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Bluestone Mines Tasmania Joint Venture

Renison Tin Mine Paste Backfill Plant Traffic Impact Assessment

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ENGINEERS AUSTRALIA

PROFESSIONAL ENGINEER OF THE YEAR
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Contents

1. Introduction 4
   - 1.1 Background 4
   - 1.2 Traffic Impact Assessment (TIA) 4
   - 1.3 Statement of Qualification and Experience 5
   - 1.4 Project Scope 5
   - 1.5 Subject Site 5
   - 1.6 Reference Resources 7
2. Existing Conditions 8
   - 2.1 Transport Network 8
   - 2.2 Road Safety Performance 11
   - 2.3 Existing Mine Operations 12
3. Proposed Development 14
   - 3.1 Development Proposal 14
4. Traffic Impacts 15
   - 4.1 Traffic Generation 15
   - 4.2 Trip Distribution 16
   - 4.3 Access Impacts 16
   - 4.4 Sight Distance 17
   - 4.5 Internal Road Network 17
   - 4.6 Road Safety Impacts 18
5. Parking Assessment 19
   - 5.1 Planning Scheme Requirements 19
   - 5.2 Parking Provision 19
6. Conclusions 20

Figure Index

Figure 1	BMTJV Site Access and Internal Road Network	6
Figure 2	Murchison Seasonal Traffic Volume	9
Figure 3	Internal Road Near PBP Entry	10
Figure 4	Internal Road Near PBP Exit	11
Figure 5	Crash Locations	12
Figure 6	Existing Murchison Highway Site Access	16

Table Index

Table 1	Murchison Highway Traffic Volume Summary	8

1. Introduction

1.1 Background

Midson Traffic were engaged by Bluestone Mines Tasmania Joint Venture (BMTJV) Pty Ltd to prepare a traffic impact assessment for the proposed construction and operation of a proposed paste backfill plant (PBP) adjacent to the existing tin process plant at Renison Tin Mine.

1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforeseen congestion or other problems where the development connects to the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

This TIA has been prepared in accordance with the Department of State Growth (DSG) publication, *A Framework for Undertaking Traffic Impact Assessments*, September 2007. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019, as well as in accordance with the requirements of the Environmental Protection Authority (EPA), *Guidelines for Preparing Environmental Impact Statements*, 2019. Specifically, the EPA states "*identify the traffic routes for the proposal (both during construction and operation) and the likely volume and nature of traffic and timing of traffic flows, including details of the current usage of these roads. Environmental impacts associated with current and altered traffic flows and usage should be discussed (such as noise and dust impacts on other roads users and residences adjacent to roads). The assessment should focus on roads within the land defined by the proposal but also indirect impacts on public roads*".

This TIA also addresses the relevant clauses of E9, Traffic Generating Use and Parking Code, of the West Coast Interim Planning Scheme, 2013.

1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of Council's Planning Scheme and The Department of State Growth's, *A Framework for Undertaking Traffic Impact Assessments*, September 2007, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 25 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004
- Bachelor of Civil Engineering, University of Tasmania, 1995
- Engineers Australia: Fellow (FIEAust); Chartered Professional Engineer (CPEng); Engineering Executive (EngExec); National Engineers Register (NER)

1.4 Project Scope

The project scope of this TIA is outlined as follows:

- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

1.5 Subject Site

The site is located within the Renison Tin Mine. The proponent is Bluestone Mines Tasmania Joint Venture Pty Ltd (BMTJV), who manages Renison on behalf of the Joint Venture partners.

The existing Renison tin mine and processing plant is located in Western Tasmania on Crown Land within the 4,662-hectare consolidated BMTJV Mining Lease 12M/95. The site is adjacent to the sealed Murchison Highway which provides vehicle access connecting the site to Burnie, 136 kilometres to the north. TasRail's currently non-operational Melba Line (formerly named the Emu Bay Line) passes next to the mine and connects Zeehan with Burnie where export shipping facilities are established.

The west coast of Tasmania experiences relatively extreme weather conditions, notably high yearly rainfall due to frontal systems. Elevated, inland areas are susceptible to snow and icy conditions hence the Murchison Highway and other roads in this area may be closed due to unfavourable weather circumstances. Road closures have been reported to affect the Rension Mine up to 2 times per year.

