Appendix 12.
Fountain Head Gold Project – Traffic Impact Assessment

ERIAS Group Pty Ltd

Fountain Head Gold Traffic and Transport Assessment
Traffic Impact Assessment

April 2021

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1. Introduction

1.1 Purpose of this report

GHD has been engaged by ERIAS Group to prepare a Traffic Impact Assessment report which will form an Appendix to an Environmental Impact Statement for the Fountain Head Gold Mine. This report seeks to assess the traffic impacts of the traffic generated by the operation of the Fountain Head Mine on the surrounding road network.

1.2 Scope and limitations

This report: has been prepared by GHD for ERIAS Group Pty Ltd and *may only be used and relied on by ERIAS Group Pty Ltd for the purpose agreed between GHD and the ERIAS Group Pty Ltd as set out in section 1.1 of this report.*

GHD otherwise disclaims responsibility to any person other than ERIAS Group Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.3. of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by ERIAS Group Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has not been involved in the preparation of the Environmental Impact Statement and has had no contribution to, or review of the Environmental Impact Statement other than in the Traffic Impact Assessment. GHD shall not be liable to any person for any error in, omission from, or false or misleading statement in, any other part of the Environmental Impact Statement

1.3 Assumptions

This report has been prepared at a preliminary stage of the development application with limited traffic data available. A number of assumptions have been made associated with the Traffic Assessment section outlined in Section 4.

1.4 Background

1.4.1 Overview of the Fountain Head operation

PNX Metals Limited ('PNX' or 'Company') is a publicly listed Company (ASX: PNX). PNX hold a significant base and precious metals tenement portfolio, primarily in the Northern Territory, and also in South Australia. The Company's focus is the development of the Fountain Head Gold Project, incorporating the mining of the Fountain Head gold deposit, and the processing of the ore via a CIL processing circuit which will also be constructed on site.

Fountain Head project area is located approximately 170 kilometres (km) south of Darwin in the Northern Territory. It is situated approximately 50 km south east of the Adelaide River Township and is approximately 13 km east of the Stuart Highway, as shown in Figure 1.

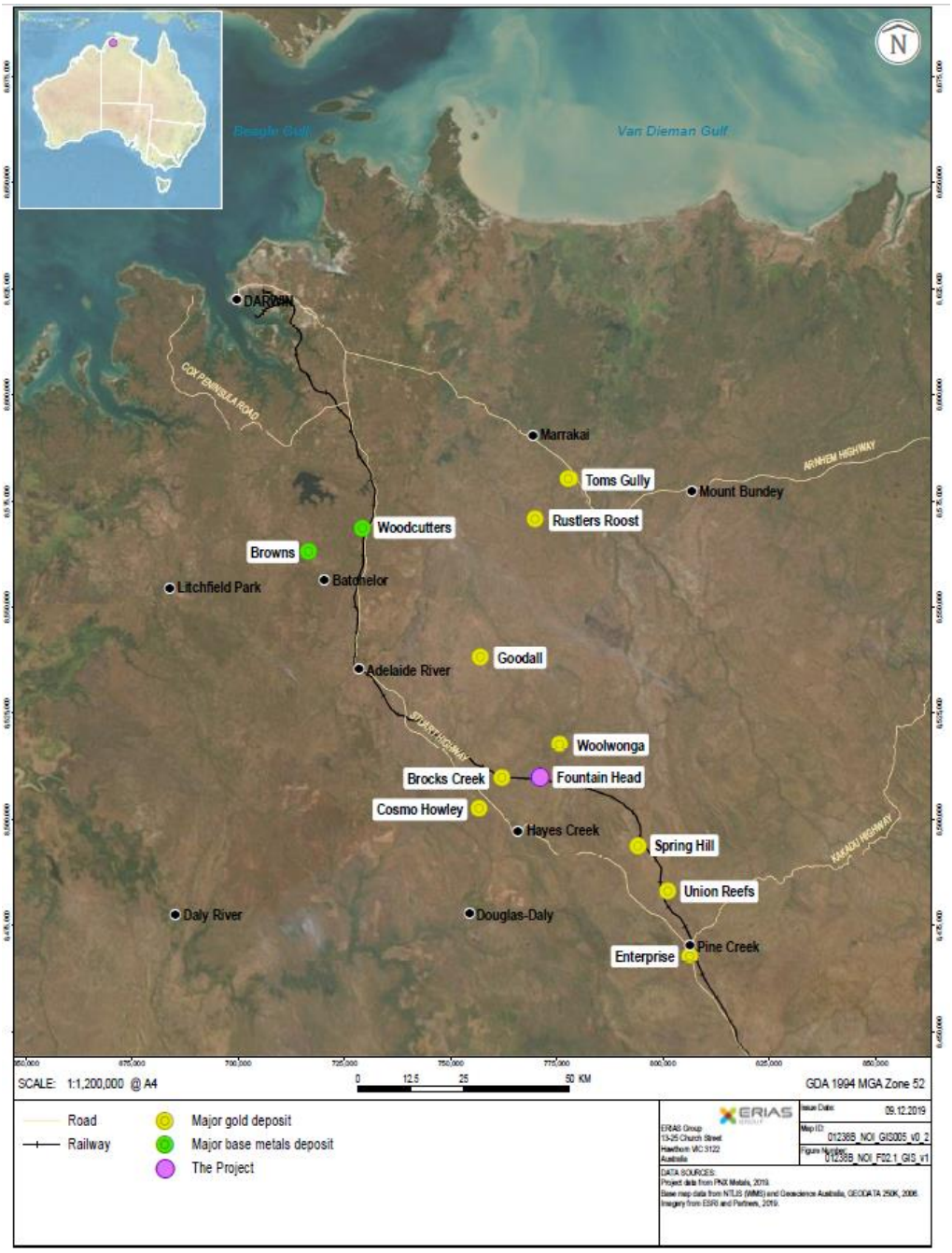


Figure 1 - Regional location

1.4.2 Overview of Fountain Head Gold Project recommencement

PNX proposes to recommence mining of the Fountain Head pit to extract gold from the ore to produce gold dore. Dewatering of the Fountain Head void is required to enable mining to recommence. Modelling suggests that dewatering would need to occur approximately 6 months prior to mining activity to begin. It is proposed to expand the existing open pit and waste rock stockpile, and the construction of required facilities and support infrastructure.

