

TNG LIMITED

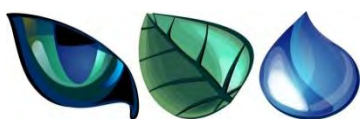
**NOVEMBER
2017**

MOUNT PEAKE PROJECT

ADDENDUM TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Wilora, Northern Territory

Prepared on behalf of TNG Limited by:



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TNG003 – TNG Limited – Mount Peake Project Environmental Impact Statement Addendum
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PROJECT TERMINOLOGY

Abbreviation	Meaning
TNG	TNG Limited
the Project	Mount Peake Project

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AAPA	Aboriginal Areas Protection Authority
ANC	Acid Neutralising Capacity
AMD	Acid and Metalliferous Drainage
ARENA	Australian Renewable Energy Agency
BMP	Biodiversity Management Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESIA	Economic and Social Impact Assessment Report
CDT	Central discharge tower
CMS	Cleaner Magnetic Separators
Cwlth	Commonwealth
DENR	Department the Environment and Natural Resources
DESC	Drainage, erosion and sediment control
EC	Electrical conductivity
EIS	Environmental Impact Statement
GDA	Geocentric Datum of Australia
IWL	Integrated Waste Landform
LIMS	Low Intensity Magnetic Separator
MERI	Monitoring evaluation review and improvement plan
NAG	Net Acid Generation
NBMMP	Non-Benign Materials Management Plan
NT	Northern Territory
NTEPA	Northern Territory Environmental Protection Authority
PAF	Potentially Acid Forming
PV	Solar photovoltaics
RC	Reflux Classifier
RMS	Rougher magnetic slurry
ROM	Run-of-Mine
SIMP	Social Impact Management Plan
TDS	Total dissolved solids
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator
WRL	Waste Rock Landform

LIST OF UNITS

Unit	Meaning
%	Percentage
°	Degree
GL/yr	Gigalitres per year
ha	Hectare
L/sec	Litres per second
m	Metre
mg/L	Milligram per litre
mm	Millimetre
Mtpa	Million tonnes per annum
m ³ /hr	Metres cubed per hour
µg/L	Micrograms per litre
µS/cm	Microseconds per centimetre

1 INTRODUCTION

1.1 BACKGROUND

TNG Limited (TNG) is proposing to develop the Mount Peake Project (the Project) 235 km north-northwest of Alice Springs and 50 km west of the Stuart Highway in the Northern Territory.

The primary objective of the Project is to produce an intermediate feedstock (concentrate) for further processing to extract high value products.

The Mount Peake Project will comprise:

- Mining of a polymetallic ore body through an open-pit truck and shovel operation;
- Processing of the ore to produce a magnetite concentrate;
- Road haulage of the concentrate to a new railway siding and loadout facility on the Alice Springs to Darwin Railway near Adnera; and
- Rail transport of the concentrate to TNG's proposed Darwin processing plant located at Middle Arm, Darwin.

The Project will mine up to 9.4 million tonnes per annum (Mtpa) and following processing will produce up to 1.8 Mtpa of magnetite concentrate for shipping to Darwin.

1.2 PROJECT ASSESSMENT TO DATE

TNG provided a Notice of Intent to undertake the Project in July 2013. Terms of Reference for development of an Environmental Impact Statement (EIS) were released in March 2014 by the Northern Territory Environmental Protection Authority (NTEPA). The EIS was to address both assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cwlth) and the *Environment Assessment Act 2013* (EA Act) and *Environmental Assessment Administrative Procedures 2013* (NT).

TNG submitted a Draft EIS addressing the Terms of Reference in February 2016. Upon consideration by the NTEPA additional information was identified as being required in order to finalise assessment.

A supplementary response document was submitted by TNG to address the information requests in April 2017. The NTEPA subsequently requested further information following submission of the supplementary document to address outstanding items.

TNG representatives met with the NTEPA in June and August 2017 to refine information requests and scopes of work to address the remaining information requirements.