The subject site and surrounding road network is shown in Figure 1.

Figure 1 BMTJV Site Access and Internal Road Network

Image Source: Project Notice of Intent (October 2020)

1.6 Reference Resources

The following references were used in the preparation of this TIA:

- BMTJV, *Paste Backfill Plant NOI*, 2020
- West Coast Interim Planning Scheme, 2013 (Planning Scheme)
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2019
- Environmental Protection Authority, *Guidelines for Preparing an Environmental Impact Assessment*, 2019
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2017
- Department of State Growth, *A Framework for Undertaking Traffic Impact Assessments*, 2007
- Roads and Maritime Services NSW, *Guide to Traffic Generating Developments*, 2002 (RMS Guide)
- Roads and Maritime Services NSW, *Updated Traffic Surveys,* 2013 (Updated RMS Guide)
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1)

2. Existing Conditions

2.1 Transport Network

For the purposes of this report, the transport network consists of Murchison Highway and the internal roads associated with the mine site.

2.1.1 Murchison Highway

The Murchison Highway is a 147-kilometre highway linking Somerset (near Burnie) located in the north-west of Tasmania to Zeehan situated near the west coast. However, the proposed development will utilise the section of Murchison Highway between the intersection with Zeehan Highway and the intersection with Ridgley Highway which provides a direct link to the Burnie Port.

The Murchison Highway is a Category 3 road, described as being one of the 'main access roads to Tasmania's regions, carrying less heavy freight traffic than regional freight roads' under the Tasmanian State Road Hierarchy. Category 3 Roads are of strategic importance to regional and local communities and economies; they link important towns to the Category 1 and Category 2 roads.

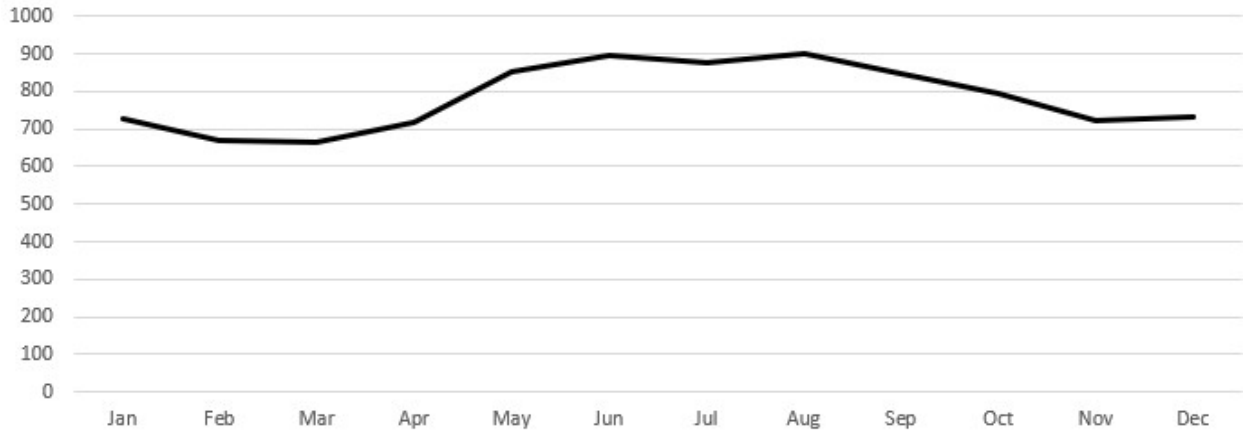
According to the Department of State Growth (DSG), the Highway is a key freight and passenger route connecting the west and north regions of Tasmania and is critical for the movement of mining product to Burnie Port for export, and to other locations within Tasmania, with the majority of mining freight moved via this road. Traffic volumes on Murchison Highway are summarised in Table 1.

Table 1 Murchison Highway Traffic Volume Summary

Location	Survey Year	AADT	% Trucks
Rosebery	2017	1,375 vpd	19.9% (274 tpd)
Renison Bell	2017	775 vpd	18.9% (147 tpd)
Staggs Corner	2018	904 vpd	19.2% (174 tpd)

The seasonal variation of traffic volume on the Murchison Highway is shown in Figure 2. The traffic volume varies between 670 and 900 vehicles per day throughout the year. The peak flows on Murchison Highway vary between 80 and 120 vehicles per hour, with the PM peak being slightly more dominant than the AM peak.