In order to begin dewatering prior to mining, the environmental approvals structure (shown below) will be a two-phase approach. The dewatering activity (Phase 1) and remaining activity relating to mining and operations (Phase 2), is outlined below.

Phase 1 – Dewatering

- Dewatering of existing open pit
- Construction of evaporation dam

Phase 2 – Construction and mining

- Expansion of existing open pit.
- Expansion of existing waste rock stockpile (WRS).
- Construction of CIL processing plant, crushing and gold processing facilities.
- Co-disposal of tailings within the existing WRS.
- Construction of supporting infrastructure i.e., workshops, power station, roads, offices etc.
- Continued dewatering and evaporation of the pit and evaporation dam.

Transport overview

Ore and other bulk products or by-products will not be required to be transported off-site with the exception of Gold Bullion Dore bars and recyclable waste streams.

The majority of reagents and consumables for the operations will be trucked from Darwin and Adelaide using existing road networks, including a turn off from the Stuart Highway onto Fountain Head Road. The Fountain Head Road leads to Ban Ban Springs Road which is bituminised up to the Glencoe Mine (approximately 2.5 km's north of the Fountain Road / Ban Ban Springs Road intersection). Access to the site will be via Ban Ban Springs Road.

Approximately 540 m to the south of the operation is the Adelaide to Darwin railway line, this rail line has intermittent passenger and freight services which can pass through at any time of day or night.

1.4.3 Traffic assessment of Fountain Head Gold Project recommencement

This assessment has been prepared to examine the potential impact of the proposed operations on the local road transport network. In particular, this assessment considers the potential cumulative road transport impacts of the Fountain Head Operation in the context of other mining developments and background traffic growth upon the recommencement of mining.

A separate Traffic Management Plan report will assess the construction traffic associated with activities for readying the site for the recommencement of mining. Construction traffic has been confirmed to be more than operational traffic.

This assessment has focussed on the long-term effects of operational traffic exclusively.

1.5 Reference materials

- Traffic Impact Assessment – Stats, PNX Metals, 2020
- NT Traffic Stats & FH CIL Projections_20210223. PNX Metals, 2021
- Fountain Head Gold Project - Traffic & Transport Scope of Work, ERIAS Group, April 2020
- ATSB Transport Safety Investigation Report – Rail Occurrence Investigation 2006/015 – February 2008
- Annual Traffic Report 2019, Department of Infrastructure, Planning and Logistics, 2019.
- Austroads Guide to Road Design Part 4 – Intersections and Crossings

1.5.1 Traffic data

Traffic data was taken from the above-mentioned Annual Traffic Report.

Crash history (21052020 Stuart Hwy) was requested and was received on 21/05/2020 from DIPL Road Safety Team for the section of Stuart Highway in the vicinity of Fountain Head Road.

Rail crossing information was requested and supplied by AustralAsia Rail Corporation on 26/05/2020.

2. Existing conditions

2.1 Road network

The transport network that will carry traffic from the Fountain Head Operation includes major highways and minor roads. A desktop assessment of the road network has been undertaken and is described in the following sections and in the figure below:

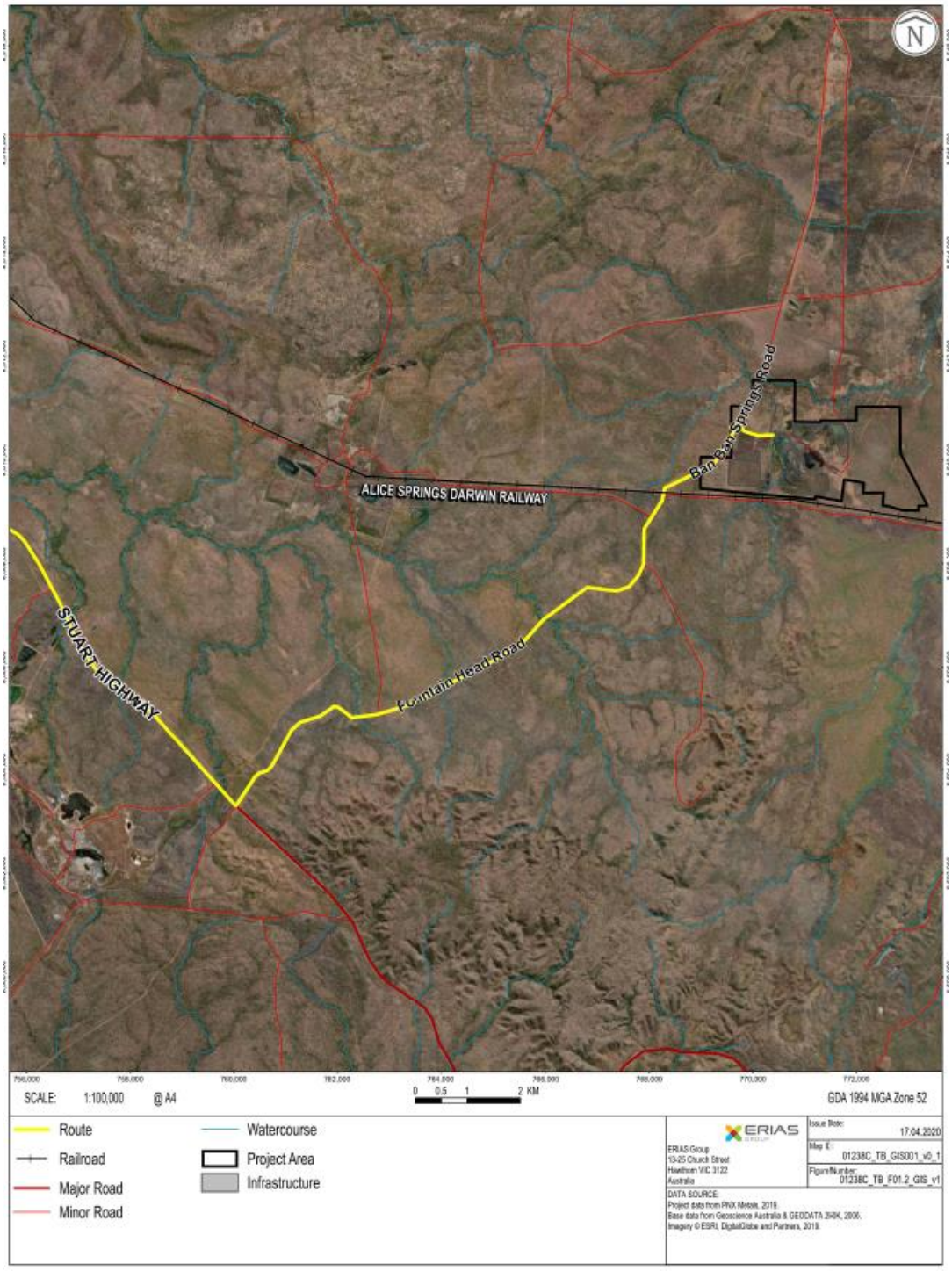


Figure 2 - Road network in vicinity of site

2.1.1 Stuart Highway

The Stuart Highway is the major north-south highway connecting Darwin with Adelaide in South Australia and is part of the National Land Transport Network. It is used for freight and tourism traffic and is managed and maintained by DIPL.

The Stuart Highway is typically constructed to a rural highway standard, with one lane travelling in each direction, additional turning lanes at key intersections and a posted speed limit of 130 kilometres per hour (km/h). Through townships and urban centre (such as Darwin and Adelaide River) Stuart Highway is an urban arterial road with a reduced speed limit.

There are no current plans for any major upgrades on the Stuart Highway.

2.1.2 Fountain Head Road (east)

Fountain Head Road (east) is managed and maintained by DIPL and is a standard sealed rural road with one lane in each direction. The sealed width is approximately 6.6 meters with no shoulders. Fountain Head Road originates at Stuart Highway and continues for approximately 11.3 km up to the Adelaide-Darwin Railway crossing where it continues as Ban Ban Springs Road.

2.1.3 Ban Ban Springs Road

Ban Ban Springs Road is a private, partially sealed road that originates as the continuation of Fountain Head Road (east) at the Adelaide-Darwin Railway Crossing. Ban Ban Springs Road is approximately 11 km in length, with only the first 4.5 km north of the rail crossing with sealed pavement. There is an access gate 100 m beyond the level crossing.

The level crossing is passive controlled via stop signs on the road approach and was the site of a collision between the Ghan Passenger Train and a road-train in December 2016. This is further outlined in the traffic assessment in Section 4.5.

2.1.4 Mount Wells Road

Mount Wells Road is managed and maintained by DIPL and runs parallel to the Adelaide-Darwin Railway Line and is an unsealed road.

It runs from the intersection with Fountain Head Road to Kakadu Highway approximately 80 km to the south-east. Mount Wells Road crosses the railway line at several points along its length. There are also several adjoining roads leading to Stuart Highway such as Grove Hill Road.

A load limit sign for Mount Wells Road exists at Fountain Head Road, at the Stuart Highway.

Mount Wells Road forms part of the Northern Goldfields Loops which is a popular tourist attraction.

2.1.5 Fountain Head West Road

Fountain Head West Road is maintained and managed by DIPL. It runs in a north-south direction between the Stuart Highway and Dorat Road. The road is sealed with one traffic lane in each direction.

2.2 Key intersections

2.2.1 Stuart Highway / Fountain Head Road (east) / Fountain Head West Road

The intersection of the Stuart Highway and Fountain Head Road is a stop sign controlled 4-way intersection.

The intersection currently has basic left and right turn treatments on all legs, with the exception of the left turn from Fountain Head Road onto Stuart Highway (southbound) which provides a wide slip lane / acceleration lane.

An overview image of the intersection is provided below:

Figure 3 - Fountain Head Road / Stuart Highway

2.2.2 Fountain Head Road (east) / Mount Wells Road

The intersection at Fountain Head Road / Mount Wells Road is a skewed T- intersection, with Mount Wells Road forming the minor road. The intersection is uncontrolled.

An overview image of the intersection is provided below:

Figure 4 - Fountain Head Road / Mt Wells Road

2.3 Existing traffic volumes

2.3.1 Daily traffic volumes

The Department of Infrastructure, Planning and Logistics releases an Annual Traffic Report which provides traffic counts on a number of Northern Territory Government roads.

The Stuart Highway has two (2) traffic monitoring stations in proximity to the Fountain Head site to measure the volume and type of traffic. These sites are located 500 m south of Adelaide River (RDVDP003 – 48 km north of Fountain Head Road), and a monitoring point 2 km north of Kakadu Highway turnoff near Pine Creek (RDVDP005 - 61km south of Fountain Head Road).

