad. Dip. Env. Stud. (Hons.), MIE Aust., CPENG, MAAS
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ARCHITECTURAL ACOUSTICS
NOISE CONTROL

Phone 03 6249 7165
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Email pterts@southcom.com.au

18/2/2016

Mr. Craig Williams
1356 Tea Tree Road,
Rekuna, Tea Tree,
Tasmania, 7017
e-mail: caswilliams@bigpond.com
copy: rwbarnes73@gmail.com

Response to Dr. Derek Walter's letter of 10/2/2016
Ref. (EN-EM-EV-DE-248330/H507979)ZP,
Request for additional information

Item 5

Information required: "Discuss the likely range of 10 minute Leq levels over the normal working day and….."

Answer: Page A 8 gives statistical analysis of noise at location 1, near your house and at location 2, near your dam. At location 2, the range of 10 min Leq was from 38.8 dB(A) to 44.2 dB(A).

On page D 5, at location 3, also near the dam and approximately in line with the neighbouring dwelling (location 5 on page B 2) the range of 3 lots of10 minute Leq was from 43.6 dB(A) to 46.2 dB(A) with no quarry test trucks and from 45.3 dB(A) to 48.6 dB(A) for 7 lots of 10 minute Leq's with one test truck movement in each 10 minute period. The noise is dominated by Tea Tree Road Traffic, particularly the large % of commercial vehicles.

The nearest neighbour (location 5) is likely to experience a similar acoustic climate as they too are somewhat closer to the Tea tree Road than our measuring station at location 3.

In order to establish the likely Leq over a working day, we measured the noise of the Tea Tree Road traffic on 17/2/2016, at a site approximately 55 m north of location 3. This location is about 164 m from Tea tree Road.

We measured the traffic noise over three 50 minute periods between 1.16 pm and 4.03 pm. The average wind speed varied between 3.2 m/s and 3.8 m/s. Between 2.22 pm and 3.02 pm we counted 41 cars and 10 trucks and one motorcycle. We gratefully acknowledge the supply of traffic data from J. Murrell at the Department of State Growth.

Hence, L10 (3 h) = (45.4 + 45.3 + 45.3) = 45.3 dB(A).

From 'The State Road Traffic Noise Management Guideline Nov 2011', page 15 (par. 6.1) we can calculate the 18 hour L10 as follows:

L10 (18 h) = L 10 (3 h) – 1 = 45.3 – 1 = 44.3 dB(A).

From the same guideline, page 11, (par. 5.3) we can estimate the 16 hour Leq as follows:

Leq (16 h) = L10 (18 h) – 2 = 44.3 – 2 = 42.3 dB(A)

Hence, because location 5 and location 3 are within 300 m of the road (See page 18, par 7.1 of the guideline) and the traffic noise dominates, we can estimate the 16 hour Leq to be 42.3 dB(A). This is the ambient noise in the absence of quarry noise and this is the noise level we can use to estimate the acceptability of the quarry noise.

As a matter of interest, AS .2 – 1997 'Acoustics – Description and measurement of environmental noise' part 2: Application to specific situations gives in Appendix A, 'Estimated average background A – weighted sound pressure levels (LA90,T) for area category R 3 (Area with medium density transportation or some commerce or industry) for Monday to Saturday 0700 to 1800, 50 dB(A) and for category 2, (Area with low density transportation) a background noise level of 45 dB(A). The appendix is only a guideline and preference is given to measured results.

Item 6

Information required "Provide details of the noise level prediction/modelling methods"

Answer: The calculations given in the last 4 columns on page B 3were obtained as follows:

1. The spectra of the crusher and the sieve at 38 m was converted to the spectra at 445 metres (geometric spreading) by subtracting 20 log(445/38) = 21.4 dB from the octave band levels.

2. From the contours we obtained the heights of the quarry floor, quarry lip and the nearest residence (loc.5) and determined the Fresnel number for 1000 Hz band. Seer attached diagram showing the geometry and the calculation.

   The Fresnel number was 2.569 for 1000 Hz.

3. We used this number to determine the attenuation for a point source and the attenuation at 1000 Hz was 17 dB. (Bies, D.A & Hansen, C.H., 'Engineering Noise Control'. page 221).

4. The atmospheric attenuation was determined for 120 degrees Celsius and 50 % relative humidity. For 1000 Hz it was 0.5dB/100 m. The attenuation for 445 m is then 2.2 dB. (Harris, C. M., 'Handbook of Noise Control" page 3-10).

5 Hence for neutral weather conditions, the 1000 Hz octave band centre frequency sound pressure level is:

72 – 21.4 – 17 – 2.2 = 31.4 dB which is the value shown on page B 3, in the 1000 Hz octave band in the column marked 'calm'.

6. For the adverse weather influence, that is a gentle breeze from the quarry to location 5, the nearest neighbour, we add 12. dB to the 1000 Hz band and obtain a s.p.l = 31.4 + 12 = 43.4 dB. (This data is obtained from Bies et al page 127 for 500 m).

7. For the favourable weather influence, which includes a gentle breeze blowing from the neighbour towards the quarry, we subtract 5 dB, that is 31.4 – 5 = 26.4 dB.

8. These values are shown on page B 3 for 1000 Hz band in the last two columns.

Item 7

Information required: "Discuss the importance of dominant or intrusive noise characteristics…."

Answer:

A. A common tonal component in quarry operations is the rock drill impacting on hard rock. This sets up vibrations in the long metal drill and these are tonal. The quarry does no blasting so rock drills are not used.

B. Reversing alarms can also be tonal. However, broadband reversing alarms can be fitted to other quarry equipment.

Item 8

Information required: "Provide objective evidence to support the assertion that the intended crusher will be quieter than the measured crusher…."

Answer: The measured crusher was operating in a larger quarry and it was an old model not well maintained. It would be un-economical in terms of running costs, insurance and hiring costs to use a crusher that is over designed for the quarry size.

Item 9

Information required: "Identify the maximum number of days that crushing is to occur."

Answer: The crusher is to be used for 5 days a year. It is worth noting that past 'Description and measurement of environmental noise', for example, AS 1055-1973 and AS 1055-1978 made allowances for the duration of the noise being assessed. Prof. A. Lawrence in 'Architectural Acoustics', refers to a Draft Proposal ISO/TC 43/SC 1 where for a 0.8 % to 3 %

duration of the noise during the time period, 18 dB is to be subtracted as a correction to the measured level.

This quarry will have the crusher, clearly the loudest machine, operating for 5 days/ 250 days = 2 % of the working year.

To conclude, many of the neighbours are within the 300 m from the tea tree road and subject to traffic noise, especially from trucks and 4 WD vehicles. The Leq (16 h) = 42.3 dB(A) which is the likely ambient noise level over the day.

Agricultural areas have a rich assemblage of noises from wild life, domesticated animals, farming activities which in a suburban area may be regarded as extraneous noise events. Recently, for the first time in our professional life, in Glenorchy at night time we recorded a double barrel shot gun fired at about 11.30 pm, during a domestic situation. This was an extraneous noise event. However, during noise surveys in the country, distant gun fire has been heard from time to time. The same with magpies singing in the trees and domestic herd animals on pastures.. What is unusual in the city is often common in the country.

Yours sincerely,

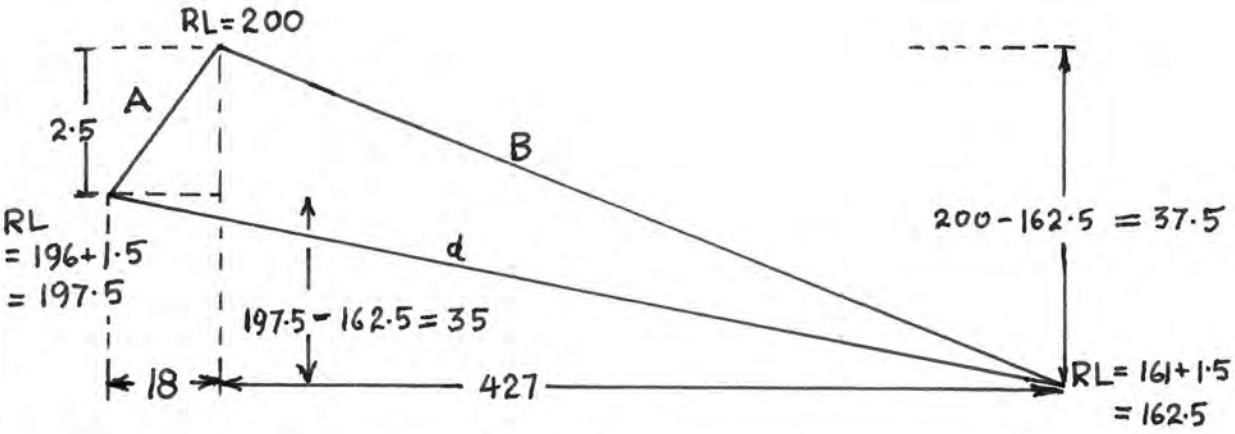
Pearu Terts

PEARU TERTS
Consulting Engineer

Work Sheet

Sheet 1 of 2
Project No.
Prep by Date
Ckd by Date

Re QUARRY - #5
Project 1356 TEA TREE ROAD



*1·5m is ACOUSTIC CENTRE OF CRUSHER AND Ht. of man. N.T.S.

$A = \sqrt{18^2 + 2.5^2} = 18.1728$

$B = \sqrt{427^2 + 37.5^2} = 428.6435$

$d = \sqrt{445^2 + 35^2} = 446.3743$

$A + B - d = 0.442$

$\text{Fresnel No} = \frac{2f(A+B-d)}{V}$

For 1000 Hz, $N = \frac{2 \times 1000 \times 0.442}{344}$

$= 2.5697$

A 2.

PEARU TERTS
Consulting Engineer

Work Sheet
Sheet 2 of 2
Project No.
Prep by Date
Ckd by Date

Re QUARRY - # 5
Project 1356 TEA TREE ROAD

	Description		Octave Band Centre Frequency (Hz)								
			31·5	63	125	250	500	1k	2k	4k	8k
1	Crusher at 38 m + sieve		72	73	65	67	70	72	69	67	39
2	spectral atten. at 445 m =										
3	$20 \log \frac{445}{38}$	−	21·4	21·4	21·4	21·4	21·4	21·4	21·4	21·4	21·4
4	Fresnel No		·08	·16	·32	·64	1·28	2·57	5·14	10·28	20·56
5	Attenuation		7	8·2	9·8	11·3	13·8	17	20	23	24.
6	Atmos. atten 20°C, 50% RH	dB/100m	−	−	·04	·12	·28	·5	1·0	2·8	6 EST.
7	Atten. To 445 m		−	−	·2	·5	1·2	2·2	4·4	12·5	26·7
8	Neutral (calm) weather		43·6	43·4	33·6	33·8	33·6	31·4	25·2	12·1	-331
9											
10	Adverse weather influence 500 m		−	+7	+6	+6	+7	+12	+7	+8	+8
11	Bies et al P127 - to # 5		43·6	50·4	39·6	39·8	40·6	43·4	32·2	20·1	-25
12											
13	Favorable weather influence 500m		−	-2	-4	-5	-5	-5	-5	-6	-6
14	breeze to quarry from # 5		43·6	41·4	29·6	28·8	28·6	26·4	20·2	6·1	—
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

NOTES:

Department of StateGrowth

AADT Summary Report

Parameters

Report:	AADT Summary
Site Group:	SR Tea Tree A2289
Road:	Tea Tree Secondary Road
Requested by:	j-murrell

AADT Summary for site group: SR Tea Tree A2289 on the Tea Tree Secondary Road

SITE	YEAR	AADT	AADT Accuracy	AAWT	% CV	%CV Accuracy	Datasource	Active/ Dormant
a2289130, Road A2289, Link No 6, E of Back Tea Tree Rd L06 Ch 1.79	2014	2,152	Very Good	2,203	11.5	Very Good	Short term - tubes	Active
a2289140, Road A2289, Link No 94, 150m W of Colebrook MR L94 Ch 8.57	2014	1,407	Very Good	1,445	14	Very Good	Short term - tubes	Active

Requested by:j-murrell
Tue, 16 Feb 2016 11:09:29

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9941 -- English (ENA)

Datasets:

Site:	**[A2289130 06 1.79] TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	11:00 Wednesday, 23 July 2014 => 14:24 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289130 20140723_20140806.EC0 (PlusB)
Identifier:	L158SXKK MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 6969 / 27469 (25.37%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9941
Site: A2289130 06 1.79.0.0EW
Description: **TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(E) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	2.0	3.0	2.0	4.0	5.0	6.0	10.0	3.2	4.6
0100-0200	0.0	5.0	3.0	7.0	3.0	1.0	6.0	3.6	3.6
0200-0300	1.0	4.0	1.0	2.0	4.0	6.0	3.0	2.4	3.0
0300-0400	2.0	1.0	0.0	3.0	3.0	1.0	1.0	1.8	1.6
0400-0500	6.0	5.0	4.0	9.0	7.0	5.0	0.0	6.2	5.1
0500-0600	10.0	9.0	15.0	8.0	12.0	5.0	1.0	10.8	8.6
0600-0700	57.0	61.0	63.0	63.0	62.0	27.0	17.0	61.2	50.0
0700-0800	**76.0<**	**88.0<**	**79.0<**	64.0	**74.0<**	43.0	30.0	**76.2<**	64.9
0800-0900	56.0	72.0	64.0	63.0	73.0	44.0	45.0	65.6	59.6
0900-1000	66.0	58.0	57.0	**79.0<**	54.0	61.0	73.0	62.8	64.0
1000-1100	63.0	57.0	49.0	71.0	63.0	84.0	97.0	60.6	69.1
1100-1200	54.0	52.0	51.0	66.0	50.0	**106.0<**	**105.0<**	54.6	**69.1<**
1200-1300	68.0	50.0	45.0	64.0	57.0	84.0	67.0	56.8	62.1
1300-1400	61.0	52.0	53.0	41.0	63.0	92.0	88.0	54.0	64.3
1400-1500	70.0	74.0	65.0	54.0	92.0	**97.0<**	**93.0<**	71.0	77.9
1500-1600	87.0	92.0	71.0	94.0	90.0	67.0	76.0	86.8	82.4
1600-1700	**123.0<**	**120.0<**	**110.0<**	**128.0<**	**124.0<**	82.0	60.0	**121.0<**	**106.7<**
1700-1800	93.0	77.0	82.0	110.0	98.0	54.0	45.0	92.0	79.9
1800-1900	27.0	44.0	65.0	48.0	71.0	44.0	34.0	51.0	47.6
1900-2000	24.0	29.0	25.0	42.0	23.0	26.0	17.0	28.6	26.6
2000-2100	8.0	14.0	20.0	18.0	19.0	18.0	9.0	15.8	15.1
2100-2200	12.0	13.0	16.0	14.0	11.0	16.0	10.0	13.2	13.1
2200-2300	4.0	4.0	9.0	15.0	13.0	16.0	3.0	9.0	9.1
2300-2400	2.0	2.0	4.0	5.0	17.0	20.0	3.0	6.0	7.6
Totals									
0700-1900	844.0	836.0	791.0	882.0	909.0	858.0	813.0	852.4	847.6
0600-2200	945.0	953.0	915.0	1019.0	1024.0	945.0	866.0	971.2	952.4
0600-0000	951.0	959.0	928.0	1039.0	1054.0	981.0	872.0	986.2	969.1
0000-0000	972.0	986.0	953.0	1072.0	1088.0	1005.0	893.0	1014.2	995.6
AM Peak	0700	0700	0700	0900	0700	1100	1100		
	76.0	88.0	79.0	79.0	74.0	106.0	105.0		
PM Peak	1600	1600	1600	1600	1600	1400	1400		
	123.0	120.0	110.0	128.0	124.0	97.0	93.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9942 -- English (ENA)

Datasets:

Site:	**[A2289130 06 1.79] TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	11:00 Wednesday, 23 July 2014 => 14:24 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289130 20140723_20140806.EC0 (PlusB)
Identifier:	L158SXKK MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 6919 / 27469 (25.19%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9942
Site: A2289130 06 1.79.0.0EW
Description: **TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(W) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	1.0	1.0	0.0	1.0	5.0	0.4	1.1
0100-0200	0.0	2.0	0.0	1.0	1.0	0.0	5.0	0.8	1.3
0200-0300	2.0	1.0	2.0	1.0	5.0	0.0	4.0	2.2	2.1
0300-0400	5.0	4.0	6.0	4.0	6.0	0.0	1.0	5.0	3.7
0400-0500	5.0	6.0	5.0	6.0	4.0	4.0	2.0	5.2	4.6
0500-0600	18.0	19.0	19.0	14.0	22.0	11.0	5.0	18.4	15.4
0600-0700	44.0	56.0	49.0	48.0	32.0	15.0	5.0	45.8	35.6
0700-0800	**109.0<**	91.0	98.0	95.0	99.0	23.0	9.0	98.4	74.9
0800-0900	105.0	**117.0<**	**109.0<**	**113.0<**	**103.0<**	56.0	30.0	**109.4<**	**90.4<**
0900-1000	56.0	68.0	59.0	58.0	53.0	56.0	53.0	58.8	57.6
1000-1100	50.0	57.0	59.0	58.0	64.0	73.0	63.0	57.6	60.6
1100-1200	74.0	63.0	52.0	56.0	70.0	**82.0<**	**64.0<**	63.0	65.9
1200-1300	63.0	42.0	57.0	61.0	61.0	75.0	86.0	56.8	63.6
1300-1400	58.0	50.0	47.0	61.0	67.0	76.0	83.0	56.6	63.1
1400-1500	76.0	54.0	51.0	83.0	77.0	92.0	114.0	68.2	78.1
1500-1600	**104.0<**	73.0	91.0	99.0	**114.0<**	**105.0<**	**114.0<**	96.2	**100.0<**
1600-1700	101.0	**105.0<**	**93.0<**	**99.0<**	104.0	103.0	86.0	**100.4<**	98.7
1700-1800	74.0	68.0	60.0	84.0	70.0	72.0	74.0	71.2	71.7
1800-1900	26.0	38.0	43.0	45.0	40.0	64.0	38.0	38.4	42.0
1900-2000	20.0	20.0	16.0	22.0	25.0	24.0	19.0	20.6	20.9
2000-2100	13.0	9.0	23.0	23.0	17.0	15.0	16.0	17.0	16.6
2100-2200	5.0	4.0	14.0	9.0	16.0	7.0	11.0	9.6	9.4
2200-2300	6.0	5.0	5.0	11.0	6.0	15.0	4.0	6.6	7.4
2300-2400	2.0	0.0	5.0	2.0	5.0	11.0	1.0	2.8	3.7
Totals									
0700-1900	896.0	826.0	819.0	912.0	922.0	877.0	814.0	875.0	866.6
0600-2200	978.0	915.0	921.0	1014.0	1012.0	938.0	865.0	968.0	949.0
0600-0000	986.0	920.0	931.0	1027.0	1023.0	964.0	870.0	977.4	960.1
0000-0000	1016.0	952.0	964.0	1054.0	1061.0	980.0	892.0	1009.4	988.4
AM Peak	0700	0800	0800	0800	0800	1100	1100		
	109.0	117.0	109.0	113.0	103.0	82.0	64.0		
PM Peak	1500	1600	1600	1600	1500	1500	1500		
	104.0	105.0	93.0	99.0	114.0	105.0	114.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9943 -- English (ENA)

Datasets:

Site:	**[A2289130 06 1.79] TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	11:00 Wednesday, 23 July 2014 => 14:24 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289130 20140723_20140806.EC0 (PlusB)
Identifier:	L158SXKK MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 758 / 27469 (2.76%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9943
Site: A2289130 06 1.79.0.0EW
Description: **TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(3 4 5 6 7 8 9 10 11 12) Dir(W) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0100-0200	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.2	0.1
0200-0300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0300-0400	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.2	0.1
0400-0500	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
0500-0600	1.0	2.0	3.0	0.0	3.0	0.0	0.0	1.8	1.3
0600-0700	5.0	9.0	7.0	9.0	7.0	1.0	0.0	7.4	5.4
0700-0800	10.0	11.0	**15.0<**	**14.0<**	**18.0<**	0.0	1.0	**13.6<**	**9.9<**
0800-0900	**16.0<**	13.0	7.0	6.0	10.0	3.0	1.0	10.4	8.0
0900-1000	7.0	**15.0<**	6.0	9.0	12.0	5.0	5.0	9.8	8.4
1000-1100	7.0	9.0	12.0	7.0	10.0	**8.0<**	**6.0<**	9.0	8.4
1100-1200	12.0	8.0	8.0	11.0	14.0	7.0	2.0	10.6	8.9
1200-1300	12.0	7.0	7.0	8.0	9.0	3.0	2.0	8.6	6.9
1300-1400	16.0	9.0	9.0	**15.0<**	**12.0<**	4.0	**6.0<**	12.2	10.1
1400-1500	**24.0<**	10.0	7.0	14.0	9.0	**6.0<**	1.0	**12.8<**	**10.1<**
1500-1600	10.0	**14.0<**	**18.0<**	10.0	8.0	4.0	4.0	12.0	9.7
1600-1700	11.0	9.0	8.0	8.0	9.0	3.0	2.0	9.0	7.1
1700-1800	9.0	5.0	6.0	5.0	4.0	2.0	4.0	5.8	5.0
1800-1900	2.0	4.0	4.0	5.0	3.0	5.0	2.0	3.6	3.6
1900-2000	2.0	4.0	2.0	1.0	2.0	1.0	2.0	2.2	2.0
2000-2100	1.0	1.0	3.0	1.0	0.0	0.0	2.0	1.2	1.1
2100-2200	0.0	0.0	2.0	0.0	1.0	0.0	1.0	0.6	0.6
2200-2300	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.8	0.9
2300-2400	2.0	0.0	0.0	1.0	0.0	0.0	0.0	0.6	0.4
Totals									
0700-1900	136.0	114.0	107.0	112.0	118.0	50.0	36.0	117.4	96.1
0600-2200	144.0	128.0	121.0	123.0	128.0	52.0	41.0	128.8	105.3
0600-0000	146.0	128.0	121.0	126.0	130.0	54.0	41.0	130.2	106.6
0000-0000	148.0	130.0	124.0	127.0	134.0	54.0	41.0	132.6	108.3
AM Peak	0800	0900	0700	0700	0700	1000	1000		
	16.0	15.0	15.0	14.0	18.0	8.0	6.0		
PM Peak	1400	1500	1500	1300	1300	1400	1300		
	24.0	14.0	18.0	15.0	12.0	6.0	6.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9944 -- English (ENA)

Datasets:

Site:	**[A2289130 06 1.79] TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	11:00 Wednesday, 23 July 2014 => 14:24 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289130 20140723_20140806.EC0 (PlusB)
Identifier:	L158SXKK MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 806 / 27469 (2.93%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9944
Site: A2289130 06 1.79.0.0EW
Description: **TEA TREE SR, TEA TREE 170m East of Back Tea Tree Rd - E & W Bnd <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(3 4 5 6 7 8 9 10 11 12) Dir(E) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0100-0200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0200-0300	1.0	1.0	0.0	1.0	2.0	1.0	0.0	1.0	0.9
0300-0400	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.4	0.3
0400-0500	0.0	1.0	0.0	3.0	2.0	0.0	0.0	1.2	0.9
0500-0600	3.0	4.0	3.0	0.0	6.0	1.0	0.0	3.2	2.4
0600-0700	8.0	10.0	7.0	3.0	7.0	2.0	2.0	7.0	5.6
0700-0800	**16.0<**	**23.0<**	**18.0<**	17.0	15.0	1.0	3.0	**17.8<**	**13.3<**
0800-0900	11.0	16.0	7.0	8.0	**15.0<**	4.0	5.0	11.4	9.4
0900-1000	10.0	12.0	12.0	**19.0<**	8.0	4.0	5.0	12.2	10.0
1000-1100	13.0	19.0	13.0	11.0	14.0	5.0	**9.0<**	14.0	12.0
1100-1200	9.0	7.0	11.0	9.0	9.0	**7.0<**	2.0	9.0	7.7
1200-1300	**18.0<**	6.0	4.0	11.0	3.0	**9.0<**	**6.0<**	8.4	8.1
1300-1400	17.0	9.0	7.0	7.0	10.0	7.0	5.0	10.0	8.9
1400-1500	10.0	9.0	8.0	10.0	11.0	6.0	4.0	9.6	8.3
1500-1600	14.0	**12.0<**	**11.0<**	**14.0<**	13.0	3.0	1.0	**12.8<**	**9.7<**
1600-1700	8.0	7.0	7.0	7.0	**13.0<**	3.0	2.0	8.4	6.7
1700-1800	12.0	7.0	2.0	5.0	7.0	4.0	2.0	6.6	5.6
1800-1900	1.0	3.0	1.0	6.0	3.0	0.0	2.0	2.8	2.3
1900-2000	0.0	0.0	3.0	2.0	2.0	1.0	1.0	1.4	1.3
2000-2100	1.0	0.0	0.0	1.0	3.0	1.0	0.0	1.0	0.9
2100-2200	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.2	0.3
2200-2300	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.2	0.1
2300-2400	1.0	0.0	1.0	0.0	1.0	1.0	0.0	0.6	0.6
Totals									
0700-1900	139.0	130.0	101.0	124.0	121.0	53.0	46.0	123.0	102.0
0600-2200	149.0	140.0	111.0	130.0	133.0	58.0	49.0	132.6	110.0
0600-0000	150.0	140.0	112.0	130.0	135.0	59.0	49.0	133.4	110.7
0000-0000	155.0	146.0	115.0	135.0	145.0	61.0	49.0	139.2	115.1
AM Peak	0700	0700	0700	0900	0800	1100	1000		
	16.0	23.0	18.0	19.0	15.0	7.0	9.0		
PM Peak	1200	1500	1500	1500	1600	1200	1200		
	18.0	12.0	11.0	14.0	13.0	9.0	6.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9936 -- English (ENA)