Figure 2 Murchison Seasonal Traffic Volume



The Australian and Tasmanian governments have allocated funding to continue upgrading the Murchison Highway under the Heavy Vehicle Safety and Productivity Program. The project involves widening and strengthening the road to more safely cater for heavy vehicle access, as well as improving safety for all road users by installing road safety barriers and improving visibility of oncoming traffic in specific areas.

2.1.2 Internal Road

The internal mine roads associated with the PBP are privately owned and maintained and not available to the public. These roads are unsealed. The connecting road near the PBP entry and exit are shown in Figure 3 and Figure 4 respectively.

Figure 3 Internal Road Near PBP Entry

Figure 4 Internal Road Near PBP Exit

2.2 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

Crash data was obtained from the Department of State Growth for a five year period between 1st January 2016 to 31st December 2020 for all roads within the Renison-Bell region.

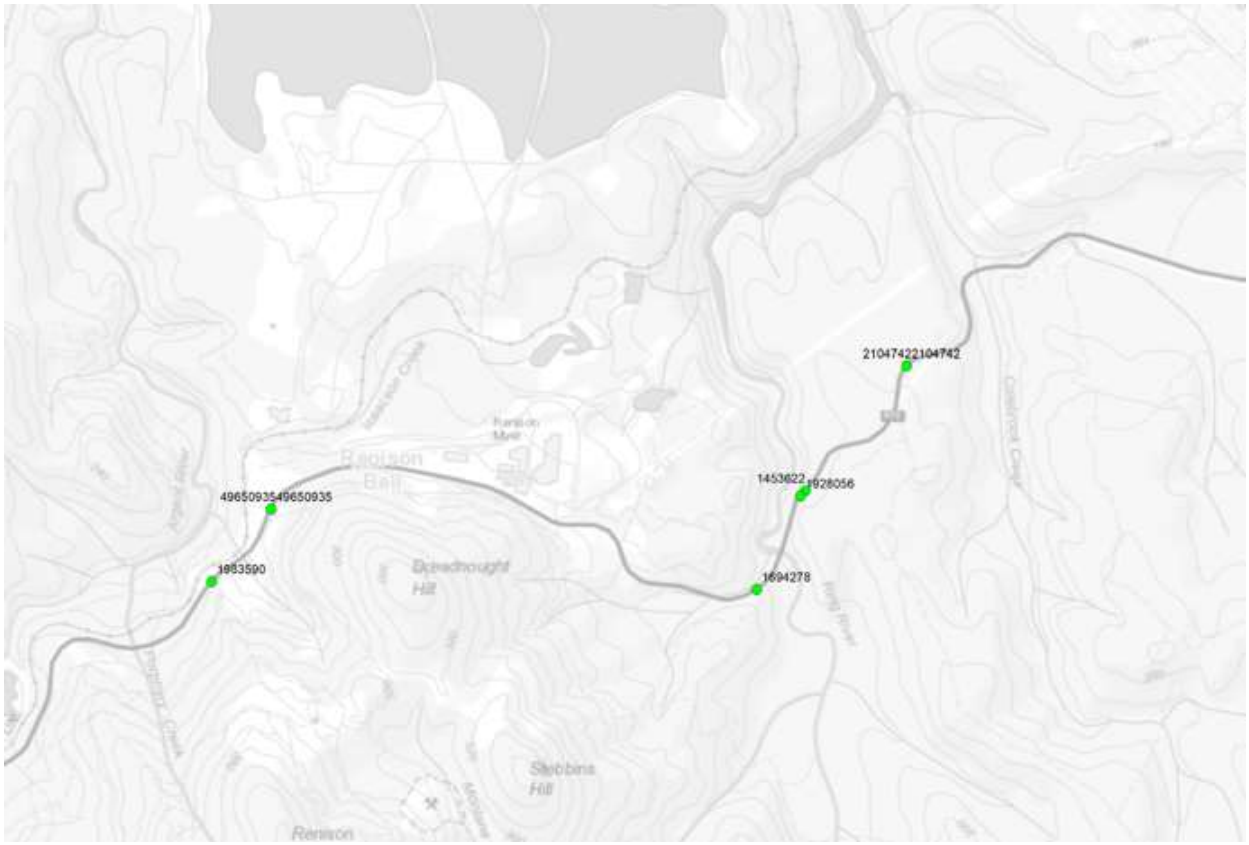
The findings of the crash data is summarised as follows:

- No crashes were reported within the internal roads associated with the Renison Mine.
- A total of 6 crashes were reported on the Murchison Highway during this time. The crash locations are shown in Figure 5.
- Severity. 1 crash involved minor injury; 5 crashes involved property damage only.
- Day of week. 3 crashes were reported on weekends (2 x Sundays and 1 x Saturday). 2 crashes were reported on Thursdays and 1 crash was reported on a Friday.

- Time of day. All crashes were reported between 5:40am and 7:30pm. There was no crash pattern by time of day.
- Vehicle classification. All crashes involved light vehicles (cars).

The crash data does not indicate that there are any pre-existing road safety deficiencies in the road network in close proximity to the mine.

Figure 5 Crash Locations



Source: Department of State Growth

2.3 Existing Mine Operations

Renison is the only major tin mine in production within Australia and one of the world's largest underground tin mines. The operation consists of an underground mine, a mineral processing facility and tailings storage facilities (TSF), named A-B Dam, C Dam and D Dam. The existing Renison mine and processing plant has been operated for approximately 50 years by several owners.

Renison currently produces approximately 7,000 tonnes of tin in concentrate per annum. At current production rates, the existing Ore Reserve is sufficient for a further 8 years of mining. The Proponent's strategy is to maintain an 8-year Ore Reserve by replenishing its mining depletion from its resource base, as well as continuing to grow the existing resource base. Based upon the long history of operations, the current resource inventory, exploration upside and strong cash flows, the Proponent is confident that Renison will remain a long-life profitable operation.

In 2016 work commenced on the construction of a new TSF, named D Dam (completed in 2018), providing approximately 6.5 million cubic meters of additional tailings storage capacity, equivalent to 16 years of storage at current production rates.

The current workforce of the Renison mine is mainly based in Zeehan which was established as a mining town in 1882 and is a part of the West Coast Council local government area (LGA). The LGA includes towns such as Rosebery, Zeehan, and Queenstown, Strahan and Tullah. According to the 2016 Australian Bureau of Statistics (ABS) census data, the three main settlements within 20 km of Renison are Rosebery (population 708), Zeehan (population 712) and Tullah (population 163). The current Renison Mine employs 260 workers, averaging 150 employees on site per day. Approximately 50% of the current workforce are from the LGA while 50% are from other areas and as such are classified as drive-in drive-out (DIDO) workforce.

The current traffic generation of the mine is typically less than 200 vehicle movements per day (two-way). Detailed traffic generation information is provided in Section 4.1.1.

3. Proposed Development

3.1 Development Proposal

Bluestone Mines Tasmania Joint Venture (BMTJV) propose development of a paste backfill plant (PBP) adjacent to the existing tin process plant at Renison Tin Mine. The PBP will dewater Casserite Flotation Tailings (CFT) to make a filter cake which can be temporarily stored and then made into a paste for mixing with a binder to facilitate its use underground in backfilling stope closure operations.

The PBP construction and operational processes are outlined as follows:

General Construction Activities

- Construction of Paste Backfill Plant. This will either be transfer of Henty Mine Plant or design and construction of new plant on-site.
- Bulk earthworks.
- Construction of pipeline corridors.

Operational Activities

- Transfer of tailings.
- Filtration of tailings.
- Paste mixing and delivery.
- Binder storage and dosing.

The proposed construction of the PBP will have the following key transport impacts:

- Existing contract and shift personnel will be employed during the construction phase so there will be no change in traffic to and from the site in relation to construction personnel.
- Additional heavy vehicles associated with the transportation of infrastructure and materials to site.

The operation of the proposed PBP will result in the following transport impacts:

- There will be 3 additional employees employed for operations resulting in additional passenger cars to and from site.
- There will be regular additional supply vehicles to site for delivery of binder and other supporting material inputs (such as diesel). These materials are relatively low volume and only result in minor increase in truck movements.

The proposed PBP is to be constructed on a modified area of land in close proximity to the existing Renison Tin Mine Process Plant as shown in Figure 1.