Similarly, Fountain Head Road has a traffic monitoring station located 2 km east of the Stuart Highway (RDVDC057). The locations of the traffic monitoring stations are shown in the figure below:

Figure 5 - Traffic monitoring locations

The traffic monitoring locations also include the percentage of heavy vehicles as per the Austroads vehicle classification system in the figure below:

AUSTROADS Vehicle Classification System

Level 1 Length (indicative) Type	Level 2 Axles and Axle Groups Axles	Groups	Level 3 Vehicle Type Typical Description	AUSTROADS Classification Class	Parameters	Typical Configuration
	LIGHT VEHICLES					
Short up to 5.5m		1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	d(1) ≤ 3.2m and axles = 2	
Medium 5.5m to 14.5m	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc	2	groups = 3 d(1) ≥ 2.1m, d(1) ≤ 3.2m, d(2) ≥ 2.1m and axles = 3, 4 or 5	
	HEAVY VEHICLES					
	2	2	Two Axle Truck or Bus	3	d(1) > 3.2m and axles = 2	
	3	2	Three Axle Truck or Bus	4	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle, or Rigid vehicle and trailer	6	d(1) > 3.2m, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle, or Rigid vehicle and trailer	7	d(2) < 2.1m or d(1) >2.1m or d(1) > 3.2m axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle, or Rigid vehicle and trailer	8	d(2) < 2.1m or d(1) >2.1m or d(1) > 3.2m axles = 5 and groups > 2	
	≥ 6	> 2	Six Axle Articulated Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	B Double B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6	
	> 6	5 or 6	Double Road Train Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	Triple Road Train Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions: Group: Axle group, where adjacent axles are less than 2.1m apart
Groups: Number of axle groups
Axles: Number of axles (maximum axle spacing of 10m)
d(1): Distance between first and second axle
d(2): Distance between second and third axle

Figure 6 - Austroads vehicle classification

The Annual Average Daily Traffic (AADT) at the three stations are shown below with projected traffic volumes up to 2025 extrapolated from the existing data:

Table 1 - Traffic volumes along Stuart Highway (RDVDP003)

Location		2018	2019	2020*	2021*	2022*	2023*	2024*	2025*
RDVDP003 - Stuart Highway 500 m South of Adelaide River Bridge	Inbound	657	671	688	704	719	735	752	769
	Outbound	649	661	692	714	725	747	770	794
	Total	1306	1332	1380	1418	1443	1482	1522	1564

*Denotes forecasted years

The average heavy vehicle split at this location was determined to be approximately 17.0%

Table 2 - Traffic volumes along Stuart Highway (RDVD005)

Location		2018	2019	2020*	2021*	2022*	2023*	2024*	2025*
RDVDP005 - Stuart Highway 2 km North of Kakadu Highway	Inbound	605	631	640	650	660	669	679	690
	Outbound	586	610	617	623	630	637	644	651
	Total	1191	1241	1257	1273	1290	1306	1323	1340

*Denotes forecasted years

The average heavy vehicle split at this location was determined to be approximately 26.4%.

Table 3 - Traffic volumes along Fountain Head Road (RDVDC057)

Location		2017	2018	2019	2020*	2021*	2022*	2023*	2024*	2025*
RDVDC057-Fountain Head Road - 2 km East of Stuart Highway	Inbound	17		12	12	11	11	10	10	9
	Outbound	16		12	12	11	11	10	10	9
	Total	33		24	24	22	22	20	20	19

*Denotes forecasted years

The average heavy vehicle split at this location as determined to be approximately 21.9%

2.4 Road users

The road users on the surrounding road network are likely to include:

- Buses between Darwin and Katherine, general traffic, tourists and vehicles associated with moving goods and services along the Stuart Highway.
- Tourists, vehicles associated with other mines, and vehicles associated with the Ban Ban Springs Station along Fountain Head Road and Ban Ban Springs Road.

2.5 Crash history

An assessment of the crash history along Stuart Highway within 3 km to the north and south of Fountain Head Road has been undertaken to assess whether there are any particular safety concerns at the Fountain Head Road / Stuart Highway intersection, Over the last 5 years (2015-2019) of available data shows that 9 crashes have been recorded on this section of road.

There have been 6 crashes within 3 km north of Fountain Head Road, one in the vicinity of the intersection between Stuart Highway and Fountain Head Road, and two between the intersection and Dorat Road 3 km to the south. The crash that occurred in the vicinity of the Fountain Road intersection involved a vehicle that ran off the road heading north on the Stuart Highway.

The crash types and fatalities/injuries have been summarised below in Table 4.

Table 4 - Crash history (2015-2019)

Crash type	Number of crashes		
	Total	Casualties	Injured
Hit other Animal	2	0	2
Overturned	3	0	3*
Ran off Road	3	0	6*
Side swipe	1	0	0*

* *Denotes that one of the listed crashes reported no injuries.*

Based on the number and types of crashes, there does not appear to be any specific accident trends associated with this section of road.

3. Proposed development

3.1 Fountain Head operation

It is proposed to recommence mining of the Fountain Head pit to extract gold from the ore to produce gold dore.

Site operations are expected to commence in 2022 and be ongoing for approximately 3-4 years. All required infrastructure and mobile equipment are expected to arrive at the site during the construction phase, prior to the commencement of the project.

Staff will be split into day shift and night shift during operation. All staff are expected to be housed and accommodated at the Kirkland Lake Cosmo Village, located along Fountain Head West Road.