Datasets:

Site:	**[A2289140 94 8.55] TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	15:00 Wednesday, 23 July 2014 => 14:51 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289140 20140723_20140806.EC0 (PlusB)
Identifier:	L163ME2B MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 4536 / 17961 (25.25%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9936
Site: A2289140 94 8.55.0.0EW
Description: **TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(E) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	1.0	1.0	2.0	2.0	2.0	3.0	6.0	1.6	2.4
0100-0200	0.0	5.0	1.0	4.0	2.0	0.0	3.0	2.4	2.1
0200-0300	2.0	3.0	3.0	1.0	2.0	4.0	1.0	2.2	2.3
0300-0400	2.0	1.0	0.0	2.0	1.0	0.0	0.0	1.2	0.9
0400-0500	2.0	4.0	2.0	8.0	5.0	3.0	0.0	4.2	3.4
0500-0600	10.0	6.0	8.0	5.0	9.0	4.0	1.0	7.6	6.1
0600-0700	35.0	37.0	33.0	37.0	36.0	20.0	12.0	35.6	30.0
0700-0800	**59.0<**	**66.0<**	**78.0<**	49.0	**59.0<**	33.0	19.0	**62.2<**	**51.9<**
0800-0900	44.0	62.0	55.0	45.0	51.0	32.0	33.0	51.4	46.0
0900-1000	32.0	37.0	34.0	**59.0<**	42.0	35.0	51.0	40.8	41.4
1000-1100	41.0	47.0	38.0	48.0	43.0	51.0	56.0	43.4	46.3
1100-1200	32.0	39.0	33.0	38.0	43.0	**70.0<**	**70.0<**	37.0	46.4
1200-1300	32.0	36.0	38.0	32.0	33.0	47.0	44.0	34.2	37.4
1300-1400	50.0	36.0	43.0	37.0	31.0	47.0	**62.0<**	39.4	43.7
1400-1500	47.0	51.0	48.0	36.0	64.0	56.0	59.0	49.2	51.6
1500-1600	60.0	61.0	52.0	61.0	**74.0<**	34.0	42.0	61.6	54.9
1600-1700	**77.0<**	**70.0<**	**65.0<**	69.0	72.0	**56.0<**	43.0	**70.6<**	**64.6<**
1700-1800	50.0	40.0	48.0	**73.0<**	54.0	41.0	27.0	53.0	47.6
1800-1900	16.0	26.0	33.0	27.0	40.0	25.0	16.0	28.4	26.1
1900-2000	11.0	13.0	11.0	18.0	25.0	17.0	16.0	15.6	15.9
2000-2100	8.0	5.0	11.0	16.0	14.0	13.0	8.0	10.8	10.7
2100-2200	4.0	5.0	11.0	7.0	4.0	13.0	5.0	6.2	7.0
2200-2300	3.0	4.0	8.0	7.0	7.0	14.0	0.0	5.8	6.1
2300-2400	2.0	3.0	0.0	4.0	6.0	7.0	0.0	3.0	3.1
Totals									
0700-1900	540.0	571.0	565.0	574.0	606.0	527.0	522.0	571.2	557.9
0600-2200	598.0	631.0	631.0	652.0	685.0	590.0	563.0	639.4	621.4
0600-0000	603.0	638.0	639.0	663.0	698.0	611.0	563.0	648.2	630.7
0000-0000	620.0	658.0	655.0	685.0	719.0	625.0	574.0	667.4	648.0
AM Peak	0700	0700	0700	0900	0700	1100	1100		
	59.0	66.0	78.0	59.0	59.0	70.0	70.0		
PM Peak	1600	1600	1600	1700	1500	1600	1300		
	77.0	70.0	65.0	73.0	74.0	56.0	62.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9937 -- English (ENA)

Datasets:

Site:	**[A2289140 94 8.55] TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	15:00 Wednesday, 23 July 2014 => 14:51 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289140 20140723_20140806.EC0 (PlusB)
Identifier:	L163ME2B MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 4640 / 17961 (25.83%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9937
Site: A2289140 94 8.55.0.0EW
Description: **TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(W) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	1.0	0.0	0.0	1.0	4.0	0.2	0.9
0100-0200	0.0	3.0	0.0	1.0	2.0	0.0	0.0	1.2	0.9
0200-0300	2.0	1.0	2.0	1.0	4.0	0.0	1.0	2.0	1.6
0300-0400	2.0	1.0	2.0	2.0	3.0	1.0	1.0	2.0	1.7
0400-0500	2.0	5.0	2.0	3.0	3.0	2.0	4.0	3.0	3.0
0500-0600	10.0	14.0	15.0	9.0	13.0	6.0	3.0	12.2	10.0
0600-0700	43.0	43.0	39.0	40.0	32.0	9.0	1.0	39.4	29.6
0700-0800	**66.0<**	60.0	**70.0<**	66.0	**60.0<**	23.0	7.0	**64.4<**	50.3
0800-0900	52.0	**71.0<**	48.0	**70.0<**	54.0	35.0	27.0	59.0	**51.0<**
0900-1000	32.0	40.0	35.0	39.0	47.0	33.0	32.0	38.6	36.9
1000-1100	32.0	37.0	40.0	37.0	39.0	**54.0<**	**43.0<**	37.0	40.3
1100-1200	48.0	41.0	40.0	32.0	46.0	42.0	42.0	41.4	41.6
1200-1300	38.0	34.0	41.0	46.0	47.0	51.0	58.0	41.2	45.0
1300-1400	47.0	37.0	37.0	40.0	52.0	53.0	68.0	42.6	47.7
1400-1500	50.0	38.0	49.0	57.0	42.0	61.0	68.0	47.2	52.1
1500-1600	**61.0<**	58.0	61.0	51.0	**83.0<**	63.0	**87.0<**	62.8	**66.3<**
1600-1700	60.0	**62.0<**	**66.0<**	**61.0<**	71.0	**67.0<**	71.0	**64.0<**	65.4
1700-1800	54.0	53.0	52.0	55.0	50.0	49.0	49.0	52.8	51.7
1800-1900	18.0	27.0	26.0	29.0	30.0	41.0	25.0	26.0	28.0
1900-2000	14.0	12.0	10.0	17.0	19.0	15.0	15.0	14.4	14.6
2000-2100	7.0	4.0	14.0	16.0	10.0	11.0	6.0	10.2	9.7
2100-2200	4.0	3.0	5.0	10.0	15.0	8.0	6.0	7.4	7.3
2200-2300	4.0	4.0	6.0	5.0	7.0	11.0	4.0	5.2	5.9
2300-2400	1.0	0.0	3.0	1.0	2.0	4.0	0.0	1.4	1.6
Totals									
0700-1900	558.0	558.0	565.0	583.0	621.0	572.0	577.0	577.0	576.3
0600-2200	626.0	620.0	633.0	666.0	697.0	615.0	605.0	648.4	637.4
0600-0000	631.0	624.0	642.0	672.0	706.0	630.0	609.0	655.0	644.9
0000-0000	647.0	648.0	664.0	688.0	731.0	640.0	622.0	675.6	662.9
AM Peak	0700	0800	0700	0800	0700	1000	1000		
	66.0	71.0	70.0	70.0	60.0	54.0	43.0		
PM Peak	1500	1600	1600	1600	1500	1600	1500		
	61.0	62.0	66.0	61.0	83.0	67.0	87.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9938 -- English (ENA)

Datasets:

Site:	**[A2289140 94 8.55] TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	15:00 Wednesday, 23 July 2014 => 14:51 Wednesday, 6 August 2014
Zone:	Australia (TAS)
File:	A2289140 20140723_20140806.EC0 (PlusB)
Identifier:	L163ME2B MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Included classes:	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 595 / 17961 (3.31%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9938
Site: A2289140 94 8.55.0.0EW
Description: **TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(3 4 5 6 7 8 9 10 11 12) Dir(W) Sp(0,160) Headway(>0)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
0000-0100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0100-0200	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.2	0.1
0200-0300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0300-0400	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.2	0.1
0400-0500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0500-0600	2.0	4.0	4.0	1.0	1.0	0.0	0.0	2.4	1.7
0600-0700	4.0	9.0	5.0	6.0	5.0	1.0	0.0	5.8	4.3
0700-0800	**11.0<**	7.0	7.0	7.0	9.0	2.0	1.0	**8.2<**	6.3
0800-0900	8.0	10.0	3.0	6.0	6.0	5.0	2.0	6.6	5.7
0900-1000	5.0	**11.0<**	6.0	6.0	**12.0<**	4.0	3.0	8.0	**6.7<**
1000-1100	10.0	7.0	7.0	6.0	7.0	**6.0<**	**3.0<**	7.4	6.6
1100-1200	9.0	5.0	**8.0<**	**7.0<**	8.0	4.0	0.0	7.4	5.9
1200-1300	8.0	10.0	7.0	7.0	9.0	0.0	5.0	8.2	6.6
1300-1400	7.0	7.0	9.0	8.0	6.0	4.0	4.0	7.4	6.4
1400-1500	**15.0<**	6.0	12.0	**13.0<**	5.0	**9.0<**	0.0	10.2	8.6
1500-1600	9.0	**15.0<**	**14.0<**	6.0	**12.0<**	2.0	**5.0<**	**11.2<**	**9.0<**
1600-1700	6.0	6.0	5.0	9.0	8.0	2.0	3.0	6.8	5.6
1700-1800	6.0	5.0	4.0	3.0	3.0	4.0	3.0	4.2	4.0
1800-1900	1.0	1.0	4.0	4.0	3.0	4.0	1.0	2.6	2.6
1900-2000	2.0	4.0	2.0	1.0	3.0	0.0	3.0	2.4	2.1
2000-2100	0.0	1.0	3.0	2.0	1.0	0.0	1.0	1.4	1.1
2100-2200	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.2	0.3
2200-2300	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.2	1.1
2300-2400	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
Totals									
0700-1900	95.0	90.0	86.0	82.0	88.0	46.0	30.0	88.2	73.9
0600-2200	101.0	104.0	96.0	91.0	98.0	47.0	35.0	98.0	81.7
0600-0000	103.0	105.0	98.0	92.0	99.0	48.0	36.0	99.4	83.0
0000-0000	105.0	109.0	102.0	94.0	101.0	48.0	36.0	102.2	85.0
AM Peak	0700	0900	1100	1100	0900	1000	1000		
	11.0	11.0	8.0	7.0	12.0	6.0	3.0		
PM Peak	1400	1500	1500	1400	1500	1400	1500		
	15.0	15.0	14.0	13.0	12.0	9.0	5.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9939 -- English (ENA)

Datasets:

Site:	**[A2289140 94 8.55] TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
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Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

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Included classes:	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	_Virtual Week AA Austroads
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 686 / 17961 (3.82%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-9939
Site: A2289140 94 8.55.0.0EW
Description: **TEA TREE SR, CAMPANIA 150m West of Colebrook MR - E & W Bound <100>**
Filter time: **0:00 Thursday, 24 July 2014 => 0:00 Thursday, 31 July 2014**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(3 4 5 6 7 8 9 10 11 12) Dir(E) Sp(0,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.1
0100-0200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0200-0300	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.6	0.4
0300-0400	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.6	0.4
0400-0500	0.0	2.0	0.0	4.0	2.0	0.0	0.0	1.6	1.1
0500-0600	1.0	4.0	3.0	0.0	7.0	1.0	0.0	3.0	2.3
0600-0700	5.0	6.0	5.0	1.0	4.0	3.0	2.0	4.2	3.7
0700-0800	10.0	15.0	**23.0<**	10.0	**15.0<**	1.0	1.0	**14.6<**	**10.7<**
0800-0900	**12.0<**	16.0	9.0	10.0	12.0	6.0	4.0	11.8	9.9
0900-1000	6.0	11.0	6.0	**12.0<**	10.0	4.0	4.0	9.0	7.6
1000-1100	8.0	**19.0<**	9.0	11.0	13.0	**7.0<**	4.0	12.0	10.1
1100-1200	7.0	6.0	8.0	5.0	7.0	3.0	**6.0<**	6.6	6.0
1200-1300	10.0	**9.0<**	6.0	5.0	3.0	**9.0<**	**6.0<**	6.6	6.9
1300-1400	**18.0<**	6.0	8.0	9.0	7.0	5.0	3.0	9.6	8.0
1400-1500	5.0	6.0	8.0	8.0	9.0	4.0	4.0	7.2	6.3
1500-1600	15.0	6.0	9.0	**11.0<**	**15.0<**	4.0	1.0	**11.2<**	**8.7<**
1600-1700	6.0	5.0	**11.0<**	5.0	13.0	1.0	3.0	8.0	6.3
1700-1800	9.0	7.0	2.0	8.0	4.0	4.0	3.0	6.0	5.3
1800-1900	2.0	1.0	0.0	1.0	0.0	0.0	2.0	0.8	0.9
1900-2000	0.0	1.0	2.0	1.0	3.0	3.0	1.0	1.4	1.6
2000-2100	1.0	0.0	0.0	2.0	3.0	1.0	0.0	1.2	1.0
2100-2200	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
2200-2300	0.0	0.0	0.0	0.0	1.0	2.0	0.0	0.2	0.4
2300-2400	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
Totals									
0700-1900	108.0	107.0	99.0	95.0	108.0	48.0	41.0	103.4	86.6
0600-2200	115.0	114.0	106.0	99.0	118.0	55.0	44.0	110.4	93.0
0600-0000	116.0	114.0	106.0	99.0	119.0	57.0	44.0	110.8	93.6
0000-0000	119.0	121.0	109.0	104.0	130.0	58.0	45.0	116.6	98.0
AM Peak	0800	1000	0700	0900	0700	1000	1100		
	12.0	19.0	23.0	12.0	15.0	7.0	6.0		
PM Peak	1300	1200	1600	1500	1500	1200	1200		
	18.0	9.0	11.0	11.0	15.0	9.0	6.0		

*** - No data.**

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This document has been prepared in accordance with the scope of services agreed upon between Van Diemen Consulting (VDC) and the Client.

To the best of VDC's knowledge, the report presented herein represents the Client's intentions at the time of completing the document. However, the passage of time, manifestation of latent conditions or impacts of future events may result in changes to matters that are otherwise described in this document. In preparing this document VDC has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this document, VDC has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

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Document Status

Revision	Author	Review	Date
1	R Barnes C McCoull	C Williams	18-2-2016
1	R Barnes C McCoull	EPA	18-2-2016

ENVIRONMENTAL ASSESSMENT REPORT

Williams' Quarry

1356 Tea Tree Road, Campania

C A & S M Williams

Board of the Environment Protection Authority

March 2016

Environmental Assessment Report	
Proponent	C A & S M Williams
Proposal	Williams' Quarry
Location	1356 Tea Tree Road, Campania
NELMS no.	PCE 9340
Permit application no.	DA 2015/122 (Southern Midlands Council)
Doc1 folder	EN-EM-EV-DE-248330
Doc1 no.	H514902
Class of Assessment	2B

Assessment process milestones	
N/A	Notice of Intent submitted
8/10/2015	EER Guidelines issued
17/9/2015	Permit application submitted to Council
24/9/2015	Application received by Board
12/12/2015	Start of public consultation period
18/1/2016	End of public consultation period
18/2/2016	Supplementary information submitted to Board

Acronyms	
Board	Board of the Environment Protection Authority
EER	Development Proposal and Environmental Management Plan
DPIPWE	Department of Primary Industries, Parks, Water and Environment
EIA	Environmental impact assessment
EMPC Act	*Environmental Management and Pollution Control Act 1994*
EMPCS	Environmental management and pollution control system
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
LUPA Act	*Land Use Planning and Approvals Act 1993*
MRT	Mineral Resources Tasmania (Department of State Growth)
RMPS	Resource management and planning system
SD	Sustainable development
SMC	Southern Midlands Council
SRAD	Standard recommended attenuation distance
TSP Act	*Threatened Species Protection Act 1995*

Report summary

This report provides an environmental assessment of CA & SM Williams' proposed quarry and crushing operation.

The proposal involves the extraction of up to 10,000 cubic metres per annum of hard rock, and up to 2,500 cubic metres of that material is to be crushed. The quarry is currently authorised to operate as a level 1 quarry (extraction only, no crushing), and is situated on private land at 1356 Tea Tree Road, Campania.

This report has been prepared based on information provided by the proponent in the Environmental Effects Report (EER) and EER Supplement. Relevant government agencies and the public have been consulted and their submissions and comments considered as part of this assessment.

On 29 January 2016 and 10 February 2016, the Board requested that the proponent submit supplementary information to address public and Council comments on the EER. Supplementary information was submitted by the proponent on 18 February 2016.

Further details of the assessment process are presented in Section 1 of this report. Section 2 describes the statutory objectives and principles underpinning the assessment. Details of the proposal are provided in Section 3. Section 4 reviews the need for the proposal and considers the proposal, site and design alternatives. Section 5 summarises the public and agency consultation process and the key issues raised in that process. The detailed evaluation of key issues is in Section 6, and other issues are evaluated in Section 7 and Appendix 1. The report conclusions are contained in Section 8.

Appendix 2 contains details of comments made and issues raised in the consultation process. Appendix 3 contains environmental permit conditions for the proposal.

Table of Contents

1 Approvals process

An application for a permit under the *Land Use Planning and Approvals Act 1993* (LUPA Act) in relation to the proposal was submitted to Southern Midlands Council on 17 September 2015.

The proposal is defined as a 'level 2 activity' under clause 5(a), Schedule 2 of the *Environmental Management and Pollution Control Act 1994* (EMPC Act), being a quarry, and under clause 6(a)(ii) of Schedule 2, being a materials handling (crushing) operation. Section 25(1) of the EMPC Act required Council to refer the application to the Board of the Environment Protection Authority (the Board) for assessment under the Act. The application was received by the Board on 24 September 2015.

The Board required that information to support the proposal be provided in the form of an Environmental Effects Report (EER) prepared in accordance with guidelines issued by the Board on 8 October 2015. A draft EER was submitted with the permit application but it did not meet the requirements of the Board's guidelines, and a revised version was submitted subsequent to the guidelines being issued.

The EER was released for public inspection for a nominal 28-day period (extended in accordance with statutory requirements), commencing on 12 December 2015. An advertisement was placed in the Hobart *Mercury* and a notice was placed on the EPA website. The EER was also referred at that time to relevant government agencies for comment. 23 public submissions were received.

On 29 January 2016 the Board requested that the proponent submit supplementary information to address issues raised in public representations on the EER. A further request was made on 10 February 2016 to submit supplementary information to address issues raised by Southern Midlands Council in a submission made to the Board. Supplementary information was submitted by the proponent on 18 February 2016.

Previous application

It should be noted that an application under the LUPA Act for a similar activity was lodged by the proponent with Southern Midlands Council in November 2014 and referred to the Board in December 2014. The Board assessed the application and approved the proposal with conditions in May 2015, but Southern Midlands Council subsequently refused to grant a permit.

The Resource Management and Planning Appeal Tribunal, in accordance with section 62 of the LUPA Act, has granted leave to the proponent to lodge a new application for substantially the same activity.

This report, and the Board's assessment, treats the current application as *de novo* and does not take the previous application and assessment into account except for administrative purposes.

2 SD objectives and EIA principles

The proposal must be considered by the Board in the context of the objectives of the Resource Management and Planning System of Tasmania (RMPS), and in the context of the objectives of the Environmental Management and Pollution Control System (EMPCS) (both sets of objectives are specified in Schedule 1 the EMPC Act). The functions of the Board are to administer and enforce the provisions of the Act, and in particular to use its best endeavours to further the RMPS and EMPCS objectives.

The Board must undertake the assessment of the proposal in accordance with the Environmental Impact Assessment (EIA) Principles defined in Section 74 of the EMPC Act.

3 The proposal

The proposal involves the extraction of up to 10,000 cubic metres of hard rock per year, and up to 2,500 cubic metres of that material is to be crushed. The quarry is situated on private land at 1356 Tea Tree Road, Campania and within mining lease number 1980P/M. Figure 1 below shows the quarry location, Figure 2 shows the extent of the mining lease and the access road for the quarry, and Figure 3 shows the proposed site layout.

The main characteristics of the proposal are summarised in Table 1. A detailed description of the proposal is provided in Part B of the EER.

Table 1: Summary of the proposal's main characteristics

Activity	
Extraction 10,000 cubic metres of hard rock per year and crushing of a maximum of 2,500 cubic metres of that material per year.	
Location and planning context	
Location	1356 Tea Tree Road, Campania (as shown in Figure 1 below). The EER describes the locality as Rekuna, however there is no clear definition of this locality and it no longer has a discrete postcode. The quarry is situated within the defined locality of Campania.
Land zoning	The site is zoned as Rural Resource under the *Southern Midlands Interim Planning Scheme 2015*.
Land tenure	The proposed activity lies within private land belonging to the proponent, certificate of title Volume 155147 Folio 1.
Mining lease	1980P/M (lease held by proponent)
Lease area	6 hectares
Bond	$5,000
Existing site	
Land Use	The proposal site has been used for some years as a small quarry. The EER provides no information on prior land use. The balance of the mining lease is highly modified agricultural land and a machinery workshop area.
Topography	The quarry is located on the southern side of a small hillock, in an elevated position above the small valley through which Tea Tree Road passes. The northern slope of this hillock is relatively steep and leads down towards Tea Tree Road. The LIST states that there are no known active landslides, but part of the mining lease has been identified by MRT as susceptible to landslides (Low hazard band).
Geology	The geology of the quarry is Jurassic dolerite with a thin clay-loam soil derived from in situ weathering of the bedrock. Rock to the south of the quarry is Triassic sandstone. The mining lease also contains tertiary sediments, and undifferentiated Cainozoic sediments.