4. Traffic Impacts

4.1 Traffic Generation

The traffic generation of the proposed PBP was assessed in two stages: construction phase and operational phase. This was compared to the existing mine traffic generation for the purposes of assessing the likely impacts of the PBP generation.

4.1.1 Existing Mine Traffic Generation

Existing traffic generation consists of current capital works construction activity and operational mine activity. Traffic activity at the mine was assessed for a 24-hour period in January.

Shift times for most employees are from 06:00 – 18:00 for day shift, 18:00 – 06:00 for night shift. Some variation occurs in shift times however, with some sections commencing their shifts at 05:30 or 17:30. There are also some other variations with Admin staff who generally start at 07:00 or 08:00, depending on their role.

A 24 hour survey noted 93 light vehicles entering site and 37 trucks accessing the site.

This can be broken down into:

- 21 employee light vehicles;
- 72 non-employee light vehicles; and
- 37 heavy vehicles (trucks)

This equates to 186 vehicles, two-way movements over a 24-hour period.

4.1.2 PBP Traffic Generation

Construction and operational traffic generation were estimated from first principles as follows:

- Construction phase – the construction phase of the project will be dayshift work, five days per week. Existing construction contract and shift personal will be utilised for the construction phase of the project. Traffic generation associated with the construction phase will be associated with materials delivery. During peak times it is estimated that up to 4 heavy vehicle trips will be generated by the construction activities (consisting of 2 trucks with 1 inward and 1 outward movement).
- Operational phase – three staff will be associated with the operational phase of the project. The staff movements will generate 4 vehicle trips per day assuming car occupancy of 2 people per vehicle with two movements per day for each vehicle (rounding up from 1 x inward and 1 x outward trips). Heavy vehicle trips associated with the operational phase will consist of several heavy vehicle movements per week.

The construction phase traffic generation of the PBP represents an increase of 2% when compared to the daily mine traffic activity.

The operational phase traffic generation of the PBP represents an increase of less than 3% when compared to the daily operational traffic movements associated with the mine.

4.2 Trip Distribution

The trip distribution has been assumed as follows:

- 90% of heavy vehicle movements will approach the site on Murchison Highway from the north and return in that direction based on utilisation of Burnie Port and supply of most operational inputs from the north-west and northern parts of the State.
- 10% of heavy vehicle movements will approach the site on Murchison Highway from the south and return in that direction based on supply of some operational inputs from Hobart.
- Workforce for the current Renison Mine and proposed development travel each work day between the mine site and Zeehan or Rosebery. It has been assumed 50% reside in each township.

4.3 Access Impacts

The existing site access connects to Murchison Highway at a wide T-junction with Murchison Highway having priority (in accordance with the T-junction rule). The junction layout is shown in Figure 6.

Figure 6 Existing Murchison Highway Site Access

View east at site access

View west at site access

4.4 Sight Distance

The existing mine road access at Murchison Highway was assessed in terms of sight distance. The Austroads publication, *Guide to Road Design, Part 4A: 'Unsignalised and Signalised Intersections',* 2019 (Austroads Guide) states that Safe Intersection Sight Distance (SISD) should be provided on the major road at any intersection.

SISD provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation (e.g. in the worst case, stalling across the traffic lanes), and to decelerate to a stop before reaching the collision point. SISD allows for a 3 sec observation time for a driver on the priority legs of the intersection to detect a problem ahead (e.g. car from minor road stalling in through lane), plus the Stopping Sight Distance (SSD).

A small sample of vehicle speeds were measured at the site's access using a radar device. The 85th percentile speed was estimated to be 70-km/h in both directions. The Austroads SISD requirement for 70-km/h is 151 metres.

It is further noted that Austroads Minimum Gap Sight Distance requirements (MGSD) are 78 metres for a critical gap of 4-seconds (left turn manoeuvre) and 97 metres for a critical gap of 5-seconds (right turn manoeuvre) and an 85th percentile speed of 70-km/h. MGSD is based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. The MGSD required for the driver of an entering vehicle to see a vehicle in the conflicting streams safely in order to commence the desired manoeuvre. State Growth generally accept MGSD values for existing low risk junctions on the State Road network when sight distance is limited due to geometric or other constraints.