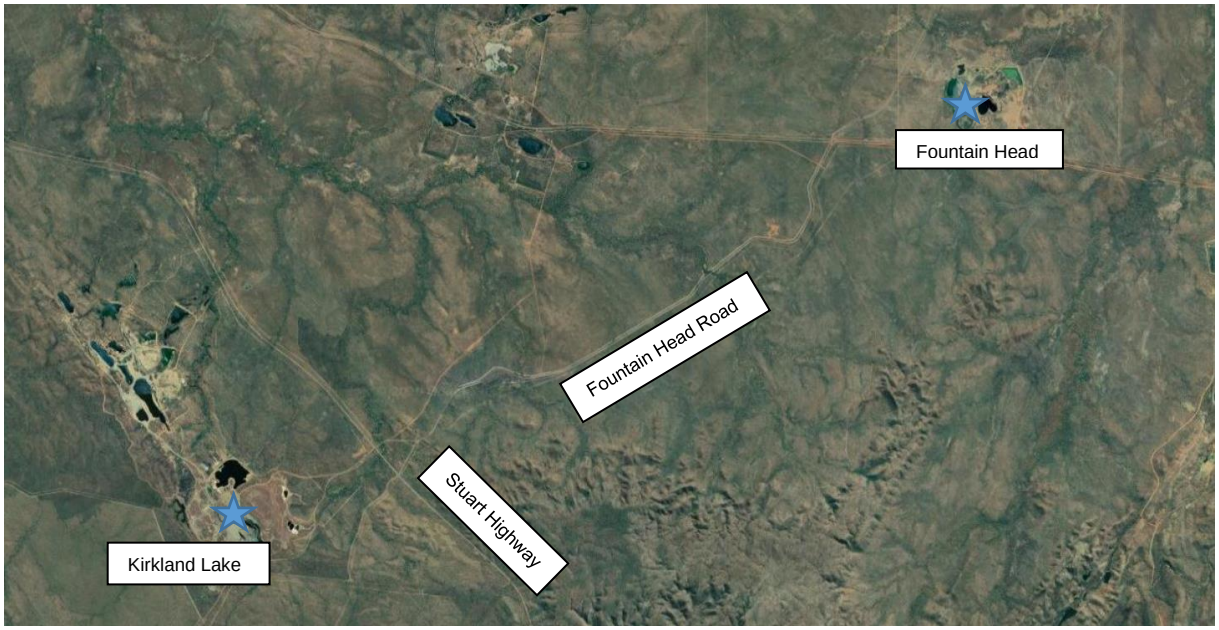


Figure 7 - Map of site operations

4. Traffic assessment

4.1 Traffic generation

The traffic generation for the Fountain Head Operation was determined based on the proposed operational traffic demands. These traffic demands are associated with staff trips for the operation of the site and also trips associated with deliveries to and from the site. These activities are described in the following sections:

4.1.1 Staff traffic generation

The staff details as shown below have been provided by PNX Metals. The following assumptions are made based on the data provided:

- The majority of staff are expected to be transported from Kirkland Lake Cosmo Village to the site via a shuttle bus to reduce the number of vehicular trips along Fountain Head Road and Ban Ban Springs Road. There will be approximately 70 persons housed at the village at any one time (day and night shift).
- The staff shifts are split into day shift and night shifts only, it is assumed that the changeover will occur during the AM and PM peak hour.
- The shuttle bus is defined to be a heavy vehicle.

The table below shows the staff traffic generation during the AM peak and PM peak hours that will occur each day.

Table 5 - Staff traffic generation details

Hour starting	Entering			Exiting			Total
	Number of light vehicle trips	Number of heavy vehicle trips	Total entering	Number of light vehicle trips	Number of heavy vehicle trips	Total exiting	
AM Peak	8	1	9	4	1	5	14
PM Peak	4	1	5	8	1	9	14

4.1.2 Consumable traffic generation

The details for consumable deliveries to and from the site have been provided by PNX Metals. The following assumptions are made based on the data provided:

- All deliveries will be made using heavy vehicles
- The largest size vehicle will be a 25-metre-long B-Double (refer to Class 10 and 11 within Figure 6 for side profile).
- Deliveries will be conducted 7 days a week and during the day outside of peak periods

The table below shows the traffic generation by delivery vehicles.

Table 6 - Delivery traffic generation details

Hour starting	Entering			Exiting		
	Number of light vehicle trips	Number of heavy vehicle trips	Total trips	Number of light vehicle trips	Number of heavy vehicle trips	Total trips
Daily	0	2	2	0	2	2
Monthly	0	75	75	0	75	75

The table below shows the combined traffic generation of the site:

Table 7 - Combined traffic generation details

Hour starting	Entering			Exiting			Total
	Staff	Delivery	Total entering	Staff	Delivery	Total exiting	
AM Peak	9	2	11	5	0	5	16
PM Peak	5	0	5	9	2	11	16
Daily Total							32

The projected Average Annual Daily Traffic (AADT) along Fountain Head Road is 22 vehicles in 2022. The additional combined daily trs generated by the operation of the site (32 trips) will result in an increase of 145%, resulting in a total of 54 trips per day along Fountain Head Road.

Austroads publishes guidance on capacity of roads and traffic lanes, where interrupted flow conditions exist, a traffic lane can carry about 900 vehicles per hour (21,600 movements per day). Although there has been a 145% increase of traffic on Fountain Head Road, the total number of additional trips is considered quite low. Based on the existing daily traffic volumes, Fountain Head Road will have sufficient capacity to cater for the increased traffic generated by proposal. Assuming that all traffic along Fountain Head Road continues onto Ban Ban Springs Road, Ban Ban Springs Road will also have sufficient capacity to cater for the increased traffic generated by the proposal.

The projected AADT along Stuart Highway is 1443 vehicles in 2022, the combined additional trips generated (4 trips) will result in an increase of traffic by 0.3%, resulting in a total of 1447 trips per day along Stuart Highway. Based on the existing traffic volumes and the small percentage increase (<5%) as a result of the development, Stuart Highway has sufficient capacity to cater for the increased traffic generated by the proposal.

4.2 Trip distribution

4.2.1 Staff traffic generation

It is assumed that all staff will be housed at the Kirkland Lake Cosmo Village. The trip distribution at the intersection of Stuart Highway / Fountain Head Road is provided in the following figures for the AM and PM peak periods, with LV representing light vehicles and HV representing heavy vehicles.