Soils	Shallow, skeletal, rocky soils. Thin clay-loam soil derived from in situ weathering of the bedrock. Some dermosol, other not classified. Dermosols are diverse and have a moderate to strong structured B2 (subsoil) horizon and a lack of a strong texture contrast between the A and B horizons. These soils are not high in free iron (less than 5% Fe), nor are they calcareous throughout the profile. There is an increase in clay content with depth.
Hydrology	The quarry (and existing mining lease) lie within the Plummers Creek catchment which flows eastward to the Coal River near Campania. There are no natural watercourses within the mining lease – drainage is directed to the west and north via constructed surface drains, dams and ponds. See Figure 4 below.
Fauna	The EER provides no general information about fauna on or near the site.
Flora	The quarry site and immediate surrounds are pasture used for livestock grazing. Pastures are actively maintained, being ploughed and fertilised on a regular basis. There is *Eucalyptus viminalis* dry forest and woodland at the south and west boundaries of the mining lease. Notable weeds within or directly adjacent to the active quarry are horehound and Californian thistle
Local region	
Climate	Mean annual rainfall at nearby Campania (Kincora) is relatively low at 494.9 mm. Slightly more rain falls in the spring compared to the rest of the year. As is generally typical for southern Tasmanian, winds at nearby Campania are predominantly north, north-west to westerly throughout the year. There is a distinct peak in strong southerly and gentle south-easterly winds in the afternoon period which reflects sea breezes in summer and southerly changes in the winter-autumn period. Some of the stronger southerly winds recorded at Campania are likely to be more gentle at the quarry site, due to the quarry's location on the northern side of the Coal River Tier, which deflects southerly winds.
Surrounding land zoning, tenure and uses	The surrounding area is predominantly used for farming and is zoned as Rural Resource and Significant Agricultural under the *Southern Midlands Interim Planning Scheme 2015*. The township of Campania is located approximately three kilometres to the north-east of the quarry. It has been widely publicised that there is interest in the property immediately to the east of the quarry being developed as a 'Chinese Buddhist Cultural Park'.
Species of conservation significance	Sickle speargrass (*Austrostipa scabra subsp. falcata*) and Woolly new-holland daisy (*Vittadinia gracilis*) (both listed as rare under the TSP Act) and curly sedge (*Carex tasmanica*) (vulnerable under the EPBC Act) are recorded as occurring on a neighbouring property to the east of the quarry. There are records of three Tasmanian Wedge-tailed eagle (*Aquila audax subsp. fleayi*) nests within five kilometres of the quarry, however none are within one kilometre of the quarry and the EER states that the sparse surrounding vegetation is not able to support a nest.
Proposed infrastructure	
Major equipment	Standard quarrying equipment – bulldozer, loader, excavator, and 10 tonne truck. A crusher will be brought to the quarry as and when required through a contractual arrangement with an equipment hire company. The crusher will be track-mounted, noise shielded, mobile and jaw-type.
Other infrastructure	All machinery is owned and maintained by the proponent using the machinery workshop located on the same property (approved by Council as an Industrial (Limited Impact) use). Amenities for workers will be provided at the proponent's home near the site.

Inputs	
Water	Water will be used for dust suppression at the quarry, on stockpiles, and on access tracks. Water will be taken from sediment settlement ponds and/or from the farm dam located at the northern end of the proponent's property.
Energy	Machinery will be powered by diesel fuel.
Other raw materials	None.
Wastes and emissions	
Liquid	Stormwater runoff from extraction and stockpile areas.
Atmospheric	Dust from internal and external traffic, materials handling, crushing and blow-off from stockpiles.
Solid	General refuse including food scraps, paper and packaging.
Controlled wastes	Wastes generated by the servicing of machinery, such as waste engine oil, oil filters, waste tyres.
Noise	Noise generated by the use of heavy machinery for extraction and crushing of rock material, and by the loading and transportation of material.
Greenhouse gases	Greenhouse gases generated by the use of diesel fuel for powering machinery and vehicles.
Construction and operations	
Proposal timetable	Extraction has proceeded at the quarry for some time under the existing Level 1 permit. Extraction will continue (up to 10,000 cubic metres per annum) under the present proposal, and crushing will also be undertaken on a campaign basis (up to 2,500 cubic metres per annum) on no more than five consecutive days per year. The 10 year strategy for gravel/rock extraction is to develop a second bench after the existing active face has been pushed northwards (about 10 m) and westward (about 30 m) and made about 5 m deeper.
Operating hours (ongoing)	Proposed operating hours for general quarry operations are as at present, which are those recommended in the *Quarry Code of Practice*: 0700 to 1900 hrs Monday to Friday 0800 to 1600 hrs on Saturday No operations on Sunday and public holidays The EER proposes that crushing operations will take place between 0800 and 1700 hours on weekdays only, excepting public holidays.

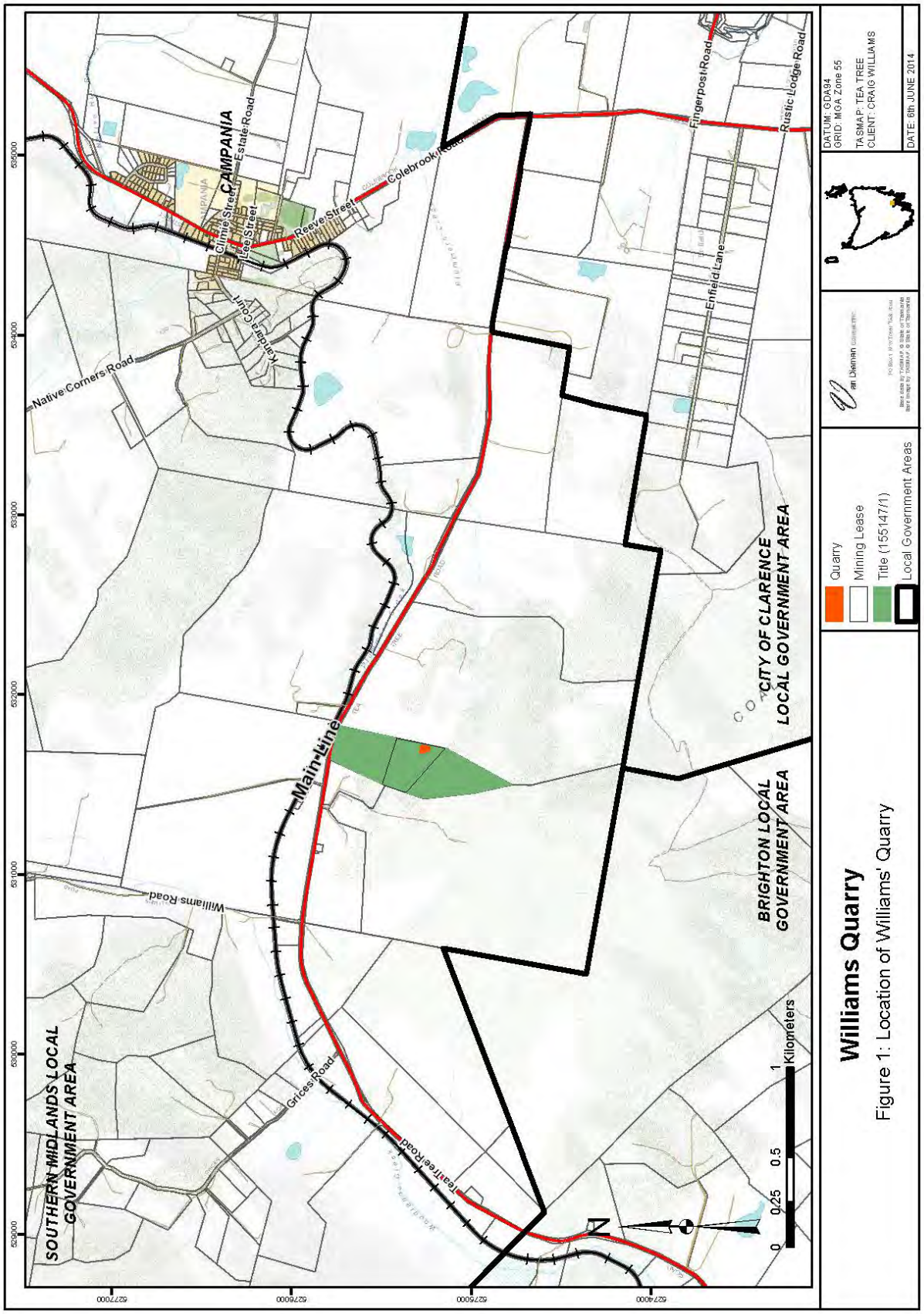

Figure 1: Proposal location (Source: EER, Figure 1)

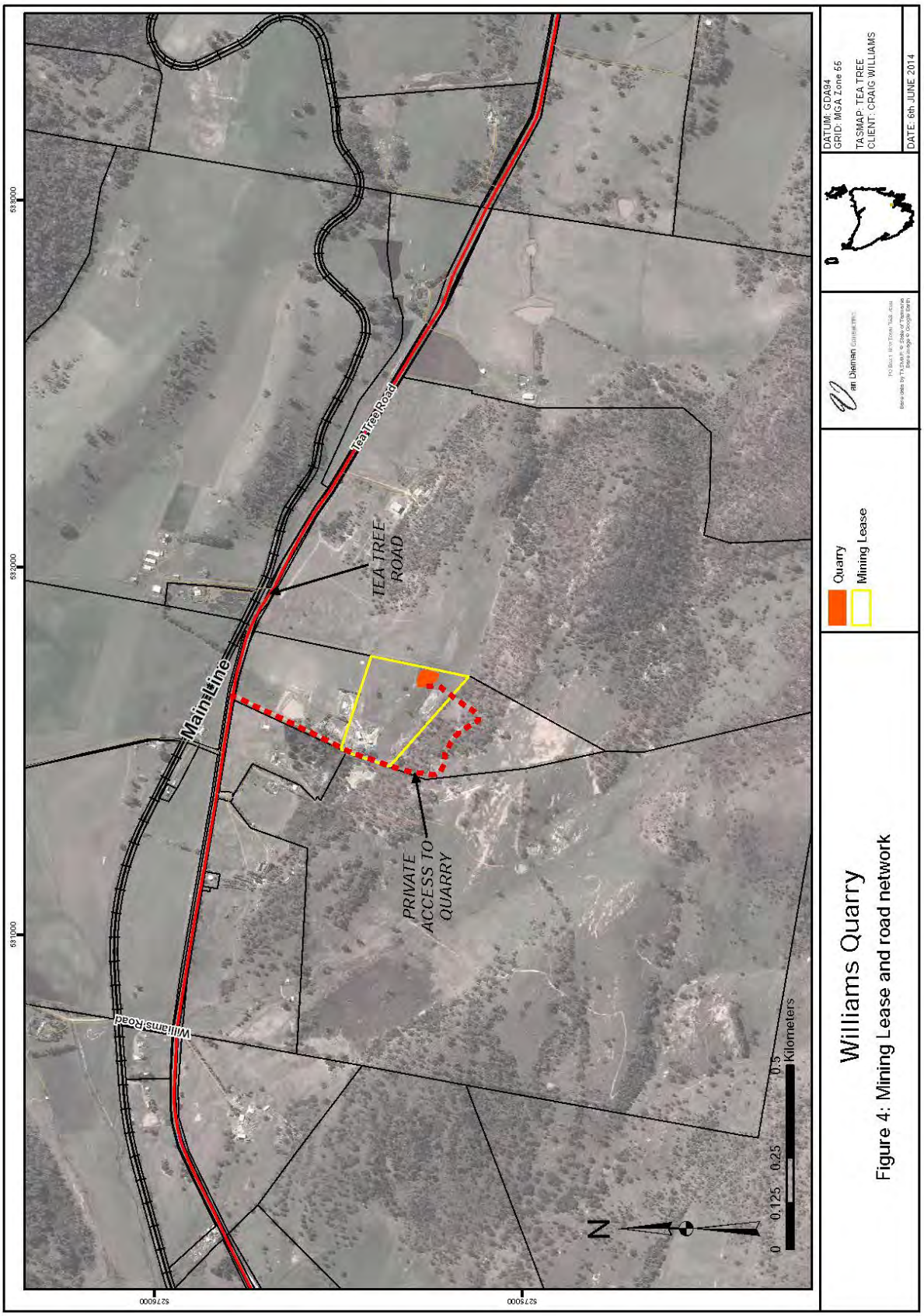

Figure 2: Quarry location, mining lease and access road (Source: EER, Figure 3)

Figure 3: Quarry location, mining lease and access road (Source: EER, Figure 5b)

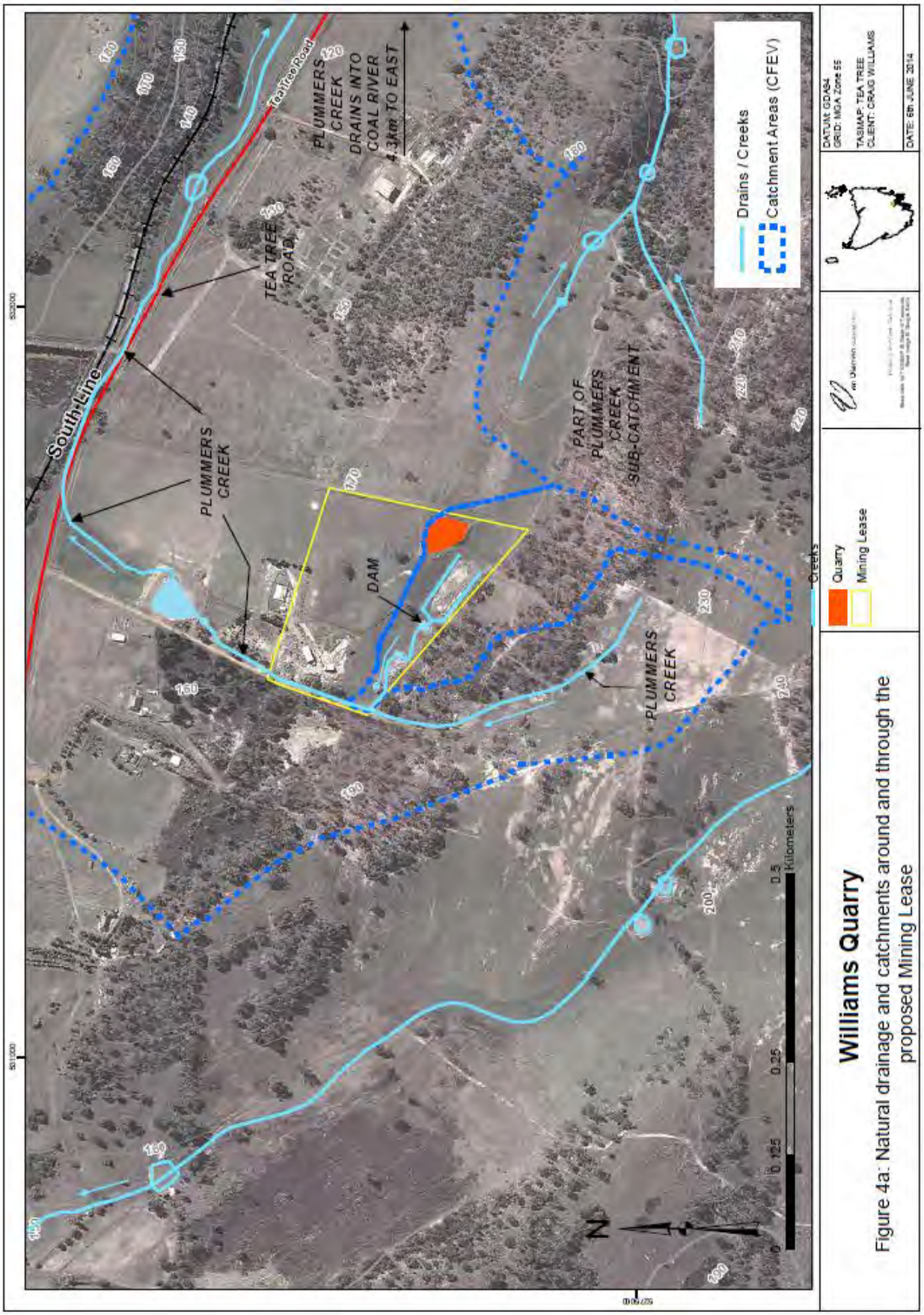

Figure 4: Site and area hydrology (Source: EER, Figure 4a)

4 Need for proposal and alternatives

The EER (Part B) states that the quarry was approved as a level 1 operation to enable the proponent to supply the local market, in particular agricultural enterprises which require the quarry product for farm laneways. There has since been development of demand for finer, more consistent-sized material and so proponent decided to upgrade to a level 2 production level and to undertake crushing of some of the extracted material on site.

There are no site alternatives for the quarry as the appropriate material is on the proponent's private property.

The quarry is fully operated by the proponent/landowner and his family and it is not expected to provide any additional employment or direct economic benefit beyond that which the proponent will receive from operating the business.

The EER states that the resource on the site will be sufficient for a minimum of 25 years of supply at the maximum extraction rate of 10,000 cubic metres per year (although that appears to relate to the mining lease as a whole rather than the currently proposed quarrying site).

5 Public and agency consultation

A summary of the public representations and government agency/body submissions is contained in Appendix 2 of this report.

23 public representations were received. The main issues of environmental concern raised in representations included:

- the number of residences in other ownership within the 750 metres SRAD for use of a crusher, and potential impacts on amenity;
- concerns regarding noise associated with use of the crusher and other machinery;
- distance of the quarry and access road from property boundaries;
- noise and dust associated with use of the access road by quarry trucks;
- sediment collection pond stability; and
- lack of consultation with neighbours regarding the quarry proposal and proposed activities to be undertaken on site.

Other issues were raised in public representations which do not come within the scope of the Board's assessment and which are the responsibility of other authorities. These are briefly summarised in Appendix 2. Several representations also raised issues relating to the previous (2015) permit application and assessment process. These are not summarised in Appendix 1 as they are not relevant to the Board's current assessment.

The EER was referred to a number of government agencies/bodies with an interest in the proposal. Responses were received from the following:

- Mineral Resources Tasmania (Department of State Growth);
- Traffic Engineering Branch, Department of State Growth;
- Growth Strategy and Coordination Branch, Department of State Growth;
- Southern Midlands Council (SMC).

The following Divisions/areas of the Department of Primary Industries, Parks, Water and Environment provided advice on the EER:

- Air Section, EPA Division;
- Noise Specialist, EPA Division;
- Water Section, EPA Division;
- Industrial Operations Section, EPA Division;
- Policy & Conservation Advice Branch (PCAB), Natural and Cultural Heritage Division;
- Aboriginal Heritage Tasmania, Natural and Cultural Heritage Division.

The EER Supplement prepared by the proponent provides a response to several of the environmental issues raised by the public and SMC.

SMC submission

Under section 25(2)(a) of EMPCA, the Board must conduct its assessment of a permit application in consultation with the relevant planning authority (usually the Council which referred the application to the Board). One measure the Board takes to fulfil this requirement is to invite the Council to submit comments to the Board on the case for assessment. For the assessment that is the subject of this report, the Board invited SMC to submit comments on the EER to it during the public consultation period. SMC submitted comments by letter which the Board received on 15 January 2016. Issues raised by SMC are summarised as follows.

1. The application contains deficiencies pertaining to acoustic impact. Council provided a copy of a report by an acoustic consultant that it had commissioned, which raises issues in relation to the acoustic reports appended to the EER.
2. A very large proportion of the land within the 750 metre standard recommended attenuation distance (SRAD) is in other ownership. The likely development restrictions that would result raises an issue of fairness to the other land owners, in the context of the RMPS objectives.
3. The development restrictions that would result will restrict economic development, contrary to the RMPS objectives.
4. The choice of site for the quarry is poor, and alternatives should have been considered.
5. The proximity of the quarry to the intended site for the Tasmanian Chinese Buddhist Cultural Park (TCBCP), the fact that much of the TCBCP site lies within the 750 metre SRAD, and the proximity of the quarry to the boundary of the property where the TCBCP site is located, may jeopardise the TCBCP proposal. This would be contrary to the desired outcomes of clause 3.0.4 of the current planning scheme.
6. Issues were raised regarding the Board's assessment process and its compliance with sections 74(4)(a) and 74(8) of EMPCA (section 74 specifies the EIA Principles).

The matters raised by the SMC's acoustic consultant referred to in issue 1 above are addressed in section 6.1 of this report.

In relation to issues 2, 3 and 4 raised by SMC, it is noted that the planning authority has referred the proposal for environmental assessment on the basis that it is a permissible level 2 activity in accordance with the planning scheme.

The Board considers that the planning scheme is the primary tool within the RMPS for ensuring that land use is fair and orderly and that the Board should assess the environmental impacts of proposed developments in the context of the surrounding land uses as defined by the planning scheme. Beyond this, these matters are most appropriately considered by the planning authority.

In relation to issue 5 raised by SMC, the Board is unable to give significant weight to proposals that are currently prohibited under the planning scheme and for which an approval process has not formally commenced.

Issue 6 questions the Board's assessment process and its compliance with section 74(4)(a) and 74(8) of EMPCA. The Board is satisfied that its current assessment process complies with the EIA Principles and other relevant provisions of EMPCA. Specifically, the Board has complied with the requirements of section 74(4) of EMPCA by issuing guidance to the applicant in accordance with section 27D, in the form of guidelines for an Environmental Effects Report (EER). The guidelines included guidance on environmental issues that may be of concern to the public and which the Board is obliged to assess.

In relation to s.74(8) the Board's assessment process involves consideration of representations provided to Board in relation to the proposal to be assessed. The representations are considered in the context of the RMPS and EMPCS objectives. These objectives guide the Board's capacity to

resolve certain conflicts. Where conflict is unresolved at the point at which a council makes a decision on an application, the Board relies on the appeal provisions set out in section 61 of the LUPA Act.

6 Evaluation of key issues

The key environmental issues relevant to the proposal that were identified for detailed evaluation in this report were:

- Noise
- Dust
- Traffic impacts – noise and dust

Each of these issues are discussed in the following subsections.

The proponent will be required to comply with the following general permit conditions (these have relevance to all of the environmental issues evaluated in this section and in section 7). The conditions are necessary for the efficient environmental management of the activity by the proponent and for the efficient regulation of the activity by the Director.

G1 Access to and awareness of conditions and associated documents

G2 Incident response

G3 No changes without approval

G4 Change of responsibility

G5 Change of ownership

G6 Complaints register

G7 Quarry Code of practice

6.1 Noise

Description

Existing environment

The proposed quarry is located within a rural agricultural environment, in a wide valley dissected by Tea Tree Road, and located behind a small topographic rise which shields the quarry from visibility from Tea Tree Road. In addition to noise from normal rural agricultural activities, traffic noise from Tea Tree Road (a Regional Freight Route) creates a low to moderate level of background noise at the site, and infrequent passing of trains on the rail line to the north of Tea Tree Road and sounding of the train horn at nearby uncontrolled crossings is also a source of noise in the area.

The proponent already operates an agricultural services and machinery repair business on the property, and also lives on site.

Potential emissions

Noise emissions will originate from use of a bulldozer, loader, excavator and trucks, for ripping, excavation, and transport of materials onto stockpiles, loading into trucks and cartage from the site. Trucks travelling along the access road at the western boundary of the property will also be a

source of noise (that issue is addressed in section 6.3 of this report). No blasting is to occur at the quarry.

A crusher will be brought on site as required for campaign-type crushing operations over a period of five days per year, to crush up to 2,500 cubic metres of material of the total 10,000 cubic metres per year proposed for excavation. The EER states that the crusher will be a track-mounted, noise-shielded, mobile, jaw-type crusher.

The EER (section D8.4) indicates that the crusher is likely to be the loudest noise source in a quarry. Estimates of noise levels are based on noise measurements taken by the proponent's noise consultant of a stationary, unshielded, impact-type crusher and shifter located at another quarry. The proponent states that the crushing under this proposal will be substantially quieter as the crusher to be used will be a track-mounted, noise-shielded, mobile, jaw-type crusher.

Potential impacts

There are eight residences in other ownership located within the separation distance for use of a crusher (750 metres) recommended in the *Quarry Code of Practice* (see Figure 5 below). The nearest residence in other ownership (designated as house #5 in the EER, at 1220 Tea Tree Road) is located 443 metres to the north-west of the quarry pit and approximately 95 metres from the access road. The proponent's residence (designated as house #6 in the EER) is located 208 metres from the quarry.

The existence of the topographic 'lip' directly north of the quarry pit, which has been raised by an earthen bund, is considered by the proponent to be sufficient to shield nearby residences from noise generated by quarry operations. The EER also states that the distinctive and rapid decrease in elevation between the hill which supports the quarry and nearby residences provides extra noise attenuation (EER section D8.3).

The proponent's noise assessment (Appendix 7 of the EER) states that the ambient noise level (quarry not operating) at the boundary of the house #5 property is 39 dB(A). The assessment estimates quarry noise (including use of crusher) at this residence to be 35 dB(A) with little or no wind, and 45 dB(A) with wind blowing towards the residence, and the EER states that the quarry is therefore likely to meet the noise requirements of the *Quarry Code of Practice* (EER section D8.4).

The EER (section D8.6) states that a low to moderate level of background noise is experienced at the proponent's house due to traffic movements on Tea Tree Road, and due to use of the railway line which lies to the north of Tea Tree Road. The nearest residences in other ownership are located closer to Tea Tree Road than to the quarry and the EER claims that the main noise source for those residences is Tea Tree Road.

Noise emissions from vehicles using the private access road and associated impacts are addressed in section 6.3 of this report.