The available sight distance was estimated to be approximately 140 metres to the west and 170 metres to the east. The available sight distance is therefore deficient to the east by approximately 11 metres in accordance with SISD requirements. The available sight distance complies with the SISD requirements to the east. The available sight distance complies with the MGSD requirements in both directions.

The available sight distance at the junction is considered acceptable based on the following:

- It is an existing junction that has been in continuous use for many years.
- The crash data does not provide an indication that there are any road safety deficiencies associated with the junction.
- The available sight distance meets the requirements of MGSD.
- The traffic volumes are very low on Murchison Highway and the minimal increased traffic generation associated with the proposed PBP development will not result in any significant increased risk.

4.5 Internal Road Network

The internal road accessing the proposed PBP will change from one two-way road to a one way arrangement (separate entry and exit roads with the entry road being the current two-way road).

The design of the internal roads will need to safely accommodate the design vehicles associated with the ongoing operational requirements of the PBP.

4.6 Road Safety Impacts

The traffic generation associated with the PBP represents a relatively small increase of the operational traffic associated with the site as a whole. The crash history does not provide any indication that there are pre-existing road safety deficiencies in the network.

The very low traffic generation (and hence negligible increased risk exposure) of the PBP proposal will not cause any significant detrimental impacts on the transport network.

5. Parking Assessment

5.1 Planning Scheme Requirements

West Coast Council's Interim Planning Scheme 2013 outlines the parking and loading/unloading provisions required for various uses. These requirements are stated in *E9 Traffic Generating Use and Parking Code*.

Acceptable Solution A1 of Clause E9.5.1 of the Planning Scheme states "*Provision for parking must be the minimum number of on-site vehicle parking spaces must be in accordance with the applicable standard for the use class as shown in the Table to this Code*".

In table E9.1 Provision of Parking Spaces and Loading Areas, the proposed development is considered to be in Use Class 'Extractive industry'. As such, the following requirements must be met:

- Minimum Parking Space Requirement – No requirement; Spaces must be provided to service the likely workforce and attendance on the land.
- Minimum Loading Area Requirement – 1 x articulated truck space.

The Planning Scheme parking and loading/ unloading provisions have been met based on the area that will be set aside to cater for staff and loading associated with the operational phase of the PBP (noting that five staff will be required for the operation of the PBP).

5.2 Parking Provision

The existing car park for employees is located before the gatehouse (ie restricted access to site) and is sufficient for a large number of vehicles. Light vehicles and heavy vehicles entering the mine site must have prior approval and upon arrival are registered by security personnel to ensure location whilst visiting on site is known and vehicle movements can be managed.

The car parking provision is sufficient for the three proposed operational staff associated with the PBP proposal.

6. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed development near the existing Renison Mine site situated on Murchison Highway between Zeehan and Rosebery in Tasmania's west coast region. The development involves the construction and operation of a new paste backfill plant at Renison that will operate concurrently with the existing mine and processing plant.

The key findings of the TIA are summarised as follows:

- During operation, the proposed PBP development generates up to 5 vehicles per day (consisting of 4 staff vehicle movements and occasional truck movements).
- The traffic generated by the operational phase of the PBP project will not have any significant adverse impacts on the transport network in the context of the network's capacity and efficiency, noting that it is a relatively insignificant increase from the traffic generated by the mine site as a whole (less than 3% increase in traffic generation compared to the existing mine traffic generation).
- Construction activity will utilise existing site contract and shift workers and therefore will not generate additional staff construction traffic. A small amount of additional heavy vehicle traffic will be generated associated with transport of construction infrastructure associated with the PBP. This will consist of several truck movements per day (2% increase in vehicle movements compared to the existing operational mine traffic generation).
- The impacts associated with the construction phase of the project are considered to be minimal in the context of the road network's capacity and efficiency due to the relatively small overall heavy vehicle increase.
- The existing mine access at Murchison Highway is considered to be safe and will provide an appropriate level of efficiency. This is based on the relatively high road safety performance of the relevant section of the Murchison Highway, the acceptable sight distance, and the relatively low volumes using the access.
- The existing car parking provision at the mine is sufficient for the three proposed operational staff associated with the PBP proposal.

Based on the findings of this report the proposed development is supported on traffic grounds.

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