1.3 PURPOSE OF THIS DOCUMENT

This document is provided as an Addendum to the EIS and Supplementary Document; it is a collation of the outstanding information requirements to enable the NTEPA to finalise assessment of the Mount Peake Project.

Key objectives of the Addendum are outlined below:

- To redefine the Project scope, eliminating infrastructure or activities that no longer form part of the Project;
- To supply the information agreed by the NTEPA with TNG representatives in the following documents (all appearing in Appendix 1):
 - *Considerations for the Response Document;*
 - *Surface Water Supplementary Investigation – Scope of Work;*
 - *Adverse Materials Supplementary Investigation – Scope of Work;*
 - *Cultural and Social Impacts Supplementary Investigation – Scope of Work; and*
 - *Biodiversity Supplementary Investigation – Scope of Work.*
- To present a revised Risk Assessment, with consideration for new or alternate infrastructure or activities that appear in the updated Project scope;
- Provide a consolidated Commitments Table for the Mount Peake Project.

2 REVISED PROJECT DESCRIPTION

2.1 PROJECT CHANGES

Chapter 2 of the Draft EIS described the Mount Peake Project; since submission of the EIS, elements of the project have been amended.

Key changes to the Project include:

- Tailings material will be filtered and dry-stacked, resulting in the Tailings Storage Facility (TSF) being removed from the process;
- The Waste Rock Landform (WRL) has been reconfigured as an Integrated Waste Landform (IWL) to allow for co-disposal of waste rock and dry-stack tailings;
- Water requirements for the Project have been reduced due to removal of TSF from the process;
- The disturbance footprint for the Project has been reduced from 1,060 ha to 735 ha.

The facilities proposed as part of the revised Mount Peake Project comprise:

- Open cut pit;
- IWL;
- Run-of-Mine (ROM) pad;
- Four long term stockpiles of up to 4Mt capacity each;
- Explosives and detonator magazines;
- Turkey's nest;
- Process plant comprised of crushing and grinding circuit with magnetic separation;
- Concentrate stockpiles;
- Gas fired power station;
- Borefield, associated water pipeline and power line;
- Fuel farm;
- Gatehouse and weighbridge;
- Administrative buildings, laboratory, workshops and warehouses;
- Accommodation village;
- Laydown and parking areas;
- Internal road network;
- Haul/access road between the mine site and Adnera Loadout Facility including an underpass of Stuart Highway (for concentrate trucks) and intersection with Stuart Highway (for mine site access) with gas pipeline within corridor footprint to mine site; and
- Concentrate loadout facility and rail siding at Adnera.

Further details on amended infrastructure is provided below. Other aspects of the Project remain as described in the Draft EIS.

2.1.1 Revised Processing Overview

Processing at Mount Peake Mine Site involves crushing, grinding and magnetic separation to produce a magnetite concentrate. Throughput of the plant will be 3 Mtpa initially, with an option to double to 6 Mtpa in year 5 of operations. The plant will operate 24/7.

Layouts of the processing facilities are shown in Figure 2-1 and Figure 2-2 and a simplified process diagram is shown in Figure 2-3. Table 2-1 below identifies processing changes from that previously proposed in the Draft EIS.

Table 2-1: Alterations to Processing at Mount Peake Project

Circuit	Previous	Current
Crushing	Two-stage crushing to P80=30mm.	Single stage crushing to P80=150mm. Secondary crushing and cone crushers have been removed.
Grinding and classification	High Pressure Grinding Rolls (HPGR) and ball mill.	SAG, ball mill and pebble crusher (SABC) configuration. Add SAG mill and second ball mill.
Magnetic Separation	Rougher and two-stage cleaner Low Intensity Magnetic Separator (LIMS).	Add Reflux Classifier (RC) after cleaner LIMS to remove silica.
Non-Magnetic Tailings	Thickened and pumped as slurry to TSF.	Filtered dry stack. Add Belt filter after thickener for dewatering tails. Filter cake is stockpiled and trucked to IWL.