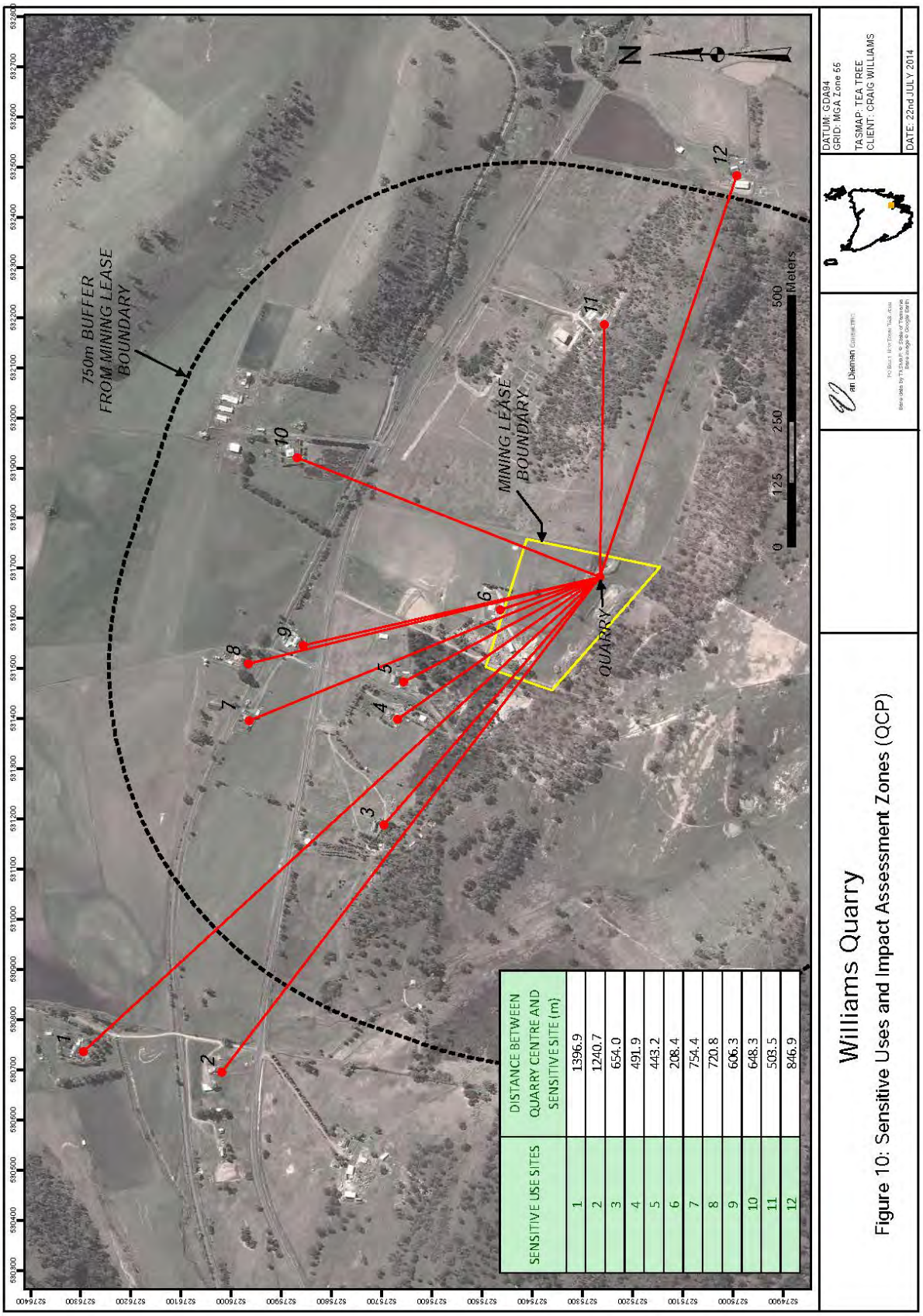

Figure 4. Nearby sensitive uses and distances from quarry (Source: EER, Figure 9).

Management measures

Section D8 of the EER provides discussion on noise impacts and proposed management actions. The main management measures and other factors which would contribute to lowering the risk of noise nuisance at nearby residences are as follows.

- Most noise will be generated in the quarry pit itself and deflected to the south, away from the nearest residences.
- Machinery operating in the laydown area will be shielded by the ridgeline, preventing direct noise emissions reaching residences.
- Operating hours of extraction machinery and trucks will adhere to the *Quarry Code of Practice* guidelines.
- Crusher operating hours will be restricted to 0800 and 1700 hours on weekdays only.
- Crushing will take place on a 'campaign' basis only, during five consecutive days per year.
- The crusher will be located in the quarry pit, in order to shield noise emissions.
- The topographic barrier between the quarry and residences will be maintained, and its effectiveness improved by increasing the height of the earthen bund, particularly at the western end of the quarry area (the latter undertaking is described in section B6 of the EER).
- Background noise is already experienced by nearby residences from Tea Tree Road traffic and rail movements, and from agricultural machinery used in the area (tractors and diesel machinery).
- No blasting will occur.

EER Commitments

The following commitments in the EER (Part F) are relevant to noise impacts.

Commitment 1: Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hours Monday to Friday, 0800 to 1600 hours on Saturday; closed on Sunday and public holidays.

Commitment 2: Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.

Commitment 9: The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum).

Commitment 10: A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.

Commitment 19: To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be prepared and maintained for the activity.

Public and agency comment and responses

Several public representations expressed concern about noise impact from quarry operations and truck movements. This mainly related to residences within 750 metres of the quarry. The Board's delegate considered that there was sufficient information in the EER for the Board to form an opinion on noise impacts generally, however the proponent was required to provide further information on the following specific issues.

1. No discussion in the EER of variation in the carrying of sound across hills.
2. The EER has only selective discussion of noise impacts. No reference to impacts on a representor's property (1216 Tea Tree Road). (This appeared to relate to house #3 in Figure 9 of the EER.)
3. The proponent parks and services heavy machinery around his house/workshop. Noise generated there, and when moving to and from the quarry, has not been considered in the application or EER noise reports.
4. Ground vibration from quarrying and crushing presents a risk to the six statues being erected at 1384 Tea Tree Road.

SMC made a submission to the Board during the public consultation period. The submission included a report by an acoustic consultant engaged by SMC which raised a number of issues in relation to the noise reports appended to the EER. The Board's delegate required the proponent to provide further information on the following issues raised in the acoustic consultant's report.

5. The suitability of the L_{eq} parameter for measuring pre-existing 'ambient' noise (for the purposes of the *Quarry Code of Practice*).
6. Modelling methodologies.
7. Tonal, impulsive or modulation penalties.
8. The proposed crusher may not be substantially quieter that the impact crusher that was used for the assessment.
9. The number of days per year that crushing is to occur.

Responses in the EER Supplement

The proponent submitted an EER Supplement on 18 February 2016 in response to the Board's request for further information on each of the issues above. The responses are summarised as follows (numbering corresponds to that above).

1. The noise assessment conducted by the proponent's acoustic consultant considered the topography of the property and surrounds, as evident by the topographic profiles in the report prepared (Appendix 7 of the EER). Specifically, it was noted that the reflection effect off the irregular quarry face is likely to increase the noise level by no more than 2.5 dB(A). There are no sensitive areas south of the quarry face on which the noise can impinge and therefore it does not cause environmental nuisance.

2. The noise assessment by the proponent's acoustic consultant was based on the current size of the earthen bund (quarry lip) which is a worse-case scenario in terms of the noise mitigation performance it will/does offer. Line-of-sight to house #3 will be avoided by the establishment and maintenance of an earthen bund of sufficient height to provide an in-line

visual screen to that house. With the bunding installed, and given the house is at a greater distance from the quarry than house #2, the noise levels at house #3 would be less than those calculated for house #2.

3. The workshop on the property is an approved Level 1 activity that is not part of this application. Machinery from the quarry may be serviced at the workshop, irrespective of where it has come from or going to on the property. The act of servicing machinery is not part of this application nor would it occur on the area of land where the Level 2 activity is proposed to occur. It is not unusual for machinery at a quarry or comparable activity to be serviced at a shed or facility on the same land or adjoining land as the quarry.

4. The quarry is located in Jurassic dolerite, one of the most stable geologies in Tasmania. the pad of the nearest ornament (statue) is 185 metres away from the property boundary, and the quarry is more distant than this. The activities in the quarry are not likely to affect the integrity of the ornaments (e.g. concrete base) as the dolerite geology is stable and is not recognised as being a high transmitter of vibration. Furthermore, the onus is on the developer of the ornaments (statues) to ensure that the works are built to a suitable standard for the conditions in the area.

5. The 16 hour L_{eq} is estimated by the proponent's acoustic consultant to be 42.3 dB(A), in relation to house #3 and house #5 which are within 300 metres of Tea Tree Road. This is the ambient noise in the absence of quarry noise and is the noise level which can be used to estimate the acceptability of the quarry noise.

6. (The response to this issue contained considerable technical detail which cannot be summarised. Refer to the EER Supplement.)

7. A common tonal component in quarry operations is a rock drill impacting on hard rock. This sets up vibrations in the long metal drill and these are tonal. The Williams quarry does no blasting so rock drills are not used. Reversing alarms can also be tonal, however broadband reversing alarms can be fitted to other quarry equipment.

8. The measured crusher (the crusher that was the subject of noise measurements for the acoustic report appended to the EER) was operating in a larger quarry and it was an old model not well maintained. It would be un-economical in terms of running costs, insurance and hiring costs to use a crusher that is over-designed for the quarry size.

9. The use of the crusher will be restricted in accordance with Commitment 2 and the Operating Hours section of the Planning Report. Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750 metres of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.

Evaluation

Noise limits

General

The noise assessment commissioned by the proponent and summarised in the EER (section D8.4) includes a worst-case estimate of noise level at the nearest residence in other ownership of 45 dB(A). 'Worst-case" includes the crusher operating and slight breezes in the direction of the residence.

Although the estimated noise level is considered reasonable for a quarry operating in a rural agricultural area, truck movements on the access road and their impacts on the nearest residence were not factored into this estimate.

The proponent commissioned a further noise assessment which is summarised the EER (section D8.5) which provided revised ambient noise levels while trucks were being driven along the access road. Ambient noise levels at the measurement location (which was a surrogate for the location of the nearest residence) ranged from 43.6 dB(A) and 46.2 dB(A). In the EER Supplement, the proponent provided further information on ambient noise levels. The proponent's acoustic consultant estimated the 16-hour daytime ambient level to be 42.3 dB(A) (see further discussion below), which the Board accepts as being the most appropriate basis for consideration of activity noise limits. The relatively high daytime ambient noise levels (for a rural environment) are likely to be due mainly to traffic movements on Tea Tree Road.

The *Quarry Code of Practice* recommends that noise activities from quarry operations affecting residential premises (with the exception of blasting) must not exceed 10 dB(A) above daytime ambient noise levels. In areas of sensitive use or other areas that are likely to be adversely affected by noise of 10 dB(A) above ambient, noise levels must not exceed 5 dB(A) above ambient. This guidance is somewhat ambiguous, but the +5dB(A) margin has been used as a guide in this situation. Assuming a daytime ambient noise level of 42.3 dB(A), a noise level of up to 47.3 dB(A) would be acceptable at neighbouring residences in the case of this activity.

A daytime noise limit of 45 dB(A), based on the proponent's prediction of noise level at neighbouring residences under worst-case crusher noise emissions, may be difficult to achieve when noise emissions from trucks on the access road are superimposed. A daytime noise limit of 47 dB(A) (at any sensitive premises in other ownership) has consequently been specified in permit condition **N2**, which includes a margin of 2 dB(A) for likely truck noise. This limit is consistent with the recommendations of the *Quarry Code of Practice*, i.e. it is below the level of 47.3 dB(A) referred to above. Condition N2 includes a corresponding qualification that measured noise levels must be at least 5 dB(A) above ambient noise level for the condition to be breached. This daytime noise limit should ensure a reasonable level of protection for neighbouring residents from noise impacts while allowing the quarry to operate and transport materials on the access road[1].

Permit condition N2 also specifies, as a standard practice, evening and night-time noise limits. These will not normally be relevant to the proposed activity as only daytime operations are proposed (see below for further discussion on operating hours).

<u>L_{eq} parameter – SMC issue</u>

The issues raised by the SMC's acoustic consultant regarding the suitability of the L_{eq} parameter for measuring pre-existing ambient noise, and the response from the proponent in the EER Supplement, do not warrant any modification of the above position or the proposed noise limits.

The review by the SMC's acoustic consultant raised several issues relating to the interpretation of 'normal ambient noise level' in the *Quarry Code of Practice* and how this has been used in the proponent's noise assessment. Rural areas can experience very wide ranges of noise level due to the sporadic nature of many activities and thus noise criteria for quarries in rural areas have generally been based on existing L_{eq} levels, not L_{90} levels. The proponent's noise assessment has followed this scheme.

The proponent's acoustic consultant has provided in the EER Supplement an estimate of the traffic-derived 16-hour daytime L_{eq} of 42.3 dB(A), and suggests that this would be the normal

[1] Refer to section 6.3 of this report for further discussion on the noise impact of trucks.

ambient noise level. This is supported by the notional background levels of 45 and 50 dB(A) for L_{90} levels for category R2 (area with low density transportation) and category R3 (areas with medium density transportation or some commerce or industry) respectively from Australian Standard AS 1055 Part 2. The daytime noise level limit of 47 dB(A) in permit condition N2 has been conservatively based on the R2 category and the land use zoning (Rural Resource). The traffic contribution as calculated in the EER Supplement would provide support for this value.

Intrusive noise components

The Board's delegate requested that the proponent provide information on intrusive noise components, an issue raised in the SMC's acoustic consultant's report. The proponent did not provide sufficient relevant information in the EER Supplement. Nonetheless the Board understands that the intrusive components of noise from quarry operations, including crushing and screening, are usually not significant. Noise emissions from blasting and rock drilling are likely to have intrusive components but those activities will not be carried out at this quarry. Furthermore, the bulk of noise emissions will emanate from mobile machinery (bulldozer, loader and excavator), which have similar noise characteristics to machinery commonly used in rural areas. Neighbouring residents will be habituated to such machinery noise to some extent.

Condition N2 includes a standard requirement that measured noise levels be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the Tasmanian Noise Measurement Procedures Manual. The EPA Division will ensure compliance with this requirement when noise surveys required under condition **N3** are carried out, however it is unlikely that it will affect the activity's compliance with the condition N2 noise limits.

Noise surveys

The proponent's commitment to conduct a noise survey when a crusher is first on site is supported. This will verify the proponent's estimates of noise level and the effectiveness of noise attenuation and reduction measures. Accordingly, permit condition **N3** will be imposed which requires a noise survey during the first instance of crushing and at other appropriate times. Condition **N4** is also included, which specifies standard requirements for such surveys.

Topography

The EER states that the maintenance of a topographic 'lip' between the quarry and the nearby residences, in addition to the earthen bund that has been provided around the edge of the quarry, will attenuate noise emanating from the quarry. This statement is supported, but observations on site by EPA Division officers indicate that there is line of site from the working area to a neighbouring residence to the west (house #3 in Figure 4 of this report). It appears that the topography and the current extent of the earthen bund will not shield this residence from quarry noise emissions. The EER (section B6.3) states that quarry extraction will progress towards the west, which increases the concern that house #3 may be adversely impacted and raises a concern that houses #4 and #5 could possibly be affected also. The situation is illustrated in Plate 1 below.

The Board's delegate requested further information on this issue in respect of house #3. The proponent responded in the EER Supplement by stating that line-of-sight to house #3 will be avoided by the establishment and maintenance of an earthen bund of sufficient height to provide an in-line visual screen to that residence. This is acceptable to the Board. As the earthen bund is a key factor in ensuring that noise levels at neighbouring residences are not excessive, permit condition **OP6** will be imposed which requires that a noise attenuation screen be provided around the working area of such dimensions that there is no line of sight at any time between machinery operating within the quarry working area and any residence in other ownership.

To ensure that the topography and earthen bund are fully effective, permit condition **OP5** will be imposed which requires that all quarry operations take place within the quarry working area (as defined in the permit). The western and northern boundaries of the working area coincide with the quarry "lip" and the location of the earthen bund.

Despite what was said in the EER Supplement, it appears that the wider topography of the area was not taken into account in the noise level calculations carried out by the proponent's acoustic consultant (EER, Appendix 7). This is not overly important, however, because the effect of topography is to shield or absorb sound energy. Simple noise propagation calculations are based on hemispherical spreading, which assumes that all the sound energy hitting the ground is reflected back into the air and that there is no topographical screening (i.e. essentially a flat, reflective ground surface). The calculations are thus considered to be conservative (tending to over-estimate noise levels).

Plate 1: View from western elevated area of quarry towards house #3 (photograph taken on site visit 22 October 2014 by Kate Düttmer, EPA Division).

Crushing and screening operations[2]

As the crusher would be by far the most significant noise source when in operation, and given the number of residences located at a distance less than the SRAD for crushing at a quarry

[2] Permit conditions relating to crushing of material include screening, as it is possible that the crushing equipment used will include screening plant.

(750 metres), it is appropriate to impose a number of permit conditions relating specifically to the crushing operations.

The Director's delegate requested objective evidence to support the assertion in the EER that the crusher to be operated at the quarry will be quieter than the crusher utilised by the proponent's consultant for measurement and prediction of noise levels. The EER Supplement did not provide any relevant evidence, however the proponent later provided an acoustic consultant's report on noise emissions from a mobile crusher of the type proposed. The measured sound power level of the mobile crusher was 2.8 dB(A) below that of the crusher referenced in the EER noise assessment. In view of this relatively small margin, the doubts expressed in the SMC's acoustic consultant's report, and a relevant matter raised in one of the public representations, the Board considers that there is sufficient uncertainty to warrant a special permit condition in relation to crusher noise emissions. Condition **N7** will be imposed, which requires that the sound output of any plant for crushing or screening be measured to ensure that the noise limits in condition N2 will not be exceeded, before the plant is used on site. A report must be submitted to the Director before operations commence, which will enable appropriate action to be taken if the crusher noise levels appear unsatisfactory. (If the mobile crusher to be used on site is the same model as that recently measured, condition N7 will have already been fulfilled to a large extent.)

The proponent's commitment to carry out crushing operations on a maximum of five consecutive days per year is important to limiting environmental nuisance to neighbours and is supported. Permit condition **N5** will be imposed to reinforce this commitment. The Director will have the discretion to approve a variation to the five-day schedule, but this discretion would be used sparingly and only in circumstances such as plant breakdown. Condition **OP5** prohibits the crushing or screening of any material other than material extracted at the quarry, to prevent surplus crushing time and capacity being utilised.

The proponent's commitment to notify neighbours of an impending crushing operation is supported. Advance notification of works can do much to ameliorate concern about noise disturbance, and allows neighbours to prepare for it in various ways. Permit condition **N6** will be imposed to reinforce the commitment, which requires residents within 750 metres of the quarry to be notified in writing at least 72 hours prior to the commencement of an annual crushing operation.

The location of the crusher is particularly important to the attenuation of its noise emissions and minimisation of nuisance to neighbouring residents. Permit condition **OP5** requires that crushing and screening plant must be operated at the lowest practicable point of the quarry working area, and such that there is no line of sight to any residence in other ownership.

Internal heavy vehicle and machinery movements

The Board considers that a representation has raised a valid point regarding noise from internal heavy machinery movements, i.e. noise associated with the movements of machinery between the quarry and the workshop and activities at the workshop.

The workshop operates under a current level 1 permit and noise emissions from the workshop are a matter for the Council to regulate. Activities at the workshop are thus excluded from consideration in this assessment. Movements to and from the workshop may be considered in this assessment, however, as they are ancillary to the activity proposed in the application and within the property subject to the application.

Noise associated with movements of both mobile machinery and heavy vehicles between the quarry and the workshop has similar potential for nuisance to that of vehicles using the access road. The "lip" around the quarry working area will obviously provide no attenuation of noise for such movements as the activities will be external to the working area.

The Board's delegate requested information on the number, frequency, times and route(s) of machinery movements (if any) between the quarry and the workshop, but no relevant information was provided in the EER Supplement. Permit condition **OP7** will therefore be imposed, which limits heavy vehicle and machinery movements between the quarry working area and other places on the property to a maximum of six per day. This should be sufficient to allow for any necessary vehicle or machinery maintenance at the workshop.

Blasting and vibration

Blasting at the quarry, which could create unreasonable levels of noise and vibration, is not proposed. This will be reinforced by the imposition of non-standard permit condition **B1**, prohibiting blasting.

Other activities in the quarry are unlikely to adversely affect any nearby structures. Given the considerable distance from the quarry to the statues on the adjacent property (190 metres approximately), adverse effects are highly unlikely.

Operating hours

According to the *Quarry Code of Practice*, restriction of operating hours and appropriate separation distances are the most effective means of reducing the risk of noise impacts. Given the number of residences located at a distance less than the SRAD for crushing at a quarry (750 metres), it is appropriate to restrict operating hours more than would normally be the case for a quarry of this size.

The operating hours proposed by the proponent for both general quarry operations and crusher operations are considered to be too broad in the circumstances. A close of operations time of 7 pm on weekdays could have particular impact upon the environmental amenity of neighbouring residents, as ambient noise levels are often somewhat lower in the period 1800-1900 hours. It is especially important that the crusher operating hours be kept to a minimum as the crusher would be by far the most significant noise source when in operation, and the hours proposed by the proponent in the EER are supported. Accordingly, operating hours will be restricted through condition **N1** as follows.

Activity	**Weekday hours**	**Saturday hours**	**Sunday and public holiday hours**
General quarry operations	0700 - 1800	0800 - 1600	No operations permitted
Crusher operations	–0800 - 1700	No operations permitted	
Heavy vehicle and machinery movements between quarry and other places on the property	0700 - 1800	0800 - 1600	
Heavy vehicle movements on access road[3]	0800 - 1800	No operations permitted	

The Director will have the discretion to vary the weekday and Saturday operating hours, but that power would be used sparingly and only in exceptional circumstances such as unusual delivery requirements under a customer contract. Any approval would be subject to stringent conditions.

[3] Refer to section 6.3 for further discussion on hours for heavy vehicle use of the access road.

Complaints

Given the concern of neighbours over potential noise impacts, the proponent's commitment to maintain a complaints register is important. In addition to general permit condition **G6** (which requires a complaints register to be maintained), condition **N8** will be imposed which requires the quarry operator to report any noise complaint to the Director within 24 hours of receiving it. This will assist the Director with the timely enforcement of other permit conditions relating to noise.

Conclusions

The proponent will be required to comply with the following permit conditions.

B1 No blasting on The Land

N1 Operating hours

N2 Noise emission limits

N3 Noise survey requirements

N4 Noise survey method and reporting requirements

N5 Crushing and screening operations

N6 Notification of crushing and screening operations

N7 Crusher noise level

NX Noise complaints

OP5 Quarry operations

OP6 Noise attenuation screen

OP7 Heavy vehicle and machinery internal movements

6.2 Dust

Description

Existing environment

The quarry is located in an area characterised by cool winters and warm summers, with a mean annual rainfall at nearby Campania of 494 mm per year. Mean monthly rainfall is relatively constant throughout the year, but with slight peaks in late winter and spring.

Winds are predominantly from the north, west and north-west, as is typical for this part of Tasmania. Wind roses for January and June at Campania show lower wind speeds and generally calmer conditions in June. Summer afternoon winds are particularly strong with southerly and south-easterly afternoon winds occurring often, in addition to westerly winds. The quarry is protected somewhat from these southerly breezes due to the ridgeline directly to the south (Coal River Tier). Summer and autumn months show a greater proportion of winds coming from the east, north-east and south-east.

Potential emissions

The EER (section D5) identifies the following potential sources of dust from the proposed quarry operation:

- ripping of rock during dry windy conditions (summer months);
- removal of grass cover and the stripping of topsoil (very limited, according to the EER, as the footprint will not increase significantly from its current extent and the amount of topsoil is negligible);
- movement of rock and gravel within the quarry by machinery;
- crushing of rock material;
- road (gravel) use in and next to the quarry; and
- stockpiled gravel and fines.

There would also be gaseous emissions from vehicles and machinery used in association with the activity.

Potential impacts

The EER (section D5.1) states that, based on an examination of vegetation 50 metres from the site, there is no evidence that significant amounts of dust escape the existing quarry or access road. The EER states that that given the low rainfall of the area, any dust from the quarry that blows onto the standing vegetation is likely to persist for some time. Given the lack of evidence of dust persisting on nearby vegetation, the proponent states that there is little to suggest there will be significant dust generation from either the quarry or the access road.

Potential dust emissions from the quarry access road and associated impacts are addressed in section 6.3 of this report.

Management measures

The EER (section D5.1) states that during periods of dry weather, the area near the stockpiles and/or loads in trucks (unless covered by tarpaulins) will be dampened with water accessed from the nearby sediment ponds or an on-site water cart truck. This is reflected in Commitment 7 (EER Part F).