Figure 8 - Staff traffic movements at Stuart Highway / Fountain Head Road intersection

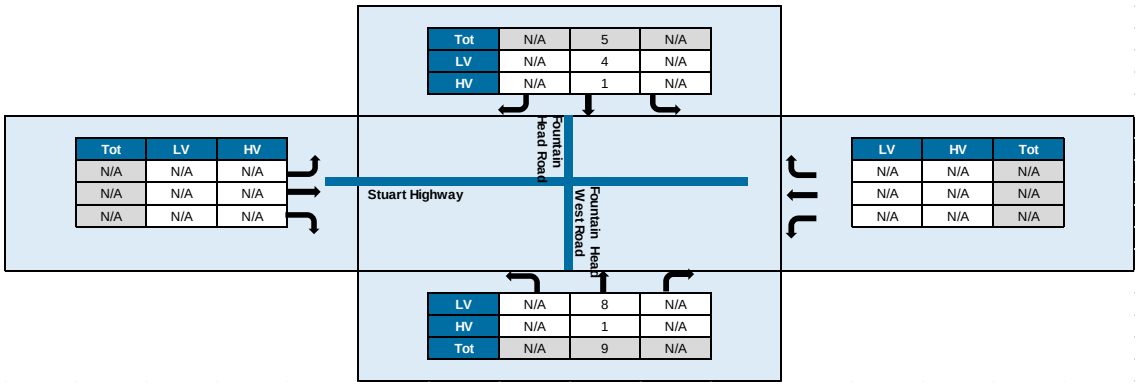


Figure 9 - Staff trip distribution - AM peak

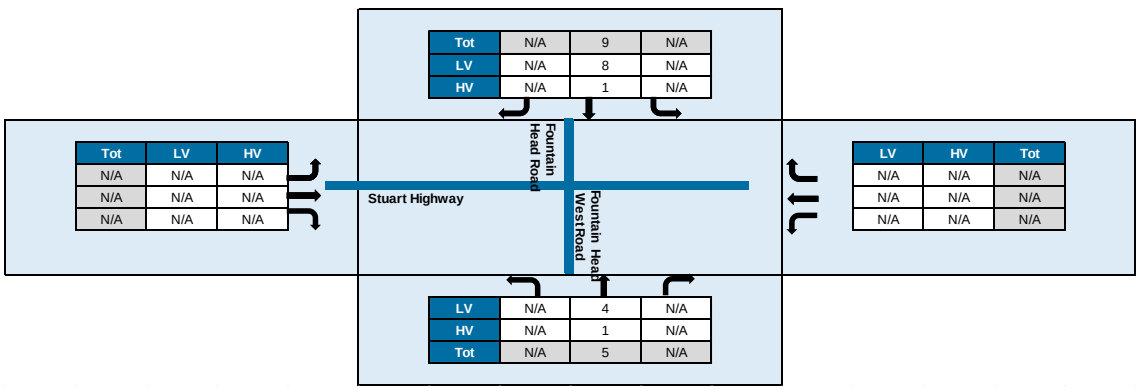


Figure 10 - Staff trip distribution - PM peak

4.2.2 Deliveries traffic generation

It is assumed that all deliveries will be made to and from Darwin and be conducted outside of the peak hours. The figures below show the deliveries made during the day, with LV representing light vehicles and HV representing heavy vehicles.

Figure 11 - Deliveries traffic movements

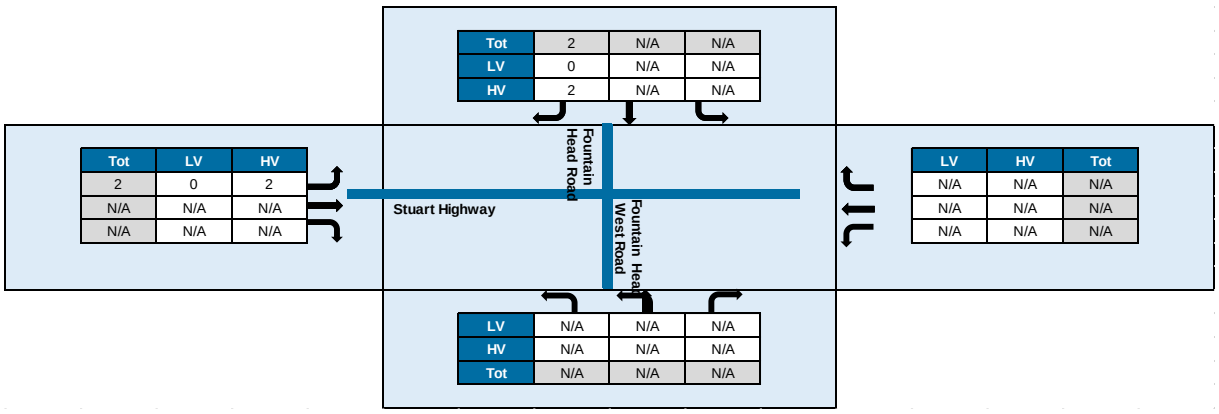


Figure 12 - Deliveries trip distribution (Whole day)

4.3 Stuart Highway / Fountain Head Road intersection assessment

4.3.1 Sight line assessment

A desktop sightline assessment at the intersection of Fountain Head Road and Stuart Highway has been undertaken to determine whether there are sufficient sightlines for vehicles to safely turn out of Fountain Head Road onto Stuart Highway. The assessment shows that there are clear sightlines to both the north and the south of Stuart Highway from Fountain Head Road, with vegetation cleared for approximately 9 metres from the side of the road.

4.3.2 Warrants for turn treatments

Due to an increase in turning traffic from Stuart Highway into Fountain Head Road, an assessment as to whether an intersection upgrade is warranted to allow vehicles to safely turn into Fountain Head Road has been undertaken.

The following assumptions have been made:

- The section of Stuart Highway around Fountain Head Road will have the same traffic volume as the survey site RDVDP003 (Stuart Highway, 500m South of Adelaide River).
- Based on the reported traffic data, the average year on year growth in two-way AADT at the survey station is approximately 2.49%.
- The directional split will be based on the existing traffic data (approximately 50% in each direction).
- Given the traffic volumes available are provided as AADT, the upper limit of 16% of the overall daily traffic for rural roads will be utilised as per Austroads Guide to Road Design Part 4 to calculate the peak hour traffic. Therefore, the major traffic volume for Stuart Highway is approximately 115 vehicles northbound and 115 vehicles southbound.
- It is conservatively assumed that all vehicular traffic along Fountain Head Road is generated from Darwin (left in / right out).
- It is conservatively assumed that the deliveries will occur during the peak hour for this assessment, however this is unlikely to be the case during operation.
- There is no growth in traffic along Fountain Head Road, with the exception of traffic generated by the proposed development.
- The turn volume is therefore determined to be 2 vehicles.