The EER (section D5.2) notes the *Quarry Code of Practice* recommendation that fixed plant and other working areas should be located with due regard to dust and noise emissions which may affect neighbours. Consistent with the Code, the crusher will be located at the site identified in Figure 5b of the EER each and every time it is used in the quarry (this is on the quarry floor, within the soil bunds and quarry 'lip'). The EER notes that standard industry practice is to dampen material prior to crushing and to also have installed sprayers on the output chute to minimise dust emissions from an otherwise dry product. Mobile modern crushers have such features installed and there is a water source available to operate these dust suppression measures whilst crushing.

Commitment 6 in the EER (Part F) is relevant: As a dust suppression measure, during periods of dry weather the access road surface, areas near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the nearby sediment pond or on-site water cart truck.

Commitment 19, to maintain a complaints register, is also relevant.

Public and agency comment and responses

One public representation stated that there is an unacceptable risk that dust from the proposed quarry operation and access road cannot be adequately contained or treated within the boundary of the land, particularly in relation to adjacent properties.
Another public representation expressed concern about the availability of sufficient volumes of water on the proponent's property to adequately water surfaces for dust suppression, especially during dry periods. The same representation claimed that there is no reference in the EER to a water tanker for dust suppression.

Evaluation

Dust generated at the quarry through extraction, crushing and loading of product, must be controlled so that it does not leave the site to the extent that it causes environmental nuisance.

In considering whether environmental nuisance would be caused on adjacent properties, a key factor is the location of residences. The nearest residence in other ownership, on an adjacent property to the west, is 443 metres from the quarry. The residence on the adjacent property to the east is 503 metres distant.

The SRAD for normal quarry operations (excluding crushing and screening) is 300 metres, which takes into account dust impact. It is therefore unlikely that the two residences referred to above will suffer environmental nuisance from dust emissions from normal quarry operations. As a precaution standard permit condition **A2** will be imposed, which requires dust to be controlled to prevent environmental nuisance beyond the boundary of the land.

Of greater concern when crushing operations take place will be potential dust impact from crushing. The SRAD for crushing, 750 metres, takes dust impact into account, so it is possible that several neighbouring residences will be affected unless management measures are adequate. Modern crushing plant has dust suppression equipment, and to ensure that the quarry operator

utilises plant of a satisfactory standard, permit condition **A1** will be imposed which requires dust to be controlled from crushing and screening plant to prevent environmental nuisance.

The quarry working area is located a short distance (10 metres) from the boundary of the adjacent property to the east. It is likely that, even with appropriate management measures, dust will be blown onto that property under some circumstances, although it is very unlikely that the amenity of the residence on the property or its curtilage will be affected. There will be no significant environmental impact on other parts of the property given its present use..

.
A further relevant point is the location of the proposed activity, in a rural and agricultural area where dust from some agricultural activities is to be expected.
The concern in a public representation about the capacity of the quarry operator to adequately water surfaces for dust suppression is noted, but the Board is satisfied that an adequate water supply is available. Water will be available from the enlarged settling pond, another existing pond and the existing farm dam. The EER (section D11) also states that mains water is available at the property. Failing this, the quarry operator will be obliged to buy in water for dust suppression. Condition **A4** will be imposed, which requires dust suppression on all trafficked areas associated with the activity. All necessary measures will need to be taken to ensure that condition A4 is not breached.

The EER (Section D5.1) refers to the use of an “on-site water cart truck” for the purpose of dust suppression.

Conclusions

The proponent will be required to comply with the following permit conditions.

A1 Control of dust emissions

A2 Control of dust emissions from plant

A4 Dust emissions from traffic areas

6.3 Traffic impacts – noise and dust

Description

The quarry is located approximately 500 metres from Tea Tree Road. Access to the quarry is via an existing unsealed private access road, which runs close to the western boundary of the property at 1356 Tea Tree Road. The access road (as proposed in the EER for the level 2 activity) is shown on Figure 2 of this report.

The EER (section D9.2) states that the maximum number of truck movements per day will remain at 30, the current maximum for the level 1 activity, but truck movements will occur on a greater number of days per year for the level 2 activity.

Heavy vehicles travelling to and from the quarry on the private access road can create dust and noise nuisance for nearby residents. The residence immediately to the west of the access road, at 1220 Tea Tree Road, is located approximately 95 metres from the access road at its closest point (house #5 on Figure 4 of this report). The EER (section D9.2) states that that particular residence may be impacted by dust from passing heavy vehicles in dry periods when winds are easterly or south-easterly.

The proponent commissioned an assessment of the acoustic impacts of trucks on the access road. Truck noise levels measured at a distance of 84 metres were 44.8-48.6 dB(A) for loaded trucks and 45.3-47.4 dB(A) for unloaded trucks. Ambient noise level was 43.6-46.2 dB(A). Measurements were made to the east of the access road on the proponent's property, rather than at the neighbouring residence(s). The assessment conclusion was as follows in regard to noise impact on neighbouring house #5.

> We estimate that at the nearest house (# 5 …), the access road is 111 m away and therefore there will be a reduction of truck noise by 2.4 dB(A) and possibly more because the road/tyre interaction is not visible because of the embankment. The Tea Tree Road is closer than our measuring location near the dam and therefore the Tea Tree Rd. traffic is about 1 dB or more louder. The quarry truck noise levels are acceptable.

Management measures

The EER (Section D9.3 and Commitment 12) states that the following measures will be taken to mitigate potential impacts of dust and noise at the residence at 1220 Tea Tree Road (house #5):

- ensure compliance with the operating hours and days for the quarry;
- maintain the existing Complaints Register to record and address any complaints received in relation to access road usage by quarry related vehicles;
- provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and
- ensure trucks carrying gravel limit their speed to 20 km/hr when using the access road.

Commitments 6, 12 and 19 in the EER (Part F) reflect the above.

Public and agency comment and responses

Two public representations raised issues relating to internal traffic movements, as follows.

- The number of traffic movements does not appear to include internal truck movements.
- The occupants or owners of 1220 Tea Tree Road will be unfairly limited in enjoying use of their land in the vicinity of the access road during quarry cartage operations.

Evaluation

Noise

The maximum noise level at the nearest residence attributable to heavy vehicle use of the access road is estimated by the proponent to be 60.1 db(A) (EER, section D8.5). This is considered to be a realistic estimate of noise level due to the passing of a 10 tonne truck. It is considerably higher than the proposed noise emission limit for the quarry and its related transportation operations (47 dB(A)) prescribed in permit condition **N2**. Given the standard averaging period for noise emissions of 10 minutes, and the short duration in which truck noise would be experienced (less than one minute), it is likely that compliance with the 47 dB(A) limit is achievable. This assumes that noise emissions emanating from the quarry itself are at an appropriate level and that trucks pass at appropriate intervals over the course of the day. If more than one truck movement occurs during any 10 minute interval then the daytime noise limit may be breached.

The passing of trucks (empty and laden) at the relatively short distance of 95 metres from the nearest residence in other ownership is likely to present a considerable risk of environmental nuisance at that residence, even if the overall noise limit for the activity is not exceeded. More distant residences may also be affected, to a lesser extent. The lack of any significant topographical barrier to provide attenuation must also be taken into account. It is therefore considered appropriate to restrict the hours at which heavy vehicles associated with the quarry operation (empty and laden) use the access road. Permit condition **N1** restricts truck use of the access road to between 0800 and 1800 hours on weekdays only. This condition will apply to cartage vehicles and trucks used for dust suppression only. Ambient noise levels tend to be lower during the periods 0700-0800 hours and 1800-1900 on weekdays than between 0800 and 1800 hours, and also generally lower on Saturdays. Truck movements are therefore considered inappropriate at those times. Given the relatively small quantities proposed to be extracted from the quarry, these restrictions are not expected to unreasonably affect the quarry operator's ability to transport extracted product from the site.

The EER states that a maximum of 30 truck movements per day are expected to occur for transportation of quarry product from the site. Permit condition **OP3** will be imposed to reinforce this.

The proponent estimates that approximately 1,600 loads (3,200 movements) using a 10 tonne truck will be required to transport the maximum permitted annual level of extracted material (10,000 cubic metres) from the site (EER section D9.2). It is estimated that the maximum level of movements (30 per day, as specified in condition OP3) may occur on up to 107 days per year, or on approximately 40 per cent of weekdays.

The proposed truck speed limit of 20 kph in EER Commitment 12 is supported and is expected to reduce the level of noise from trucks using the access road. A high level of maintenance of the access road to ensure corrugations and potholes do not occur would also reduce the risk of noise occurring due to rattling of trucks, particularly when empty (although there is no specific commitment to this in the EER). No permit conditions will be imposed in relation to these matters as the EPA Division lacks the capacity to enforce them. Enforcement will rely upon the noise level, operating hours and truck movement conditions.

Dust

Dust is likely to be generated by heavy vehicles using the unsealed access road. The neighbouring residence at 1220 Tea Tree Road is located approximately 95 metres to the west of the access road. Particularly during times of easterly winds, the risk of dust creating environmental nuisance for this residence is high. This is acknowledged by the proponent in the EER, and management commitments have been made including dampening of the access road using a water truck or sprinklers during periods of easterly and south-easterly winds, and restricting truck speed to 20 km/hr. These commitments are supported, and permit condition **A4** will be imposed to require dust suppression on roads.

The commitment to cover or dampen loads on trucks is supported, and standard permit condition **A3** will be imposed to reinforce the commitment.

The environment in which this quarry is located is dry (less than 500 mm per annum of rainfall) and calm periods of little to no wind are infrequent, particularly over the warmer months. A basic assessment of the wind rose data[4] shows that the following times have a strong easterly influence:

- January 9 am – 20% of winds are from the east, north-east, or south-east;
- January 3 pm – 24% of winds are from the east, north-east, or south-east, with predominant wind speeds of 20-30 km/hr;
- March 3 pm – 25% of winds are from the east, north-east, or south-east;
- December 3 pm – 25% of winds are from the east, north-east, or south-east, with predominant wind speeds of 20-30 km/hr.

It is during these times that the risk of dust being experienced by the neighbouring residents to the west of the access road is particularly high. Continual use of a water cart/sprinkling truck during these times is likely to contribute to an increased risk of noise nuisance at those residences. Permit condition **A4** will therefore require the movement of water sprinkling vehicles to be included in the maximum number of vehicle movements per day associated with the quarry (as prescribed in condition **OP3**). The proponent may wish to consider the installation of a permanent sprinkling system on the access road to avoid the use of a water cart, and/or restricting the transport of materials and other use of the access road in adverse conditions (dry, windy and easterly winds).

The EER (section D8.6) notes that a vegetation screen exists at the boundary close to the neighbouring residence at 1220 Tea Tree Road. It is anticipated that this would reduce the risk of exposure to windborne dust from the south-east. Additional vegetation plantings between the access road and residences may, over the longer term, provide some level of protection from dust, but until vegetation has grown sufficiently it is likely to provide little benefit.

Other issues

The EER states that an existing access road that enters the quarry from the south will be utilised for the intensified operation (see Figure 2 in this report). There is some doubt about this, however, as EPA Division staff observed during site inspection that another access road has been constructed by the proponent which enters the quarry from the west. To prevent variation in the heavy vehicle access route and concomitant variation in noise impact which may be disturbing to neighbours, permit condition **OP4** will be imposed which requires the access road proposed in the EER to be used at all times by heavy vehicles and mobile machinery. This condition also prohibits the route of the access road being altered without the Director's approval.

[4] Bureau of Meteorology online climate statistics for Campania (Kincora), http://www.bom.gov.au/climate/averages/tables/cw_094212.shtml, accessed 3 March 2015.

One public representation noted that the number of traffic movements (stated in the EER) does not appear to include internal truck movements. It is unclear whether this refers to movements within the quarry, within the mining lease or on the private access road external to the mining lease. Movements within the quarry and the mining lease are considered to be part of internal operations, the noise and dust impacts of which are addressed in sections 6.1 and 6.2 of this report. “Internal” movements on the portion of the access road outside of the mining lease are likely to be minimal, except for the water cart dampening the road during dry conditions (refer to the discussion above on that matter).

Conclusions

The proponent will be required to comply with the following permit conditions.

A3 Covering of vehicles

OP3 Maximum number of heavy vehicle movements

OP4 Access road

7 Other issues

In addition to the key issues, the following environmental issues are considered relevant to the proposal and have been evaluated in Appendix 2.

1. Flora and fauna
2. Weed and disease management
3. Stormwater and drainage management
4. Waste management
5. Dangerous goods and environmentally hazardous materials
6. Aboriginal and European cultural heritage
7. Sustainability and climate change
8. Fire risk
9. Rehabilitation

8 Report conclusions

This assessment has been based upon the information provided by the proponent in the permit application, EER and EER Supplement.

This assessment has incorporated specialist advice provided by EPA Division scientific specialists and regulatory staff, other Divisions of DPIPWE and other government agencies.

This assessment has taken into account issues raised in public representations.

It is concluded that:

1. the RMPS and EMPCS objectives have been duly and properly pursued in the assessment of the proposal; and
2. the assessment of the proposal has been undertaken in accordance with the Environmental Impact Assessment Principles.

It is concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is unlikely that the RMPS and EMPCS objectives would be compromised, provided that the Permit Conditions – Environmental No. 9340 appended to this report are imposed and duly complied with, including commitments made by the proponent in the EER and EER Supplement.

The environmental conditions appended to this report are a new set of operating conditions for the entire, intensified activity that will supersede the existing level 1 permit conditions.

Report approval

Environmental Assessment Report and conclusions, including permit conditions, adopted:

Warren Jones
CHAIRPERSON
BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

Meeting date: 3 MAR 2016

9 References

Van Diemen Consulting (2015); *Environmental Effects Report. Williams' Quarry, Rekuna*; Van Diemen Consulting Pty Ltd, New Town, Tasmania (dated 4 December 2015).

Van Diemen Consulting (2016); *Environmental Effects Report Supplement. Williams' Quarry, Rekuna*; Van Diemen Consulting Pty Ltd, New Town, Tasmania (dated 18 February 2016).

Quarry Code of Practice, Department of Primary Industries, Water and Environment and Department of Infrastructure, Energy and Resources, Hobart, 1999.

10 Appendices

Appendix 1 Assessment of other issues

Appendix 2 Summary of public and agency submissions

Appendix 3 Permit Conditions – Environmental

Appendix 1 Assessment of other issues

ISSUE 1: FLORA AND FAUNA
Description of potential impacts
The EER provides no general information about fauna on or near the site. There are records of three Tasmanian Wedge-tailed eagle (*Aquila audax subsp. Fleayi*) nests within five kilometres of the quarry, however none are within one kilometre of the quarry and the EER states that the sparse surrounding vegetation is not able to support a nest. The quarry site and immediate surrounds are pasture used for livestock grazing. Pastures are actively maintained, being ploughed and fertilised on a regular basis. There is *Eucalyptus viminalis* dry forest and woodland at the south and west boundaries of the mining lease. Sickle speargrass (*Austrostipa scabra subsp. 38alcate*) and Woolly new-holland daisy (*Vittadinia gracilis*) (both listed as rare under the TSP Act) and curly sedge (*Carex tasmanica*) (vulnerable under the EPBC Act) are recorded as occurring on a neighbouring property to the east of the quarry. Clearing of native vegetation to increase extraction areas at quarries can result in a loss of native flora and native fauna habitat.
Management measures proposed in EER
No management measures are proposed in the EER.
Public and agency comment
Public representations did not comment on flora or fauna. PCAB provided no comment to the EPA Division on general flora and fauna issues.
Evaluation
No impact on flora or fauna of conservation significance is expected given the highly modified nature of the environment at, and surrounding, the quarry area. Native vegetation which may provide denning, foraging, or nesting opportunity for threatened species is unlikely to be impacted by the proposed activity.
Conclusion
No permit conditions relating to protection of flora or fauna will be imposed.

ISSUE 2: WEED AND DISEASE MANAGEMENT

Description of potential impacts

Quarries can contribute to the spread of weeds and diseases such as *Phytophthora cinnamomi*, due to the transportation of weed and disease-bearing material (mud, soils) on machinery and vehicles to and from the quarry, as well as spreading weeds through quarry products used off site.

A number of declared weeds (*Weed Management Act 1999*) are present in the area and there are two declared weeds within the mining lease – horehound (*Marrubium vulgare*) and Californian thistle (*Cirsium arvense*). The EER (Appendix 4) states that it is highly unlikely that *Phytophthora cinnamomi* is active and/or can persist in the quarry or surrounds.

Management measures proposed in EER

Appendix 4 of the EER contains a Weed and Pathogen Management Plan which provides a description of the relevant weeds, management recommendations (including spraying) and recommended preventative strategies (such as provision of washdown facilities for vehicles and ongoing monitoring).

Commitment 3 in the EER (Part F) states: *A Weed Management Plan is implemented at the quarry operation.*

Public and agency comment

Public representations did not comment on weed or disease management.

PCAB advised the EPA Division that it supports the EER commitment to implement a weed management plan and recommends that the *Weed and Disease Planning and Hygiene Guidelines* (DPIPWE, 2015) be adhered to.

Evaluation

The proponent has existing obligations under the *Weed Management Act 1999* to manage and contain the spread of declared weeds due to quarry operations, relating to the operational quarry area as well as the entire mining lease and the wider property owned by the proponent. The Weed Management Plan provided in the EER outlines general management measures but does not provide specific plans for management of weeds in terms of an appropriately-timed spraying/removal program at this site. The proponent should refer to the appropriate Statutory Weed Management Plans for specific management actions and timings. Standard permit condition **OP1** will be imposed, requiring weed management.

Given the dry climatic conditions of the area and the lack of susceptible vegetation species on site, the risk of occurrence of *Phytophthora cinnamomi* is considered low.

Appendix 4 of the EER indicates that vehicle washdown is likely to occur at stormwater settlement ponds or areas designed for the capture of runoff from roads. It also states that washdown should be conducted as close as possible to the source of the material being removed. Washdown at the main settlement pond adjacent to the quarry would be appropriate for vehicles leaving the quarry, but not for those entering as they would traverse a portion of the mining lease and adjacent forest before reaching the quarry. Standard condition **OP2** will be imposed, which requires the proponent to wash down vehicles in accordance with the DPIPWE guidelines.

Conclusion

The proponent will be required to comply with the following permit conditions.

OP1 Weed management

OP2 Washdown Guidelines

ISSUE 3: STORMWATER AND DRAINAGE MANAGEMENT
Description of potential impacts
Waters leaving the quarry can be contaminated with sediments and other pollutants such as oil and fuel. This may have an adverse impact upon land and natural water bodies.
Management measures proposed in EER
The EER (section B6.2) states that one sediment pond will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events. The proposed 0.95 ML dam will have more than sufficient capacity to capture and treat water leaving the pit (disturbed area) for approximately 17 years. Notwithstanding this, annual cleanouts will occur to maximise efficiency of the pond and to obtain sediment for use in rehabilitation works. The capacity of the sediment pond exceeds what is required to manage water flows/sediment capture and should cater for rare high rainfall events, such as a 1 in 100-year rainfall event. The proposed sediment pond (shown on Figure 3 of this report) will overflow to another pond on the property, which drains in turn to Plummers Creek (as shown on Figure 4 of this report). Commitments 4 and 5 of the EER (Part F) reflect the above.
Public and agency comment
One public representation expressed concern that the proponent may be unable to satisfactorily construct the dam for the enlarged sediment pond.
Evaluation
The proposal to construct one large sediment settlement pond to capture run-off water from the quarry is supported and standard permit conditions **E1**, **E2** and **E3**, relating to drainage and stormwater management, will be imposed to reinforce this proposal. It is noted that during exceptional rainfall events the large settlement pond would overflow to a smaller existing settlement pond and thence to a farm dam and Plummers Creek (see Figures 3 and 4 in this report), which is acceptable. Standard permit condition E2 requires the proponent to ensure that stormwater leaving the site does not carry pollutants such as sediment, fuel or oils. (The use of fuels and oils on the site is discussed under Issue no. 5 of this Appendix.) As the area has relatively low rainfall (approximately 500 mm per year), overflow is unlikely for much of the time. The EER (section B6.2) notes that ponding occurs in the quarry during periods of heavy rainfall. This is unsatisfactory as it will contribute to waterlogging, make machinery operations difficult, increase sediment movement around the site and off-site, and may contribute to spread of *Phytophthora cinnamomi* if the pathogen is brought on site. Permit condition **E4** will therefore be imposed, which specifically requires all surface waters to drain away from working areas (including the quarry pit) towards the settlement pond. The concern about dam integrity in one of the public representations is noted. The proposed dam capacity (0.95 ML) is below the threshold for dam safety approval under the *Water Management Act 1999*. Condition E2 should provide an inducement to construct the dam adequately, as polluted water is likely to be discharged from the site in the event of dam failure and the quarry operator would then be in breach of condition E2.
Conclusion
The proponent will be required to comply with the following permit conditions: **E1** Perimeter drains **E2** Stormwater **E3** Maintenance of settling ponds **E4** Drainage from working areas

ISSUE 4: WASTE MANAGEMENT
Description of potential impacts
The accumulation of general refuse, disused plant, waste oil or other waste materials should not be allowed to occur within the quarry. Inappropriate management, storage and disposal of waste material can result in the pollution of soil, surface waters and groundwater and littering on and off site.
Management measures proposed in EER
The EER (section D7) states that the activity will not produce any rock-based solid wastes, as all of the materials extracted will be sold for various end uses or will be used in rehabilitation works on site. The servicing of machinery may generate solid waste (e.g. oil filters, worn tyres), however machinery is removed from the quarry and serviced at the existing workshop on the property rather than in the quarry itself. Waste generated by the servicing of machinery is disposed of in accordance with best practice principles. Waste generated by workers from general refuse (e.g. lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling. No waste bins are provided at the quarry for general refuse. The EER (section D6) states that there are no toilet amenities at the quarry – such amenities are provided at the existing dwelling. Commitment 7 in the EER (Part F) states: *Waste generated by the servicing of machinery is disposed of in accordance with best practice principles*. EER Commitment 8 states: *Waste generated by workers from general refuse (e.g. lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling*.
Public and agency comment
No public or agency comments were received specifically relating to waste management.
Evaluation
The commitments made in the EER are considered adequate. The proponent has obligations under the *Environmental Management and Pollution Control (Waste Management) Regulations 2010* and the *Environmental Management and Pollution Control (Controlled Waste Tracking) Regulations 2010* in relation to the management of controlled wastes (including waste tyres, waste oil and waste oil/fuel filters), and permit conditions are considered unnecessary.
Conclusion
The following information has been included in the permit: **OI1** Waste management hierarchy

ISSUE 5: DANGEROUS GOODS AND ENVIRONMENTALLY HAZARDOUS MATERIALS

Description of potential impacts

Inappropriate handling and storage of dangerous goods and environmentally hazardous materials such as fuels and oils at a quarry can increase the risk of pollution to air, water and soil.

Management measures proposed in EER

The EER (section D10) states that fuel and oil are used in the quarry to operate and maintain functional machinery. There is no permanent storage of fuels, oils, lubricants or any other dangerous goods in the quarry itself. Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling. When in the quarry, fuel and oil containers are stored at least 10 metres from any drain or sediment pond and are kept on moveable bunds with a capacity at least 1.5 times the volume of the container. One hydrocarbon spill kit is stored at the quarry for use in the event of a spillage.

The only chemicals used in the quarry are those for weed spraying. Weed spraying chemicals will be handled, used and disposed of in accordance with the manufacturer's directions and relevant regulations. Weed spraying will comply with the requirements of the Weed Management Plan for the quarry (EER Appendix 4).

Commitment 13 of the EER (Part F) states: *There is no permanent store in the quarry for fuels, oils, lubricants or any other dangerous good.*

EER Commitment 14 states: *Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling.*

EER Commitment 15 states: *When in the quarry, fuel and oil containers are stored at least 10 m away from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container.*

EER Commitment 16 states: *One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage.*

Public and agency comment

One public representation queried whether the applicant has a Dangerous Goods Licence.

Evaluation

The commitments made in the EER are considered adequate and standard permit conditions **H1** and **H2**, relating to the storage and handling of hazardous materials and the requirement to keep spill kits, will be imposed.

The query in the public representation regarding dangerous goods licencing is noted. This matter is the responsibility of Worksafe Tasmania, which administers the relevant legislation. The EPA Board will impose permit conditions H1 and H2 for the purpose of environmental protection.

Conclusion

The proponent will be required to comply with the following permit conditions:

H1 Storage and handling of hazardous materials

H2 Spill kits

The following information in relation to legal obligations has also been included in the permit:

LO2 Storage and handling of Dangerous Goods, Explosives and dangerous substances

ISSUE 6: ABORIGINAL AND EUROPEAN CULTURAL HERITAGE
Description of potential impacts
Ground disturbance during extractive processes in areas of cultural significance can increase the risk of destruction of potentially important artefacts and cultural heritage. The EER (sections D12 and D13) states the following. • The quarry and mining lease is not on listed on the Tasmanian Heritage Register or Tasmanian Historic Places Inventory (maintained by Heritage Tasmania). • Aboriginal Heritage Tasmania has previously advised that '…the area around the Coal River Valley is considered a rich area for Aboriginal heritage. However, given the highly disturbed nature of the property there is no requirement for an Aboriginal heritage investigation in this case. Aboriginal heritage sites, regardless of site type, condition, size, or land tenure are protected in Tasmania under the *Aboriginal Relics Act 1975*….'.
Management measures proposed in EER
The EER (section D13 and Commitment 19) states that an Unanticipated Discovery Plan will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered (the Plan is provided at Appendix 9 of the EER).
Public and agency comment
No public comments were received specifically relating to impacts on cultural heritage. Aboriginal Heritage Tasmania advised the EPA Division that it has completed a search of the Aboriginal Heritage Register regarding the proposal, and advises that there are no Aboriginal heritage sites recorded within the proposed expansion area. Due to a review of previous reports and the area being highly disturbed it is believed that the area has a low probability of Aboriginal heritage being present. Accordingly there is no requirement for an Aboriginal heritage investigation and AHT has no objection to the project proceeding. The activity is nonetheless subject to the *Aboriginal Relics Act 1975*.
Evaluation
The highly modified agricultural nature of the landscape at this location means that the risk of destroying undiscovered Aboriginal or European cultural heritage is likely to be very low. The EER Commitment to keep the Unanticipated Discovery Plan on hand while working on site is supported. The proponent should be aware of the obligations to stop work and notify the relevant authority should an unanticipated discovery of potentially significant Aboriginal and European heritage be uncovered.
Conclusion
The following information in relation to legal obligations has been included in the permit: **LO3** Aboriginal relics requirements

ISSUE 7: SUSTAINABILITY AND CLIMATE CHANGE
Description of potential impacts
Use of machinery powered by fossil fuels such as diesel will contribute greenhouse gas emissions to the atmosphere. The use of water for dampening stockpiles, roads and loaded trucks may impact negatively on water resources, particularly in a relatively dry area such as the one in which the quarry is located.
Management measures proposed in EER
The EER (section D11) states that the machinery to be used in the quarrying operations will be well maintained to maximum efficiency in oil and fuel consumption. The EER also states that water use will be negligible and will be provided through the use of the farm dam (water used for road and load dampening) or supplementary water cart truck. Mains water is available at the property in times of very low or no water availability from the sediment ponds or dam.
Public and agency comment
No public or agency comments were received specifically relating to sustainability or climate change.
Evaluation
The management actions proposed in relation to greenhouse gas emissions and sustainability are considered adequate.
Conclusion
The EPA does not regulate greenhouse gas emissions and no permit conditions in relation to that matter will be imposed.

ISSUE 8: FIRE RISK
Description of potential impacts
The use of machinery at the quarry which may create sparks can increase the risk of fire, particularly in hot, dry, windy weather. Fire originating from offsite may damage equipment and cause dangerous substances and chemicals to be released into waterways.
Management measures proposed in EER
No management measures in relation to fire are proposed in the EER. The EER (section D1) states that much of the vegetation directly to the south of the quarry was burnt in a bushfire in 2013.
Public and agency comment
No public or agency comments were received specifically relating to fire risk.
Evaluation
The proponent should consider limiting the use of heavy machinery which may create sparks in high fire danger conditions. The Board does not normally impose permit conditions in relation to fire risk, as it is more appropriate for the Council to do so, in consultation with Tasmania Fire Service if appropriate.
Conclusion
No permit conditions relating to fire will be imposed.

ISSUE 9: REHABILITATION

Description of potential impacts

Inadequate rehabilitation of extractive areas can increase the risk of ongoing erosion and soil instability and can increase the burden of total site rehabilitation once works have finished at the site. Inappropriately rehabilitated extractive areas can also create a visual amenity problem for the local area and can introduce and spread weeds through the use of incorrect vegetation for rehabilitation.

Management measures proposed in EER

The EER (Part E) states that it will always be the aim of the quarry operator to minimise the area of exposed land at the quarry, to minimise the overall impact the activity has on the local environment. Progressive rehabilitation will apply at the quarrying operation for those areas that have been quarried and are no longer used for the operation of the quarry. Progressive rehabilitation refers to the rehabilitation of worked out, or surplus areas, while extractive operations are ongoing. It includes the stabilisation of the landform prior to revegetation and serves to ensure landform stability and revegetation on an ongoing basis. The rehabilitation of quarry areas that are no longer being quarried or used for another purpose (such as a stockpile holding area, truck turning bay etc.) will be based on the following principles, to re-establish agricultural pasture:

1. Benches ripped or cracked prior to substrate addition.
2. Stockpiled weathered gravel, topsoil (from quarry site) and sediment from sediment interceptors applied to prepared benches.
3. Application of pasture grasses and fertiliser.
4. Monitoring of the following factors:
    a. weed infestation;
    b. pasture establishment and growth success; and
    c. landform stability.

Commitment 18 of the EER (Part F) states that 'Progressive rehabilitation' will occur in those areas that have been quarried and are no longer needed or used for the operation of the quarry.

Public and agency comment

No public or agency comments were received specifically relating to rehabilitation.

Evaluation

Minimisation of disturbed areas decreases the risk of land disturbance such as soil erosion. The EER commitment is supported and the standard conditions in relation to temporary and final cessation of works and rehabilitation requirements will be imposed to ensure rehabilitation of the site.

It is also noted that a condition of the mining lease is that a maximum of one hectare of the lease may be disturbed at any one time.

Conclusion

The proponent will be required to comply with the following standard (generic) conditions:

DC1 Stockpiling of surface soil

DC2 Progressive rehabilitation

DC3 Temporary suspension of activity

DC4 Notification of cessation

DC5 Rehabilitation on cessation

Appendix 2 Summary of public and agency submissions

Note: Tables 1 and 2 do not include issues raised by Southern Midlands Council in its submission to the EPA Board. Issues raised in the Council submission are summarised in section 5 of this report and relevant issues are addressed in section 6.

TABLE 1: ADDITIONAL INFORMATION REQUIRED BY THE EPA BOARD

Representation No./ Agency	EER section no.	EER Page no.	Comments and issues	Additional information required
4	D.8	29-35	No discussion in EER of variation in carrying of sound across hills.	Provide information on whether or not the estimated/modelled sound levels at receptors (Appendix 7) took the general topography of the area into account (topography other than the quarry "lip").
4	D.8	29-35	The EER has only selective discussion of noise impacts. No reference to impacts on representor's property (1216 Tea Tree Road).	This property appears to include house #3 as shown on Figure 9. Provide specific information on predicted noise levels and impacts at house #3 and information on how noise impacts will be minimised in relation to that particular receptor.
15	D.8	29-35	The proponent parks and services heavy machinery around his house/workshop. Noise generated there, and when moving to and from the quarry, has not been considered in the application or noise reports.	Provide information on the number, frequency, times and route(s) of machinery movements (if any) between the quarry and the house/workshop, and the likely impact of associated noise emissions on neighbours.
15	D.8	29-35	Ground vibration from quarrying and crushing presents a risk to the six statues being erected at 1384 Tea Tree Road.	Provide information on the likely level of risk to the statues from the proposed activity.

TABLE 2: OTHER MATTERS RAISED DURING THE PUBLIC CONSULTATION PERIOD

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
Support/opposition – general				
1, 5, 6, 13, 14, 18, 19, 21, 22	-	-	Supports the application; no relevant issues raised.	Noted.
2, 23	B.8	14	Supports the application; the activity will add competition to the gravel market in the Coal Valley area.	Noted.
10	B.8	14	Supports the application. The representor will not be affected by it and the activity will create work.	Noted. Representor's residence is about 1.24 km from the quarry (house #1 on Figure 9 of EER).
11	B.8	14	Supports the application. Representor dissatisfied with past media representation of the proposal and lack of consultation on similar issues involving heavy earthmoving plant.	Noted.
12	B.8	14	Supports the application; a quarry in this area will reduce cartage costs for customers.	Noted.
20	B.8	14	Supports the application; the quarry will provide a valuable source of quality gravel in the area.	Noted.
3, 7, 8, 9, 15, 16, 17	-	-	Opposes the application; various issues raised.	Noted. See individual issues in this Table and Table 1.
Dept of State Growth (Industry and Business Development Division)	-	-	No comment.	Noted.
Mineral Resources Tasmania	-	-	The proponent has addressed the key issues identified in the EER Guidelines.	Noted.

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
Amenity/nuisance – general				
3, 4, 8, 9	Part D	27-38	Amenity/living standards of neighbours within 750m SRAD (referred to as an "exclusion zone" or "separation zone" by several representors) will be adversely affected.	For the purposes of the *Environmental Management and Pollution Control Act 1994* (EMPCA), the SRAD is a guideline in the *Quarry Code of Practice* and it is open to a proponent to demonstrate that an activity can be operated within the SRAD without significant impact on neighbours. This may result in the imposition of more stringent permit conditions than would normally apply to a quarry of this size. There is adequate information in the EER and appendices for the EPA Board to form an opinion on this matter and determine appropriate permit conditions in the event that it approves the proposal (except for the issues raised in Table 1).
8	Part D	27-38	There are already eight sensitive uses within the representor's property (1384 Tea Tree Road).	Noted. Figure 9 in the EER shows only one sensitive use on this property. Nonetheless, there is adequate information in the EER and appendices for the EPA Board to form an opinion about environmental impacts on this property.
8	Part D	27-38	Proposed quarry is an unacceptably short distance (10 metres) from the representor's property boundary.	There is adequate information in the EER and appendices for the EPA Board to form an opinion about environmental impacts on this property.
Noise and vibration				
4	B.2.2	9	The commitment to provide neighbours with 72 hours' written notice of each crushing event may be ineffective due to postal delays.	The EPA Board, in the event that it approves the proposal, is likely to impose a permit condition in relation to notifications which would specify delivery requirements.
3, 4, 16	D.8	29-35	Crusher noise will have an amenity/nuisance impact on neighbours.	There is adequate information in the EER and appendices for the EPA Board to form an opinion on this matter (except at house #3 – see Table 1).

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
4	D.8	29-35	Crusher noise will be excruciating for a neighbour experiencing illness or convalescing.	There is adequate information in the EER and appendices for the EPA Board to form an opinion on crusher noise impact (except at house #3 – see Table 1).
4	D.8.5	33-35	No discussion in the EER of differing noise levels of empty and full trucks.	Estimated noise levels for loaded and empty trucks are provided in section D.8.5 of the EER.
8	D.8	29-35	Noise from the quarry will be at an unsatisfactory level and regularity at 1384 Tea Tree Road.	There is adequate information in the EER and appendices for the EPA Board to form an opinion about noise impacts on this property.
15	D.8	29-35	There is no guarantee that a crusher of the type proposed in the EER will actually be used. That type may not be available for hire when required. The crusher used may have different noise levels to those assumed for the purposes of the noise report in the EER. The representor provided a copy of an online advertisement allegedly placed by the proponent (listed on 15 July 2015 on Gumtree), seeking to purchase a jaw-type crusher. The representor notes that if a crusher is purchased it may not be of the type proposed in the EER.	The Board is assessing the proposal on the basis of the information in the EER. In the event that it approves the proposal, the Board would impose permit conditions relating to noise levels that are consistent with the information in the EER.
15, 16	D.8	29-35	Wheel loader used in the existing quarry is excessively noisy.	The Board is assessing the proposal on the basis of the information in the EER. In the event that it approves the proposal, the Board would impose permit conditions relating to noise levels that are consistent with the information in the EER. Noise emissions from the existing level 1 operation and its machinery are a matter for which Council has regulatory responsibility.

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
15	D.8.4	32-33	Proponent has not categorically stated that quarry or crushing noise will not exceed the allowable 10 dB(A) above ambient noise levels. Road traffic and train noise is minimal at times.	Section D.8.4 of the EER states that the proposed quarry is likely to meet the requirements of the *Quarry Code of Practice* (which recommends a maximum 10 dB(A) above ambient). There is adequate information in the EER and appendices for the EPA Board to form an opinion on this matter (except for the issues raised in Table 1).
15	D.9.3	36	Noise complaints have been lodged with Council in relation to the existing quarry, by the representor and at least one other resident. The representor claims that these have been forwarded to the proponent, and the statement in the EER that no complaints have been received is therefore false.	It is unclear whether the representor is referring to noise complaints about the quarry itself or truck movements on the access road. The EER's statement that no complaints have been received appears to refer to access road use only. The EPA Board, in the event that it approves the proposal, is likely to impose a standard permit condition requiring the operator to keep a record of any complaints received.
16	B.2	9	Concerned about noise as this may be a six-day operation.	The EPA Board will consider the proposed operating times and their potential impact upon neighbours when it makes a determination on the proposal.
16	B2, D.8	9 & 29-35	Representor would require written notification with all relevant documentation when crusher is to be used.	The EER includes a commitment to providing written notice of crusher operations. The EPA Board, in the event that it approves the proposal, is likely to impose a permit condition in relation to such notifications which would specify particular requirements.
Air quality				
4	D.5	28	There is likely to be insufficient on-site water supply for watering of the access road and quarry surfaces during dry conditions.	Section D.11 of the EER states that mains water is available at the property in times of very low or no water availability from the sediment ponds or dam.
4	D.5.1	28	No reference to a water tanker for dust suppression in the EER.	Section D.5.1 refers to an "on-site water cart truck".
Representation no./Agency	**EER section no.**	**EER Page no.**	**Comments and issues**	**EPA comments**

8	D.5	28	There is an unacceptable risk that dust from the proposed quarry operation and access road cannot be adequately contained or treated within the boundary of the land, particularly in relation to adjacent properties.	There is adequate information in the EER for the EPA Board to form an opinion on this matter.
Water quality				
4	D.4	27	Representor concerned that applicant is unable to construct the enlarged sediment pond acceptably. Has witnessed a breach of an existing dam on the applicant's property that caused damage.	The EPA Board, in the event that it approves the proposal, is likely to impose standard permit conditions relating to stormwater management. Sediment ponds will need to be soundly constructed to comply with those conditions.
Flora and fauna				
PCAB (DPIPWE)	D.1	27	The EER states that the declared weeds Horehound and Californian Thistle are present within the mining lease. PCAB supports the EER commitment to implement a weed management plan and recommends that the *Weed and Disease Planning and Hygiene Guidelines* (DPIPWE, 2015) be adhered to.	Noted. The EPA Board, in the event that it approves the proposal, is likely to impose standard permit conditions relating to weed management and vehicle/machinery washdown.
Transport/traffic				
4	D.5, D.8	28-35	The number of traffic movements does not appear to include internal truck movements.	Internal movements within the mining lease are not relevant to the access road or main road traffic count. Internal vehicle movements are part of the operational impact of the quarry itself.
8	Part D	27-38	The occupants or owners of 1220 Tea Tree Road will be unfairly limited in enjoying use of their land in the vicinity of the access road during quarry cartage operations.	There is adequate information in the EER and appendices for the EPA Board to form an opinion on this matter.
9	D9	35-38	Tea Tree Road is an extremely busy road; vehicles travel at 100+ kph in the vicinity. Fully laden trucks exiting the quarry property onto Tea Tree Road may cause problems.	A safety issue for Council and Department of State Growth to consider.

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
Dept of State Growth (Traffic Engineering Branch)	D9	35-38	Mr Williams has undertaken the upgrade of the road pavement adjacent his access, along with access works. The Department of State Growth is satisfied that the conditions applied to this proposal in regard to the State road asset have been met.	Noted.
Regulation				
4	B.6.3	12	No discussion in the EER of how the site will be managed over time.	Section B.6.3 of the EER provides an outline of how the quarry will be worked, within the area that is the subject of the permit application.
4	D.10	37	Representor queries whether the applicant has a Dangerous Goods licence.	Dangerous goods licencing is the responsibility of Worksafe Tasmania, which administers the relevant legislation. The EPA Board, in the event that it approves the proposal, is likely to impose standard permit conditions relating to environmentally hazardous goods storage for the purpose of protecting the environment.
4	F.1	40	Insufficient information in EER on operation of complaints register.	The EPA Board, in the event that it approves the proposal, is likely to impose a standard permit condition requiring the maintenance of a complaints register. This condition has proven effective in the past and assists authorised officers in the regulation of an activity.
4	Part F	40-41	EER does not include a Risk Management Plan	The EPA does not normally require the preparation of a Risk Management Plan for activities of this scale, and it does not appear to be warranted in this case.
4	-	-	Representor has no confidence that breaches of conditions will be managed, or that breaches will be prevented. Neighbours will have no avenue to seek rectification of issues.	In the event that the level 2 activity is approved, the EPA will regulate the environmental aspects of the activity. The Director, EPA and authorised officers have powers to enforce permit conditions and to address particular issues. Bona fide complaints received by the EPA Division will be investigated by officers.
Representation no./Agency	**EER section**	**EER Page**	**Comments and issues**	**EPA comments**

	no.	no.		
15	-	-	Neighbours would be required to monitor quarry operations against the conditions and commitments and report misdemeanours.	In the event that the level 2 activity is approved, the EPA will regulate the environmental aspects of the activity. The Director, EPA and authorised officers have powers to enforce permit conditions and to address particular issues. Bona fide complaints received by the EPA Division will be investigated by officers.
15	B.6	11-14	The representor claims that an area behind the workshop, separate from the main quarry area, has been quarried (most recently on 13/12/2015). Queries whether this will continue and to what extent.	This is a regulatory issue in relation to the existing level 1 activity, which Council may investigate. The Board, in the event that it approves the proposal, is likely in its permit conditions to clearly define the area in which quarrying operations may be carried out.
<u>Planning issues</u>				
4	E.7 [sic]	14	The quarry could alternatively be located at the southern end of the proponent's property, with lower impact on neighbours.	This matter is outside the scope of the Board's assessment – the Board is assessing the current permit application. It is a broader option of a planning nature that Council may consider.
4	E.7 [sic]	14	The *Quarry Code of Practice* includes the option of an operator "purchasing, leasing or entering into an agreement over surrounding lands". Representor suggests this option could be considered in this case (in respect of land within the 750m SRAD).	Ditto.
3, 4, 7, 16, 17	B.8	14	The proposal will restrict/prevent future developments on nearby properties (particularly within the 750m SRAD).	A planning issue for Council to consider.
8	B.8	14	The proposal will restrict/prevent future nearby developments (particularly within the 750m SRAD), contrary to objective 1(b) of Schedule 1 of the *Land Use Planning and Approvals Act 1993* (LUPAA) and objective 2.2.(a)(xiii) of the Planning Scheme.	A planning issue for Council to consider.

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
7, 9, 15, 16, 17	B.8	14	The proposal may lower the value of the representor's property/other nearby properties.	A planning issue for Council to consider.
16	B.8	14	The Rekuna area has become more of a residential agricultural area in recent years and the proposed level 2 quarry is inappropriate/unsuitable for the area.	A planning issue for Council to consider.
15	E.7 [sic]	14	The EER's statement that "the market has broadened to include a demand for consistent-sized gravel material for some clients" is unsubstantiated. No evidence is provided that there is market demand for the quarry product or regarding the financial viability of the quarry. No material has been transported from the quarry in recent months.	A planning issue for Council to consider.
8	D.8	29-35	Noise and dust from the proposed quarry cannot be adequately contained or treated within the site boundary. Council must consider this matter in accordance with Part 11.10.1(xvii) of the Planning Scheme. This risk is to the detriment of adjacent land owners and occupants.	A planning issue for Council to consider.
3, 9, 15	-	-	Concern about Council conflict of interest and/or voting processes.	A general issue for Council to consider.
9	-	-	Representor dissatisfied with past Council dealings with the proponent.	A general issue for Council to consider.

Representation no./Agency	EER section no.	EER Page no.	Comments and issues	EPA comments
Other issues				
15, 16	-	-	There has been no consultation regarding the current application by the proponent with neighbouring property owners.	Noted. Direct consultation by a proponent is not mandatory, although the Board encourages it.
Aboriginal Heritage Tasmania (DPIPWE)	D.13	38	Aboriginal Heritage Tasmania (AHT) has completed a search of the Aboriginal Heritage Register regarding the proposal, and advises that there are no Aboriginal heritage sites recorded within the proposed expansion area. Due to a review of previous reports and the area being highly disturbed it is believed that the area has a low probability of Aboriginal heritage being present. Accordingly there is no requirement for an Aboriginal heritage investigation and AHT has no objection to the project proceeding. The activity is nonetheless subject to the *Aboriginal Relics Act 1975*.	Noted.

Appendix 3 Permit Conditions - Environmental

PERMIT PART B
PERMIT CONDITIONS - ENVIRONMENTAL No. 9340

Issued under the *Environmental Management and Pollution Control Act 1994*

Activity: **The operation of a quarry (ACTIVITY TYPE: Crushing, grinding, milling or separating into different sizes (rocks, ores or minerals))**
1356 TEA TREE RD
CAMPANIA TAS 7026

The above activity has been assessed as a level 2 activity under the *Environmental Management and Pollution Control Act 1994*.

Acting under Section 25(5)(a)(i) of the EMPCA, the Board of the Environment Protection Authority has required that this Permit Part B be included in any Permit granted under the *Land Use Planning and Approvals Act 1993* with respect to the above activity.

Municipality: **SOUTHERN MIDLANDS**
Permit Application Reference: **2015/122**
EPA file reference: **248330**

Date conditions approved: 3 MAR 2016

Signed: WARREN JONES

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

DEFINITIONS

Unless the contrary appears, words and expressions used in this Permit Part B have the meaning given to them in **Schedule 1** of this Permit and in the EMPCA. If there is any inconsistency between a definition in the EMPCA and a definition in this Permit Part B, the EMPCA prevails to the extent of the inconsistency.

ENVIRONMENTAL CONDITIONS

The person responsible for the activity must comply with the conditions contained in **Schedule 2** of this Permit Part B.

INFORMATION

Attention is drawn to **Schedule 3**, which contains important additional information.

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

Table Of Contents

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

Attachments

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

Schedule 1: Definitions

In this Permit Part B:-

Aboriginal Relic has the meaning described in section 2(3) of the *Aboriginal Relics Act 1975*.

Access road means the private road from Tea Tree Road to the quarry working area shown as the broken line on Attachment 1 of these conditions.

Activity means any environmentally relevant activity (as defined in Section 3 of EMPCA) to which this document relates, and includes more than one such activity.

Authorized Officer means an authorized officer under section 20 of EMPCA.

Director means the Director, Environment Protection Authority holding office under Section 18 of EMPCA and includes a person authorised in writing by the Director to exercise a power or function on the Director's behalf.

EMPCA means the *Environmental Management and Pollution Control Act 1994*.

Environmental Harm and **Material Environmental Harm** and **Serious Environmental Harm** each have the meanings ascribed to them in Section 5 of EMPCA.

Environmental Nuisance and **Pollutant** each have the meanings ascribed to them in Section 3 of EMPCA.

Environmentally Hazardous Material means any substance or mixture of substances of a nature or held in quantities which present a reasonably foreseeable risk of causing serious or material environmental harm if released to the environment and includes fuels, oils, waste and chemicals but excludes sewage.

Movement , in regard to movement of vehicles or machinery, means a movement in one direction only.

Person Responsible is any person who is or was responsible for the environmentally relevant activity to which this document relates and includes the officers, employees, contractors, joint venture partners and agents of that person, and includes a body corporate.

Quarry working area means the area delineated on Attachment 2 of these conditions.

Quarry Code Of Practice means the document of this title published by the Department of Primary Industries, Water and Environment and the Department of Infrastructure, Energy and Resources in June 1999, and includes any subsequent versions of this document.

Stormwater means water traversing the surface of the land as a result of rainfall.

The Land means the land on which the activity to which this document relates may be carried out and:

1. falls within the area defined by certificate of title 155147/1;
2. is further delineated at Attachment 1 of these conditions; and
3. includes buildings and other structures permanently fixed to the land, any part of the land covered with water, and any water covering the land.