The assessment below is based on Figure A10(a) from *Austroads Guide to Road Design Part 4 – Intersections and Crossings* for the turn treatment warrants and has been undertaken for the left turn from Stuart Highway into Fountain Head Road.

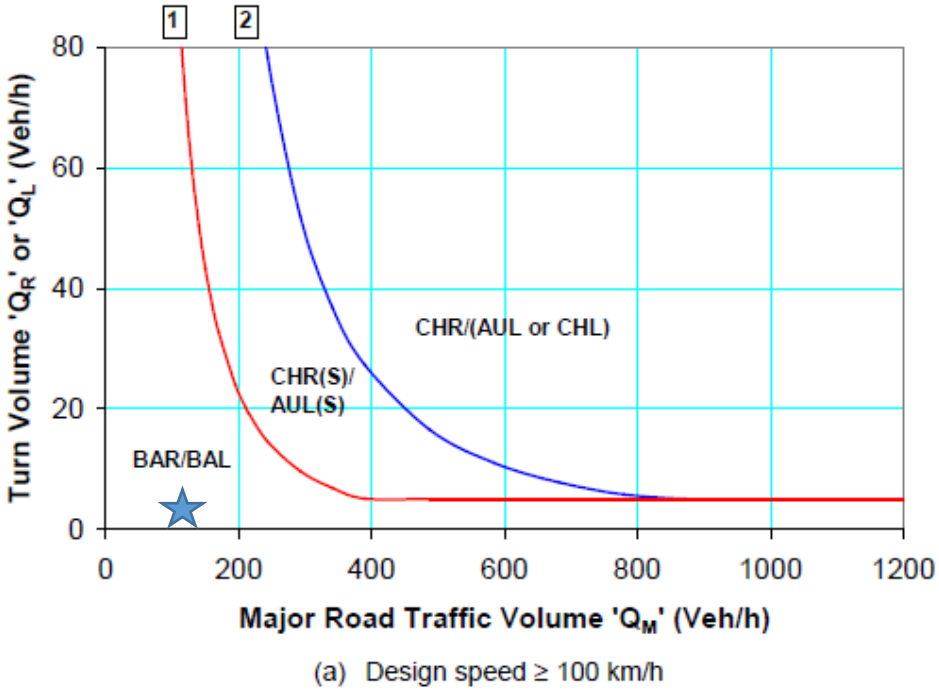


Figure 13 - Southbound (left in) assessment

The assessment is based on the existing major road traffic volume (Stuart Highway) and the proposed volume of traffic turning into Fountain Head Road, as indicated by the star in Figure 13. The assessment shows that a basic auxiliary left (BAL) treatment is considered sufficient in terms of the intersection capacity. The basic auxiliary left turn is depicted in the figure below:

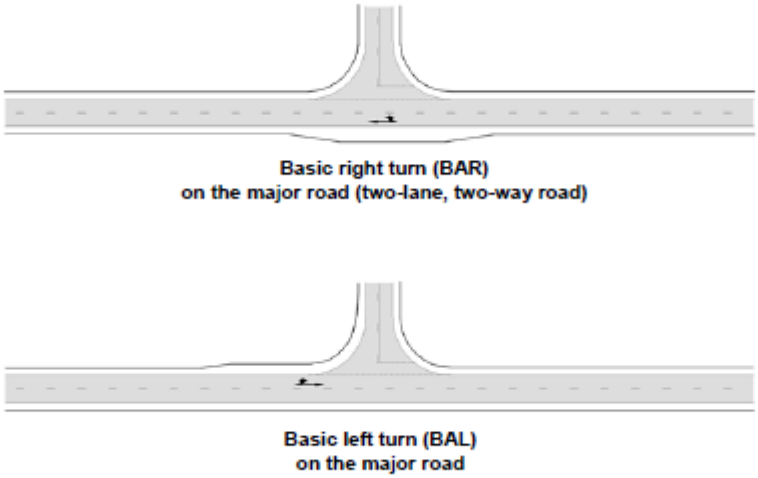


Figure 14 - BAR and BAL treatments (reproduced from Austroads)

The existing left turn treatment at the intersection is a basic auxiliary left turn, so therefore based on the assessment above, the existing turn treatment is considered acceptable.

There are no additional right turn movements into Fountain Head Road from the Stuart Highway generated by the operation of the site, therefore this assessment has not been undertaken.

4.3.3 Swept path assessment

While the type of turning treatment is considered acceptable, an assessment of the geometric design of the intersection will be undertaken via swept path assessment to determine whether the largest size vehicle used within the project will be able to successfully and safely turn into and out of Fountain Head Road from Stuart Highway.

The largest size vehicle is expected to be a 25-metre-long B-Double, used during the deliveries phase of the operation of the site. The swept path assessment has been undertaken of the B-Double turning left into the Fountain Head Road from Stuart Highway without crossing the centreline.

The swept path assessment shows that some widening of the radii will be required to facilitate the B-Double movement at the intersection. Refer to Appendix A for the swept path assessment.

The Ban Ban Springs Station currently use B-Triple road trains to transport cattle to and from the site and undertaken this manoeuvre twice monthly. Based on the swept path assessment, this manoeuvre would require the full width of the pavement for a B-Triple to turn from Stuart Highway into Fountain Head Road.

4.4 Desktop pavement and route review

The majority of operational vehicle trips will involve Stuart Highway, Fountain Head Road, Fountain Head West Road and Ban Ban Springs Road.

A desktop assessment of whether the operational routes are paved is provided below to determine whether the pavements are suitable for the operation of the project:

4.4.1 Stuart Highway

The Stuart Highway is paved with no formal shoulders, but clearings on either side. The line markings are visible along the road.