Washdown Guidelines means the document titled Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania, by the Department of Primary Industries, Parks, Water and Environment, dated March 2015, and any amendment to or substitution of this document.

Weed means a declared weed as defined in the *Weed Management Act 1999*.

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

Schedule 2: Conditions

Maximum Quantities

Q1 Regulatory limits

1 The activity must not exceed the following limits (annual fees are derived from these figures):

1.1 2,500 cubic metres per year of rocks, ores or minerals processed.

1.2 10,000 cubic metres per year of material extracted

General

G1 Access to and awareness of conditions and associated documents

A copy of these conditions and any associated documents referred to in these conditions must be held in a location that is known to and accessible to the person responsible for the activity. The person responsible for the activity must ensure that all persons who are responsible for undertaking work on The Land, including contractors and sub-contractors, are familiar with these conditions to the extent relevant to their work.

G2 Incident response

If an incident causing or threatening environmental nuisance, serious environmental harm or material environmental harm from pollution occurs in the course of the activity, then the person responsible for the activity must immediately take all reasonable and practicable action to minimise any adverse environmental effects from the incident.

G3 No changes without approval

1 The following changes, if they may cause or increase the emission of a pollutant which may cause material or serious environmental harm or environmental nuisance, must only take place in relation to the activity if such changes have been approved in writing by the EPA Board following its assessment of an application for a permit under the *Land Use Planning and Approvals Act 1993*, or approved in writing by the Director:

1.1 a change to a process used in the course of carrying out the activity; or

1.2 the construction, installation, alteration or removal of any structure or equipment used in the course of carrying out the activity; or

1.3 a change in the quantity or characteristics of materials used in the course of carrying out the activity.

G4 Change of responsibility

If the person responsible for the activity ceases or intends to cease to be responsible for the activity, he or she must notify the Director in writing of the full particulars of any person succeeding him or her as the person responsible for the activity.

G5 Change of ownership

If the owner of The Land upon which the activity is carried out changes or is to change, then, as soon as reasonably practicable but no later than 30 days after becoming aware of the change or intended change in the ownership of The Land, the person responsible must notify the Director in writing of the change or intended change of ownership.

CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

G6 Complaints register

1 A public complaints register must be maintained and made available for inspection by an Authorized Officer upon request. The public complaints register must, as a minimum, record the following detail in relation to each complaint received in which it is alleged that environmental harm (including an environmental nuisance) has been caused by the activity:

1.1 the time at which the complaint was received;

1.2 contact details for the complainant (where provided);

1.3 the subject-matter of the complaint;

1.4 any investigations undertaken with regard to the complaint; and

1.5 the manner in which the complaint was resolved, including any mitigation measures implemented.

2 Complaint records must be maintained for a period of at least 3 years.

G7 Quarry Code of Practice

Unless otherwise required by these conditions or required in writing by the Director, the activity (or activities) undertaken on The Land must comply with the Acceptable Standards provisions of the *Quarry Code of Practice.*

Atmospheric

A1 Control of dust emissions from plant

1 Dust produced by the operation of all crushing and screening plant must be controlled by the use of one or more of the following methods to the extent necessary to prevent environmental nuisance:

1.1 the installation of fixed water sprays at all fixed crushers and at all points where crushed material changes direction due to belt transfer;

1.2 the installation of dust extraction equipment at all fixed crushers and at all points where crushed material changes direction due to belt transfer, and the incorporation of such equipment with all vibrating screens;

1.3 the enclosure of the crushing and screening plant and the treatment of atmospheric emissions by dust extraction equipment; and

1.4 any other method that has been approved in writing by the Director.

A2 Control of dust emissions

Dust emissions from The Land must be controlled to the extent necessary to prevent environmental nuisance beyond the boundary of The Land.

A3 Covering of vehicles

Vehicles carrying loads containing material which may blow or spill must be equipped with effective control measures to prevent the escape of the materials from the vehicles when they leave The Land or travel on public roads. Effective control measures may include tarpaulins and load dampening.

A4 Dust emissions from traffic areas

1 The access road, surfaces within the quarry working area and other surfaces subject to motor vehicle and mobile machinery traffic associated with the activity must be dampened during the hours specified in condition N1 of this permit to ensure that dust emitted from vehicle and machinery movements does not cause environmental nuisance beyond the boundary of The Land.

2 Where a water cart or similar vehicle is utilised for dampening the access road, each movement of that vehicle on the access road is to be taken to be a heavy vehicle movement for the purposes of the limit on the number of heavy vehicle movements on the access road prescribed in condition OP3of this permit.

Blasting

B1 No blasting on The Land
Blasting must not be carried out on The Land.

Decommissioning And Rehabilitation

DC1 Stockpiling of surface soil
Prior to commencement of extractive activities on any portion of The Land, surface soils must be removed in that portion of The Land to be disturbed by the conduct of the activity and stockpiled for later use in rehabilitation of The Land. Topsoil must be kept separate from other overburden and protected from erosion or other disturbance.

DC2 Progressive rehabilitation
Worked out or disused sections of The Land must be rehabilitated concurrently with extractive activities on other sections of The Land. Progressive rehabilitation must be carried out in accordance with the relevant provisions of the *Quarry Code of Practice*, unless otherwise approved in writing by the Director. The maximum disturbed area of land which may remain, at any time, without rehabilitation is one hectare.

DC3 Temporary suspension of activity

1 Within 30 days of becoming aware of any event or decision which is likely to give rise to the temporary suspension of the activity, the person responsible for the activity must notify the Director in writing of that event or decision. The notice must specify the date upon which the activity is expected to suspend or has suspended.

2 During temporary suspension of the activity:

2.1 The Land must be managed and monitored by the person responsible for the activity to ensure that emissions from The Land do not cause serious environmental harm, material environmental harm or environmental nuisance; and

2.2 If required by the Director a Care and Maintenance Plan for the activity must be submitted, by a date specified in writing by the Director, for approval. The person responsible must implement the approved Care and Maintenance Plan, as may be amended from time to time with written approval of the Director.

3 Unless otherwise approved in writing by the Director, if the activity on The Land has substantially ceased for 2 years or more, rehabilitation of The Land must be carried out in accordance with the requirements of these conditions as if the activity has permanently ceased.

DC4 Notification of cessation
Within 30 days of becoming aware of any event or decision which is likely to give rise to the permanent cessation of the activity, the person responsible for the activity must notify the Director in writing of that event or decision. The notice must specify the date upon which the activity is expected to cease or has ceased.

DC5 Rehabilitation on cessation

1 Unless otherwise approved in writing by the Director, rehabilitation upon permanent cessation of the activity must be undertaken in accordance with relevant provisions of the *Quarry Code of Practice* and in accordance with the following:

1.1 rehabilitation earthworks must be substantially completed within 12 months of cessation of the activity; and

1.2 rehabilitated areas must be monitored and maintained for a period of at least three years after rehabilitation works have been substantially completed, after which time the person responsible for the activity may apply in writing to the Director for a written statement that rehabilitation has been successfully completed.

Effluent Disposal

E1 Perimeter drains

1 Perimeter cut-off drains must be constructed at strategic locations on The Land to prevent surface run-off from entering the area used or disturbed in carrying out the activity. All reasonable measures must be implemented to ensure that sediment transported along these drains remains on The Land. Such measures may include provision of strategically located sediment fences, appropriately sized and maintained sediment settling ponds, vegetated swales, detention basins and other measures designed and operated in accordance with the principles of Water Sensitive Urban Design.

2 Drains must have sufficient capacity to contain run-off that could reasonably be expected to arise during a 1 in 20 year rainfall event. Maintenance activities must be undertaken regularly to ensure that this capacity does not diminish.

E2 Maintenance of settling ponds

Sediment settling ponds must be periodically cleaned out to ensure that the pond design capacity is maintained. Sediment removed during this cleaning must be securely deposited such that sediment will not be transported off The Land by surface run-off.

E3 Drainage from quarry working area

All water must be directed away from the quarry working area, including the quarry pit and any stockpile areas, so that water does not collect in or on the working area.

E4 Stormwater

1 Polluted stormwater originating in the quarry working area or on the access road that will be discharged from The Land must be collected and treated prior to discharge to the extent necessary to prevent serious or material environmental harm, or environmental nuisance.

2 Notwithstanding the above, all stormwater that is discharged from The Land must not carry pollutants such as sediment, oil and grease in quantities or concentrations that are likely to degrade the visual quality of any receiving waters outside the Land.

3 All reasonable measures must be implemented to ensure that solids entrained in stormwater originating in the quarry working area or on the access road are retained on The Land. Such measures may include appropriately sized and maintained sediment settling ponds or detention basins.

Hazardous Substances

H1 Storage and handling of hazardous materials

1 Unless otherwise approved in writing by the Director, environmentally hazardous materials held in the quarry working area must be:

1.1 located within impervious bunded areas, spill trays or other containment systems; and

1.2 managed to prevent unauthorised discharge, emission or deposition of pollutants:

1.2.1 to soils within the boundary of The Land in a manner that is likely to cause serious environmental harm;

1.2.2 to groundwater;

1.2.3 to waterways; or

1.2.4 beyond the boundary of The Land.

H2 Spill kits

Spill kits appropriate for the types and volumes of materials handled for the purposes of the activity must be kept in appropriate locations to assist with the containment of spilt environmentally hazardous materials.

Noise Control

N1 Operating hours

1 Unless otherwise approved in writing by the Director, activities associated with the extraction of materials and loading of product must not be undertaken outside the hours of 0700 hours to 1800 hours on weekdays and 0800 hours to 1600 hours on Saturdays.

2 Unless otherwise approved in writing by the Director, screening or crushing of extracted materials on The Land must not be undertaken outside the hours of 0800 to 1700 hours on weekdays.

3 Unless otherwise approved in writing by the Director, heavy vehicles must not be operated or driven on the access road for the purpose of cartage of quarry product outside the hours of 0800 hours to 1800 hours on weekdays.

4 Unless otherwise approved in writing by the Director, heavy vehicles and mobile machinery must not be driven between the quarry working area and other places on The Land, on routes other than the access road, outside the hours of 0700 hours to 1800 hours on weekdays and 0800 hours to 1600 hours on Saturdays.

5 Notwithstanding the provisions of the paragraphs of this condition above, activities must not be carried out on public holidays that are observed Statewide (Easter Tuesday excepted).

N2 Noise emission limits

1 Noise emissions from the activity when measured at any noise sensitive premises in other ownership and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:

1.1 47 dB(A) between 0700 hours and 1900 hours (Day time); and

1.2 40 dB(A) between 1900 hours and 2200 hours (Evening time); and

1.3 35 dB(A) between 2200 hours and 0700 hours (Night time).

2 Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise levels by at least 5 dB(A).

3 The time interval over which noise levels are averaged must be 10 minutes or an alternative time interval specified in writing by the Director.

4 Measured noise levels must be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the Tasmanian Noise Measurement Procedures Manual.

5 All methods of measurement must be in accordance with the Tasmanian Noise Measurement Procedures Manual.

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3 MAR 2016

N3 Noise survey requirements

1 Unless otherwise approved in writing by the Director, a noise survey of the activity must be carried out while extraction, crushing and product transport activities are being simultaneously undertaken on The Land.

2 The noise survey must be carried out:

2.1 during the first instance of crushing; and

2.2 within six (6) months of any change to the activity which is likely to substantially alter the character or increase the volume of noise emitted from The Land; and

2.3 at any other time as required by the Director.

3 A report containing the noise survey results must be submitted to the Director within 30 days of the survey taking place.

N4 Noise survey method and reporting requirements

1 Noise surveys must be undertaken in accordance with a survey method approved in writing by the Director, as may be amended from time to time with written approval of the Director.

2 Without limitation, the survey method must address the following:

2.1 measurements must be carried out at day, evening and night times (where applicable) at each location; and

2.2 measurement locations, and the number thereof, must be specified, with one location established as a control location (noise).

3 Measurements and data recorded during the survey must include:

3.1 operational status of noise producing equipment and throughput of the activity;

3.2 subjective descriptions of the sound at each location;

3.3 details of meteorological conditions relevant to the propagation of noise;

3.4 the equivalent continuous (L_{eq}) and L_1, L_{10}, L_{50}, L_{90} and L_{99} A-weighted sound pressure levels measured over a period of 10 minutes or an alternative time interval approved by the Director;

3.5 one-third octave spectra over suitably representative periods of not less than 1 minute; and

3.6 narrow-band spectra over suitably representative periods of not less than 1 minute.

4 A noise survey report must be forwarded to the Director within 30 days from the date on which the noise survey is completed.

5 The noise survey report must include the following:

5.1 the results and interpretation of the measurements required by these conditions;

5.2 a map of the area surrounding the activity with the boundary of The Land, measurement locations, and noise sensitive premises clearly marked on the map;

5.3 any other information that will assist with interpreting the results and whether the activity is in compliance with these conditions and EMPCA; and

5.4 recommendations of appropriate mitigation measures to manage any noise problems identified by the noise survey.

N5 Crushing and screening operations

Unless otherwise approved in writing by the Director, plant for the crushing or screening of extracted material may only be operated on a maximum of five consecutive days of each calendar year.

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3 MAR 2016

N6 Notification of crushing and screening operations

1 Prior to each annual crushing or screening operation carried out in accordance with the conditions of this permit, the Director and the occupants of all residences within 750 metres of the quarry working area must be notified in writing of the intention to carry out the operation.

2 The notification must include a schedule specifying the dates on which crushing or screening plant will be operated.

3 The notification must be delivered at least 72 hours prior to the commencement of the crushing or screening operation.

N7 Crusher noise level

1 Before any plant for the crushing or screening of extracted material is operated on The Land, the sound output of the plant must be measured to ensure that the noise limits in condition N2 of this permit will not be exceeded.

2 A report containing the measurements, estimates of noise levels and methods used must be submitted to the Director at least one week before the plant is operated on The Land.

N8 Noise complaints

In the event that a noise complaint is received in relation to the activity, the complaint must be reported to the Director within 24 hours.

Operations

OP1 Washdown Guidelines

Prior to entering the land, machinery must be washed in accordance with the Washdown Guidelines, or any subsequent revisions of that document.

OP2 Weed management

The Land must be kept substantially free of weeds to minimise the risk of weeds being spread through the transport of products from The Land.

OP3 Maximum number of heavy vehicle movements

Unless otherwise approved in writing by the Director, no more than 30 heavy vehicle movements associated with the activity may occur on the access road during any one day.

OP4 Access road

1 Unless otherwise approved in writing by the Director, heavy vehicles and mobile machinery moving between Tea Tree Road and the quarry working area must be driven on the access road only.

2 Unless otherwise approved in writing by the Director, the route of the access road must not be altered from that shown on Attachment 1 of these conditions.

OP5 Quarry operations

1 The following operations must be conducted within the quarry working area only:

1.1 extraction of materials;

1.2 processing of materials (including crushing and screening);

1.3 stockpiling of extracted materials and processed materials; and

1.4 loading of processed materials onto vehicles.

2 Plant for the processing of materials including crushing and screening must be operated at the lowest practicable elevation within the quarry working area and such that there is no line of sight to any residence in other ownership.

3 No material may be crushed or screened on The Land except material which has been extracted within the quarry working area.

OP6 Noise attenuation screen

1 A noise attenuation screen must be erected and maintained along the northern and western sides of the quarry working area.

2 The screen must be of such dimensions that there is no line of sight at any time between machinery operating within the quarry working area and any residence in other ownership.

3 Unless otherwise approved in writing by the Director, the screen must consist of rock, soil or other earthen material excavated on The Land.

OP7 Heavy vehicle and machinery internal movements

Unless otherwise approved in writing by the Director, and subject to paragraph 2 of this condition, no more than 6 movements of heavy vehicles or mobile machinery may occur between the quarry working area and other places on The Land, on routes other than the access road, during any one day.

Schedule 3: Information

Legal Obligations

LO1 EMPCA

The activity must be conducted in accordance with the requirements of the *Environmental Management and Pollution Control Act 1994* and Regulations thereunder. The conditions of this document must not be construed as an exemption from any of those requirements.

LO2 Storage and handling of dangerous goods, explosives and dangerous substances

1 The storage, handling and transport of dangerous goods, explosives and dangerous substances must comply with the requirements of relevant State Acts and any regulations thereunder, including:

- **1.1** *Work Health and Safety Act 2012* and subordinate regulations;
- **1.2** *Explosives Act 2012* and subordinate regulations; and
- **1.3** *Dangerous Goods (Road and Rail Transport) Act 2010* and subordinate regulations.

LO3 Aboriginal relics requirements

1 The *Aboriginal Relics Act 1975*, provides legislative protection to Aboriginal heritage sites in Tasmania regardless of site type, condition, size or land tenure. Section 14(1) of the Act states that; Except as otherwise provided in this Act, no person shall, otherwise than in accordance with the terms of a permit granted by the Minister on the recommendation of the Director of National Parks and Wildlife:

- **1.1** destroy, damage, deface, conceal or otherwise interfere with a relic;
- **1.2** make a copy or replica of a carving or engraving that is a relic by rubbing, tracing, casting or other means that involve direct contact with the carving or engraving;
- **1.3** remove a relic from the place where it is found or abandoned;
- **1.4** sell or offer or expose for sale, exchange, or otherwise dispose of a relic or any other object that so nearly resembles a relic as to be likely to deceive or be capable of being mistaken for a relic;
- **1.5** take a relic, or permit a relic to be taken, out of this State; or
- **1.6** cause an excavation to be made or any other work to be carried out on Crown land for the purpose of searching for a relic.

2 If a relic is suspected and/or identified during works then works must cease immediately and the Tasmanian Aboriginal Land and Sea Council and the Aboriginal Heritage Tasmania be contacted for advice before work can continue. In the event that damage to an Aboriginal heritage site is unavoidable a permit under section 14 of the *Aboriginal Relics Act 1975* must be applied for. The Minister may refuse an application for a permit, where the characteristics of the relics are considered to warrant their preservation.

3 Anyone finding an Aboriginal relic is required under section 10 of the Act to report that finding as soon as practicable to the Director of National Parks and Wildlife or an authorized officer under the *Aboriginal Relics Act 1975*. It is sufficient to report the finding of a relic to Aboriginal Heritage Tasmania to fulfil the requirements of section 10 of the Act.

Other Information

OI1 Waste management hierarchy

1 Wastes should be managed in accordance with the following hierarchy of waste management:

1.1 waste should be minimised, that is, the generation of waste must be reduced to the maximum extent that is reasonable and practicable, having regard to best practice environmental management;

1.2 waste should be re-used or recycled to the maximum extent that is practicable; and

1.3 waste that cannot be re-used or recycled must be disposed of at a waste depot site or treatment facility that has been approved in writing by the relevant planning authority or the Director to receive such waste, or otherwise in a manner approved in writing by the Director.

OI2 Notification of incidents under section 32 of EMPCA

Where a person is required by section 32 of EMPCA to notify the Director of the release of a pollutant, the Director can be notified by telephoning 1800 005 171 (a 24-hour emergency telephone number).

OI3 Commitments

The person responsible for the activity has a general environmental duty to conduct the activity in accordance with the commitments contained in Attachment 3 of these conditions.

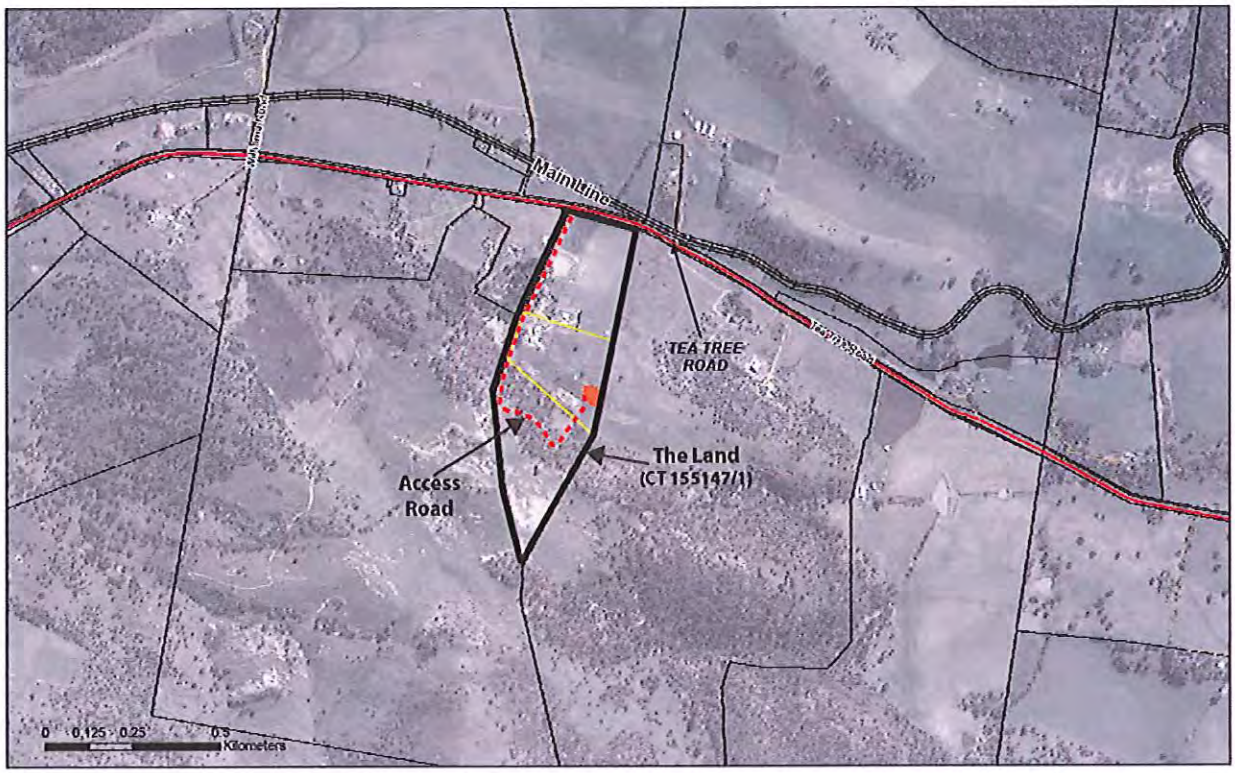
CHAIRPERSON, BOARD OF THE ENVIRONMENT PROTECTION AUTHORITY

3 MAR 2016

PCE No. 9340

Attachment 1

The Land & Access Road



3 MAR 2016

PCE No. 9340

Attachment 2

Quarry Working Area

3 MAR 2016

PCE No. 9340

Attachment 3

Commitments[1]

Number	Commitment
1	Operating hours are those recommended in the *Quarry Code of Practice* – 0700 to 1900 hrs Monday to Friday, 0800 to 1600 hrs on Saturday; closed on Sunday and public holidays.
2	Crushing will be limited to 5 days per annum, and will only occur between the hours of 0800 and 1700 Monday to Friday. Crushing will not occur on Saturday, Sunday and public holidays. Landowners within 750m of the quarry pit will be advised, in writing, of a crushing event no less than 72 hours prior to it commencing.
3	A Weed Management Plan is implemented at the quarry operation.
4	One sediment pond (0.95ML) will be used to capture and treat for sediment removal the water that may flow from the quarry during sustained or heavy rainfall events.
5	Sediment trapped by the pond will be removed annually. The collected sediment will be mixed with stockpiled top soil for progressive rehabilitation of disused quarry areas.
6	As a dust suppression measure, during periods of dry weather the Access Road surface, areas near the stockpiles and/or loads in trucks (unless they are covered by tarpaulins) will be dampened with water accessed from the nearby sediment pond or on-site water cart truck.
7	Waste generated by the servicing of machinery is disposed of in accordance with best practice principles.
8	Waste generated by workers from general refuse (eg lunch wrappers) at the quarry is removed each day to the waste bins at the existing dwelling.

[1] From Part F of the document *Environmental Effects Report Williams' Quarry, Rekuna*; Van Diemen Consulting Pty Ltd, New Town, Tasmania (dated 4 December 2015).