4.4.2 Fountain Head Road

Fountain Head Road is paved with no formal shoulders. An assessment of the intersection with Stuart Highway shows that the pavement at the intersection is worn, with some cracking, worn line marking and a lot of debris.

4.4.3 Fountain Head West Road

Fountain Head West Road is paved with no formal shoulder and has line marking for the length of the road.

4.4.4 Ban Ban Springs Road

Ban Ban Springs Road is paved for the section which will provide access to and from the Fountain Head Gold mining site.

The number of heavy vehicles is considered to be low during the operational phase of the development. Should any Oversize Overmass (OSOM) vehicles be required for the project, DIPL will require permits for their use on their roads.

4.5 Adelaide to Darwin rail level crossing

An assessment of the Adelaide to Darwin Rail Level Crossing along Ban Ban Springs Road has been undertaken below to determine if the level crossing conditions are suitable for the project.

4.5.1 Crash history

The Ban Ban Springs Level Crossings was the site of a Ghan passenger train and road-train truck collision on the 12th of December, 2006. Based on the ATSB Transport Safety Investigation Report the road-truck train carrying road base material failed to stop and check for oncoming trains and the collision caused the derailment of two locomotives, one motorail wagon

and nine passenger wagons. The train had been traveling northbound and collided with the vehicle. There were two hospitalisations, and several others were treated for minor injuries on site. The driver of the road-train was found to have slowed whilst crossing, instead of coming to a complete stop and checking for oncoming trains.

4.5.2 Assessment of the rail crossing

The ATSB Level Crossing Collision report in December 2006 specified that the existing traffic management arrangement at the Adelaide to Darwin Level Crossing at Ban Ban Springs Road consists of the road traffic control measure of 'stop and give way to trains' signs. A desktop assessment of the level crossing from existing aerial photography suggests that this arrangement is currently in place.

In addition to the signage, it is understood that there is a gate located 100 metres to the north of the rail crossing along Ban Ban Springs Road, associated with the cattle farm. This gate is typically closed until access is required along the road and acts as an informal traffic control measure at the level crossing. It is likely that the gate will remain open during the operation of the site.

GHD has contacted Australasian Rail Corporation in regard to their requirements in determining the standard for the rail/road level crossing.

It is understood that there are currently 12 return train services weekly made up of (4) bulk mining products trains, (6) intermodal freight and (2) passenger services.

The operational traffic will generate 32 movements per day over a three-year period, including 6 heavy vehicle movements.

Australasian Rail Corporation has indicated that a risk assessment of the level crossing will need to be undertaken due to an increase in traffic, to determine whether the current level crossing arrangement is suitable. This is typically done via an Australian Level Crossing Assessment Model (ALCAM) assessment, which takes into consideration the rail and traffic volumes. The ALCAM assessment is typically carried out by a local qualified assessor.

4.6 Impact to other road users

Road users along operational routes include, other mine operators, tourists along the Northern Goldfields Loop and Ban Ban Springs Station homestead. There will be a small increase in traffic associated with the operation of the mine. The Ban Ban Springs Station currently uses B-Triple road trains to transport cattle, however due to their low frequency (two per month) it is not expected to result in any significant delays to any existing road users the area.

The increase in heavy vehicle numbers is considered to be small and the road safety impacts of increased heavy vehicles on the road is considered insignificant.

Refer to GHD's traffic management plan which provides guidance on mine access arrangements and establishes protocols for safe access and mitigations.

5. Conclusions and Recommendations

It is proposed to recommence mining at the Fountain Head mine. The following findings are outlined below:

- The proposed traffic generated by the operation of the site will result in an increased traffic of 145% (32 trips) along Fountain Head Road and 0.3% (4 trips) along Stuart Highway. Both roads have sufficient capacity to cater for the increase in traffic generation.
- An assessment of the warrants for turn treatments at the intersection of Stuart Highway and Fountain Head Road shows that the current basic turn treatments are considered appropriate.
- A swept path analysis shows that the intersection will need to be widened to facilitate the movement of a B-Double turning left from Stuart Highway into Fountain Head Road without crossing the centre line
- A desktop pavement assessment shows the operational traffic routes are sealed.

The following recommendations are outlined below:

- A desktop assessment of the level crossing along Ban Ban Springs Road shows that it is controlled by stop signage and a gate. It is likely that a formal ALCAM assessment will need to be undertaken to review the increased risks associated with the increase in traffic.
- Preparation of a traffic management plan which provides guidance on mine access arrangements and establishes protocols for safe access and mitigations.
- Preparation of a site access procedure for employees to outline and encourage safe and appropriate travel to and from Kirkland Lake Cosmo Village to the site.

Appendices

Appendix A – Swept path assessment

SOME WIDENING MAY BE REQUIRED TO FACILITATE B-DOUBLE ACCESS INTO FOUNTAIN HEAD ROAD

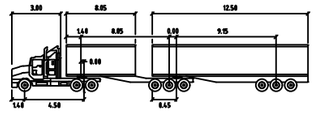
FOUNTAIN HEAD ROAD

FOUNTAIN HEAD WEST ROAD

STUART HIGHWAY

B-DOUBLE 26M
Austroads 2013 (AD)

B-DOUBLE 26M
Austroads 2013 (AD)



B-DOUBLE 26M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 78.0
Trailer Track	: 2.50		

PRELIMINARY

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A	INITIAL ISSUE	FLK	27.05.20

PNX
Fountain Head Gold

Stuart Hwy/Fountain Head Rd Swept Path Assessment

Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
T 61 3 8687 8000 **F** 61 3 8687 8111
E melmail@ghd.com.au **W** www.ghd.com

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GHD

Level 7
24 Mitchell Street
T: 61 8 8982 0100 F: 61 8 8981 1075 E: drwmail@ghd.com

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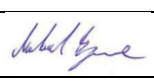
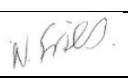
Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	F. Khung	M. Byrne		N. Fries		22.03.2021
1	F. Khung	M. Byrne		N. Fries		14.04.2021

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