3 MAR 2016

9	The crushing of the 2,500 cubic metres will be completed within a single run of 5 consecutive days (maximum).
10	A noise survey will be conducted by a suitably qualified person to monitor noise levels at nearest sensitive uses when the crusher is on site which will also include at the same time the monitoring of noise levels from other plant and vehicles associated with the quarry, once the Level 2 quarry is operating. The report of the survey will be provided to the Director of the EPA.
11	Trucks will avoid entering and leaving the quarry in the period 20 minutes either side of the school bus collection and drop-off time, as advised by the school bus operator.
12	The following measures will be applied to mitigate potential impacts of unreasonable levels of dust and noise caused to the residence at 1220 Tea Tree Road – • Ensure compliance with the operating hours and days for the quarry; • Maintain the existing Complaints Register to record and address any complaints received in relation to Access Road usage by quarry related vehicles; • Provide water (via sprinklers or water cart) to dampen the road surface during dry periods with associated south-easterly to easterly winds to keep road surface dust emission levels low; and • Ensure trucks carrying gravel limit their speed to 20km/hr when using the Access Road.
13	There is no permanent storage of fuels, oils, lubricants or any other dangerous good in the quarry.
14	Fuel and oil containers are stored at the existing workshop facility adjacent to the existing residential dwelling.
15	When in the quarry, fuel and oil containers are stored at least 10 m from any drain or sediment pond and are bunded (moveable bunds) to a capacity at least 1.5 times the volume of the container.
16	One hydrocarbon spill kit is stored at the quarry to use in the event of a spillage.
17	An *Unanticipated Discovery Plan* (Attachment 2 to these Guidelines) will be on hand during ground disturbing works to aid the quarry operator in meeting the requirements under the Act should Aboriginal heritage be uncovered.
18	'Progressive rehabilitation' will occur in those areas that have been quarried and are no longer needed or used for the operation of the quarry.
19	To enable the public to respond to any concerns they may have about the operation of the quarry, a Complaints Register will be prepared and maintained for the activity.

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WILLIAM'S QUARRY, REKUNA - LEVEL 2 DEVELOPMENT APPLICATION

Response to EPA Tasmania Review

16 March 2016

Southern Midlands Council

MB928-01F03 Response to EPA Review (r0)

Melbourne Sydney Brisbane Gold Coast Kuwait
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1. Renzo Tonin & Associates has been instructed by Southern Midlands Council to review the Development Application for Level 2 quarry use at the William's Quarry at 1356 Tea Tree Road, Rekuna (the Subject Land), with regard to potential noise impacts.

2. I have previously reviewed the Subject Land Application and provided comments in Renzo Tonin & Associates report MB928-01F02 (r0).

3. The Board of the Environmental Protection Authority (Tasmania) has conducted an independent review (EPA Review) of the Application and the findings of this are presented in a report titled Environmental Assessment Report, dated March 2016.

4. As part of the EPA Review, the proponent's acoustic consultant (Mr. Pearu Terts) was requested to provide additional information relating to concerns that I raised in Renzo Tonin & Associates report MB928-01F02 (r0).

5. Mr. Terts has provided responses to five items in a letter addressed to Dr. Derek Walter, dated 18th February 2016. The letter provides technical responses to some items addressed in Renzo Tonin & Associates report MB928-01F02 (r0), and while I still have ongoing concerns regarding how Mr. Terts has determined ambient noise levels (16-hour prediction instead of measurement) as well as other technical items, more importantly the letter does not respond to the central theme of concern highlighted in Renzo Tonin & Associates report MB928-01F02 (r0), that being the ambiguity of how the noise limits should be applied in accordance with the Tasmania Quarry Code of Practice (June 1999).

6. Further, I am of the opinion that the EPA Review does not provide sufficient evaluation regarding acceptability of Mr. Terts proposed noise limits and how the Quarry Code of Practice should be interpreted more broadly.

CENTRAL QUESTIONS THAT STILL REQUIRE RESPONSE

7. The EPA Review states the following:

The review by SMC's acoustic consultant raised several issues relating to the interpretation of 'normal ambient noise level' in the Quarry Code of Practice and how this has been used in the proponent's noise assessment. Rural areas can experience very wide ranges of noise level due to the sporadic nature of many activities and thus noise criteria for quarries in rural areas have generally been based on existing Leq levels, not L90 levels.

8. I find the above statement to be illogical as it conflicts with the argument put forward in the same sentence. In fact, it only further illustrates why primary L90 is a better noise metric in these instances (because a "sporadic" noise environment will result in more variation between measurements). This issue was highlighted in Renzo Tonin & Associates report MB928-01F02 (r0) – measuring L_{eq} noise in a sporadic environment is likely to provide inconsistent results depending on any particular variable in the environment including day, time, operator, etc. The preferred methodology should be that which provides consistent outcomes, in particular with regard to noise limits and amenity. From the above statement, I assume that the EPA is

attempting to achieve this (including in "sporadic" environments) and therefore the L_{90} (or similar) statistic actually provides a logical answer to this problem.

9. The above statement from the EPA Review is also at odds with the Tasmania Department of Environment Noise Measurement Procedures Manual 2008 where it states:

The background noise level is a reference level against which an intrusive noise is assessed. For the purposes of any Environmental Protection Policy on Noise that is made, the background noise level is defined as the L90 statistic, in the absence of the noise under consideration…

10. I am of the opinion that the above inconsistency has implications on Responsible Authorities in Tasmania more broadly, and that the Application in question only serves as a precedent.

11. If EPA Tasmania is indeed of the opinion that intrusive quarry noise should be assessed against sporadic L_{eq} noise measurement data, then I am of the opinion that:

    a. Amenity outcomes are likely to be inconsistent between different sites and dependent more on the consultant, day or time that measurements are made. This is likely to result in inconsistent reviews and approval outcomes regarding applications that are essentially the same across Tasmania;

    b. Amenity levels regarding environmental noise are likely to be significantly worse than other states and jurisdictions in Australia and the majority of the developed world;

    c. A review of the Tasmania Quarry Code of Practice (June 1999) is required that brings it into alignment with other acceptable measurement methodologies and practices used worldwide.

12. To further illustrate validity of the above opinions, the following Table provides an overview of just some of the other noise regulations and guidelines used in Australia and how noise limits are more commonly determined:

Regulation / Guideline / State	Methodology to Determine Noise Limit
Tasmania Department of Environment Noise Measurement Procedures Manual	L_{90} as reference level
EPA Victoria Guideline 1254	L_{90} +10dBA (for day periods)
EPA Victoria SEPP N-1	L_{90} +6-12dBA (for day periods, dependent on land use zoning)
EPA Victoria SEPP N-2	L_{90} +5dBA (day/evening)
EPA South Australia Environmental Protection Policy	L_{95} +5dBA
Department of Environment & Climate Change NSW Interim Construction Noise Guideline	RBL (based on L_{90}) +10dBA
NSW Industrial Noise Policy	'Intrusiveness' RBL (based on L_{90}) +5dBA

13. It is important to note that the noise limits determined in the respective regulations and guidelines in the Table above vary due to type noise source (i.e. noise from construction typically subject to the more lenient of noise limits due to its temporary nature and unavoidable works). However what is important to highlight in the Table above is that the

reference for which noise limits are determined are always a statistical percentile level (as a high percentile inherently correlates with "normal" or "typical" existing noise).

14. As an alternative to the above, the EPA Review may instead be of the opinion that quarry noise presents other benefits to the community which, on balance, result in higher levels of noise emission being determined as acceptable. I note that this is sometimes the case in other jurisdictions for earth resource and temporary construction applications. However, in such instances, it would be more appropriate to simply set the noise limits higher (i.e. +15dBA above background L_{A90}). The 'Environment Indicator Levels' determined by the World Health Organisation and reproduced in the Tasmania Environment Protection Policy suggests a level of L_{Aeq} 50 being that which generates "moderate annoyance" and this may be determined as acceptable is certain situations.

15. In the event that EPA Tasmania is of the view that the Application should be subject to a more lenient noise limit, the noise limit determined by Mr. Terts may then result in equivalent acceptable noise impacts. However, I am of the opinion that such a view by EPA Tasmania for this Application could be short-sighted, as it does not absolve it of the overarching issue and responsibility regarding the ambiguous noise limits set by the Quarry Code of Practice to begin with, and therefore the issue of inconsistency is likely to be raised time and time again.

16. So that Southern Midlands Council are able to obtain clarity on the issues raised in this document, I recommend that Council request:

    a. EPA Tasmania (or the Quarry Code Authority) provide background information on how the objectives were determined in the Quarry Code of Practice. Such commentary would need to be backed by historical evidence on how the Quarry Code of Practice was authored and may require input from other Authorities or regulators. Further, some justification or evidence regarding community reactions to noise would be required;

    b. EPA Tasmania provide clarity on why they believe L_{eq} provides a better reference level against which intrusive noise is assessed, and in particular when existing environments include "sporadic" noise sources that may not be present all of the time; and

    c. Where EPA Tasmania are of the opinion that a higher noise limit should apply to the Application, justification on why this determination has been made and how this approach may apply to other applications to result in consistent noise assessments more broadly.

Signed and dated this date

Darren Tardio

Senior Acoustic Consultant – Renzo Tonin & Associates (Vic) Pty Ltd

16 March 2016

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WILLIAM'S QUARRY, REKUNA - LEVEL 2 DEVELOPMENT APPLICATION

Acoustic Review

15 January 2016

Southern Midlands Council

MB928-01F02 Acoustic Review (r0)

Melbourne Sydney Brisbane Gold Coast Kuwait
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1. Renzo Tonin & Associates has been instructed by Southern Midlands Council to review the Development Application for Level 2 quarry use at the William's Quarry at 1356 Tea Tree Road, Rekuna (the Subject Land), with regard to potential noise impacts.

2. The documents I have reviewed to assess the proposal are:

    a. *Development Application Planning Report*, prepared by Van Diemen Consulting (no reference date or revision history provided in the document)

    b. *Environmental Effects Report*, prepared by Van Diemen Consulting and received by Council on 11/12/2015

    c. *Crushing and Quarry Noise Assessment*, prepared by Mr. Pearu Terts, dated 31/10/2014 (Appendix 7 of the Environmental Effects Report)

    d. *Truck Noise Survey*, prepared by Mr. Pearu Terts, dated 23/3/2015 (Appendix 8 of the Environmental Effects Report)

3. I understand that the proponent already operates Level 1 quarry activities on the Subject Land and the pertinent change with regard to the Level 2 application and associated noise impacts is the introduction of a mobile crusher to be used on the land for 5 days per year.

CRUSHING AND QUARRY NOISE ASSESSMENT - REVIEW

4. Mr. Terts has assessed potential noise impacts with respect to the Tasmania Quarry Code of Practice (June 1999). My understanding is that this document is a guideline prepared by the Department of Primary Industries, Water and Environment and, as a guideline, does not have mandatory status but instead assists responsible authorities in the decision process with regard to applications.

5. The 'Acceptable Standard' noise emission objectives recommended in the Code of Practice are as follows:

With the exception of blasting where permitted, noise from activities in a quarry affecting residential premises, must not exceed 10dB(A) above the normal ambient noise levels during daytime operations.

6. The Code of Practice does not provide specific reference to measurement methodologies, measurement intervals nor defined measurement parameters. The 'Acceptable Standard' therefore allows consultants to interpret the defined parameters. Because the periods of measurement and selected measurement parameter (e.g. L_{eq}, L_{90}, L_{max}) can have a significant bearing on the noise level recorded, I am of the opinion that the 'Acceptable Standard' is poorly worded for the purposes of providing a consistent assessment tool for noise.

7. Mr. Terts has interpreted "ambient noise" (in the Acceptable Standard objective) to be the L_{Aeq} noise level for all sources that were present during a single 10-minute period on 17/08/201. Mr. Terts also appears to provide clear delineation between "ambient" and "background" noise with the latter being the L_{A90} noise level recorded during the same 10-minute period.

Mr. Terts does not provide any evidence or reasoning for this and I have not been able to obtain any other document that the Code of Practice references to verify his interpretation.

8. *Ambient noise* is defined in the Code of Practice as follows:

This is the total encompassing sound in a given situation at a given time where no particular sound is dominant. It is composed of sound from all sources near and far, normally experienced in the area. Ambient noise is measured as dB (A) over a set period of time.

9. I am of the opinion that the above definition is ambiguous however it appears that Mr. Terts has interpreted *ambient noise* to be short-term L_{Aeq} noise levels. Mr. Terts has included noisy wildlife, short-term passbys from particularly noisy vehicles (i.e. motorbikes, trucks), aircraft, dog barking and other farm animals. I disagree with this interpretation for the reasons that follow.

10. The definition in the Code of Practice infers that the ambient noise should not include particular dominant sounds and that only those sources "normally experienced in the area" should be included. I draw attention to use of the word "normally". Sources such as loud vehicle passbys, aircraft, dog barking and farm animals are typically considered as extraneous noise events when assessing ambient noise, unless they would be consistently present for most of the 10 minute intervals over the normal course of a day. Because Mr. Terts has only taken a relatively short measurement (10-minutes), I am of the opinion that he is unable to determine that the sources included could be considered as "normally experienced". I am of the opinion that it is likely that there would be many 10-minute periods throughout the day where dog barking, loud vehicles and aircraft were not present.

11. The L_{Aeq} parameter is susceptible to obtaining high noise readings when discrete short-term noise events occur over a relatively short measurement period (e.g. 10-minutes) and therefore a consultant can expect to obtain large statistical variability between measurement times and situations when measuring ambient L_{Aeq}. For this reason, it is more typical to measure ambient noise with the L_{A90} parameter. The L_{A90} parameter always provides lower noise readings to the L_{Aeq} parameter because it essentially filters out short term noise events that would not be considered to be always occurring over all 10-minute periods. By definition, the L_{A90} parameter is the noise level that is exceeded 90% of the time, hence it correlates well with the 'typical' or 'steady' ambient noise. Because Mr. Terts has used the L_{Aeq} parameter for the basis of his assessment with respect to the 'Acceptable Standard', I am of the opinion that his report is misleading with respect to noise impacts and compliance.

12. The variability in L_{Aeq} is highlighted in Mr. Terts reports where values range between 38.8dB(A) and 44.2dB(A) on the 17/08/2014. By contrast, the L_{A90} recordings range between 29.5dB(A) and 30.8dB(A) for the same period. This implies that measurements conducted either at a different time, on a different day or by a different consultant could result is significantly different outcomes if using the L_{Aeq} parameter but would be consistent if using the L_{A90} parameter with respect to assessment of compliance.

13. For the above reasons, the EPA Noise Measurement Procedures Manual 2008 (the EPA Manual) specifically highlights this issue, as follows:

There are some descriptive terms that are often used in environmental noise measurement and assessment that have been given specific meanings in standards or legislation. Sometimes the use of these terms without some qualification can lead to ambiguity. For example, terms such as ambient and background should be used with care, and should be qualified where ambiguity could arise.

14. The above statement highlights why the current Code of Practice fails by not providing a suitable methodology or definition of assessment. It could be argued that the 'Acceptable Standard' refers to L_{max} noise not exceeding L_{eq} +10dB(A) just as reasonably as L_{eq} noise not exceeding L_{90} +10dB(A).

15. The EPA Manual provides definitions for both ambient and background noise as follows:

"Ambient Sound" has the same meaning as in Australian Standard AS1633-1985 Acoustics – Glossary of terms and related symbols

"Background level", for a specified time interval T, means the LA90, T sound pressure level for that time interval.

16. AS1633 provides the following definition of ambient sound:

The all-encompassing sound at a point being a composite of sounds from near and far.

17. Ambient sound as defined in the EPA Manual (and AS1633) is only qualitative and does not reference the L_{Aeq} parameter. I am not aware of any other pertinent reference document that infers use of L_{Aeq}, in the way that Mr. Terts has, in the context of determining appropriate noise level criteria.

18. Throughout the EPA Manual, it is inferred that *ambient* sound is often extraneous noise that needs to be deleted for the purposes of assessing another noise but never that it should be used for the purposes of defining noise criteria. Further, the preferred way to determine noise level criteria is highlighted under Section 14.1 of the EPA Manual, where it states:

The background noise level is a reference level against which an intrusive noise is assessed. For the purposes of any Environmental Protection Policy on Noise that is made, the background noise level is defined as the L90 statistic, in the absence of the noise under consideration…

Short measurement procedure

A statistical sound level analyser capable of measuring the L90 level must be used.

19. I agree with the methodology recommended in the EPA Manual as it is consistent with other methodologies to determine noise criteria in other Australian states and in other countries. Mr. Terts has not followed this procedure in his assessment of noise.

20. I am of the opinion that the methodology in the EPA Manual to determine noise criteria is what was inferred in the Code of Practice as this would provide a more reasonable outcome that balances the environment and industry. I am of the opinion that Mr. Terts assessment methodology would provide an outcome that is unreasonable with regard to noise impacts, and one that is inconsistent with other noise assessments for similar noise sources.

21. To highlight the discrepancy, I believe that the 'Acceptable Standard' in accordance with the Code of Practice should be the noise level that is no greater than 40dB(A), $L_{eq,10\text{-}min}$ (based on Mr. Terts data). By Mr. Terts assessment methodology, the 'Acceptable Standard' would be a noise level that is no greater than 49dB(A), $L_{eq,10\text{-}min}$. The difference in outcomes is significant with respect to associated noise impacts between the differing methodologies. Subjectively, the latter (Mr. Terts') outcome would result in quarry noise that sounds approximately twice as loud as the outcome associated with the criterion I am recommending.

22. I am therefore left to assume three possible reasons for the disputed noise criterion:

    - Mr. Terts has misinterpreted the meaning of *ambient* sound in the Code of Practice by segregating the terms *ambient* and *background*
    - Mr. Terts has used the lack of definition contained in the Code of Practice to the proponents advantage by taking relatively short measurements that include extraneous noise events
    - The Code of Practice does in fact take *ambient* to mean L_{Aeq} and therefore recommends acceptable noise levels that would be considered inconsistent and unreasonable by other authorities, regulators and assessors (including the EPA)

23. With regard to the last point above, I acknowledge that I have not been able to verify if the Code of Practice does in fact take ambient to be defined as the L_{Aeq} or L_{A90}. However if L_{Aeq} is the preferred definition of ambient noise by the Code of Practice author(s), then I argue that such a short measurement interval (such as that recorded by Mr. Terts) is inappropriate for setting the criterion. A long term (e.g. average daily) L_{Aeq} that does not include extraneous noise events (e.g. dog barking) could be considered reasonable in this case, however in practice it would still likely result in relatively large statistical variations between consultants. I reiterate that the Code of Practice has no mandatory legal status so in any case, I recommend that the Responsible Authority either:

    - Enforces use of long-term L_{Aeq} *ambient* noise measurements over at least a one-week period for the purposes of defining noise criterion, but only where it has been demonstrated that extraneous noise events have been discarded in the assessment of *ambient* sound
    - Enforces use of L_{A90} *ambient* noise measurements for the purposes of defining noise criterion

24. On page A9 of Mr Terts' report, the duration of background noise measurement is stated as 10 seconds. Such a short period is inappropriate for determining normal background noise conditions. It is also unclear as to what purpose this 10-second spectrum serves.

25. On page B1 of Mr. Terts' report, it is stated that the spectral data measured at Location 2 is background noise in the absence of traffic. This contradicts his earlier assertion that traffic forms part of ambient/background noise in the area and further confuses the delineation

26. While the Code of Practice does not state the parameter to be used for determining noise emission levels from the industry, it is typical to use the L_{Aeq} parameter in such instances where the industry noise is dominant (for the purposes of comparison to the noise criterion).

27. I have some doubts regarding Mr. Terts modelling methodologies. Mr. Terts does not provide reference to his modelling algorithm (e.g. ISO9613, CONCAWE), nor has he made an assessment of other sources of noise on the Subject Land (excavator, rock ripping, etc). While I agree that it is likely that the crusher will be the noisiest source when on-site, it would be beneficial to know if there are any cumulative noise impacts from multiple sources of machinery operating concurrently, including haul trucks which were measured by Mr. Terts. Further, the exact methodology of rock extraction would need to be stringently worded via appropriate permit conditions, were the application approved, as any drilling or rock breaking armatures used (in-lieu of ripping buckets) would potentially generate noise levels similar to crushing machinery.

28. Where existing uses are approved and only an application is made for additional machinery on-site, it is normal practice to measure existing noise emissions for the purposes of a) validating the acoustic model, b) obtaining a baseline and c) confirming current compliance status. My understanding is that the proponent already operates the majority of the machinery on the Subject Land for Level 1 quarry activities. It is curious why Mr. Terts did not take the opportunity to measure existing noise emissions to assist with his assessment of the proposal.

29. Mr. Terts has not allowed for any tonal, impulsive or modulation penalties to be applied to the overall noise emission. While I acknowledge that this is more difficult to do in predictions, the machinery listed often has such characteristics (including alarms) and therefore needs to be considered as this could increase the overall assessment level significantly.

30. Mr. Terts infers that there will be no direct quarry sound at the residential locations, due in part because of trees. Trees have been shown to provide no appreciable attenuation unless very dense and of significant depth (typically forests and large plantations).

31. Mr. Terts states that ambient noise levels will be higher near residential properties due to domestic "pumps or heat pumps". I am of the opinion that this has no relevance to the assessment (and would be considered extraneous) in accordance with the Code of Practice and there are likely to be areas around dwellings which are shielded from traffic noise from Tea Tree Road. It is therefore more likely that background noise levels could be less than Mr. Terts has measured.

32. I have estimated the Sound Power Level (SWL) of the modelled crusher from Mr. Terts' data and this suggests a SWL of 118dB(A) if his measurements were conducted in a freefield environment. This level is consistent with data supplied by manufacturers. While different methods of crushing and different manufacturers and models of crushers are likely to result in varying SWL's, modern jaw type crusher data (from manufacturers) can also be shown to be equivalent to a SWL of 118dB(A) and therefore the statement in the Environmental Effects Report that "the jaw-type proposed… will be substantially quieter than the impact type upon which noise modelling has been conducted by Mr. Terts" appears to be an anecdotal claim only by the proponent. The Environmental Effects Report should therefore provide evidence to support this claim, in particular if the likely crusher to be hired is already known.

33. I have not been instructed to conduct any noise modelling of my own, nor have I visited the existing site to record existing noise levels and therefore I cannot state at this time whether the proposal can comply with the Code of Practice. However, assuming that Mr. Terts' noise modelling is correct, the proposal would not comply with the Code of Practice based on my recommended interpretation of ambient noise. 45dB(A) L_{eq} reported by Mr. Terts would exceed the recommended criterion by 5dB(A). This exceedance is likely to be higher once tonal, impulse and modulation characteristics are considered. Because of this, I recommend that the application is rejected unless revised modelling or changes to the application indicate at least a 5dB(A) reduction.

ENVIRONMENTAL EFFECTS & PLANNING REPORTS - REVIEW

34. It is misleading that the overarching Environmental Effects Report states that "*the noise impact assessment was conducted using noise readings/spectrums from the machinery used at the site*". This is incorrect as Mr. Terts has not addressed, nor measured any of these items in his reports.

35. There is ambiguity regarding the number of days that a mobile crusher will be on the Subject Land. The Application indicates 5 days whereas Mr. Terts' report indicates up to 14 days. This should be clarified by the Responsible Authority before proceeding.

36. It is not clear to me regarding the timeline when various quarry benches will be reached on the Subject Land. While the pit itself may assist in attenuating noise, it may be considerable time until the second bench is reached, and therefore noise exposure may be significant for a long period of time before such attenuation is realised.

37. The crusher is proposed to be hired as required. It is therefore unclear as to what the crusher will be and this also implies that the crusher technology could change over time depending on availability from the supplier. Were the application to be approved, more stringent wording of conditions would be required to avoid large variations in equipment specifications. Ideally, a maximum Sound Power Level specification should be provided where it is then the responsibility of the proponent and supplier to provide for each date of use.

TRUCK NOISE SURVEY – REVIEW

38. Mr. Terts states that there will be further reduction of truck noise at the residential dwellings, in part because there is no line of sight to the road / tyres when compared to his measurements. However, it can be shown that at the relatively low speeds which trucks will be travelling, tyre interaction noise is not the dominant source and instead engine / drivetrain noise dominates. I am of the opinion that Mr. Terts assertion regarding tyre noise variance is irrelevant in this context and is therefore misleading.

39. The position of Mr. Terts measurements of truck noise may not be representative of the positions of line-of-sight to Tea Tree Road from residential dwellings. That is to say, there may be locations on residential properties that do not have direct line-of-sight to Tea Tree Road (e.g. when behind a dwelling) but would have line-of-sight to the truck access road and therefore his comparative analysis of Tea Tree Road traffic noise being similar to haul trucks may be incorrect.

40. I agree with Mr. Terts that because trucks will not operate at night, sleep disturbance thresholds will not be exceeded.

Signed and dated this date

Darren Tardio

Senior Acoustic Consultant – Renzo Tonin & Associates (Vic) Pty Ltd

15 January 2016