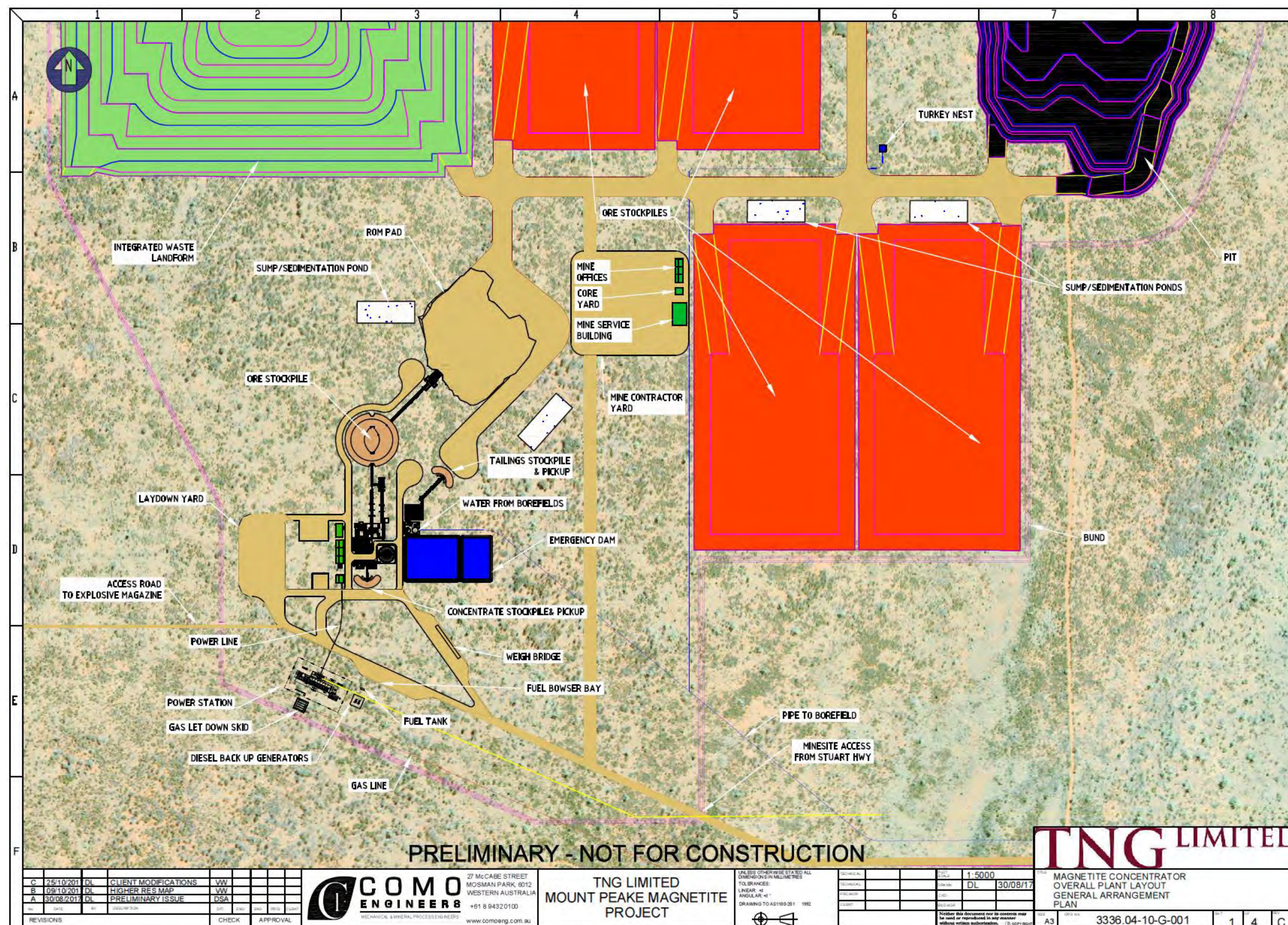


Figure 2-1: Layout of Processing Facilities over Aerial

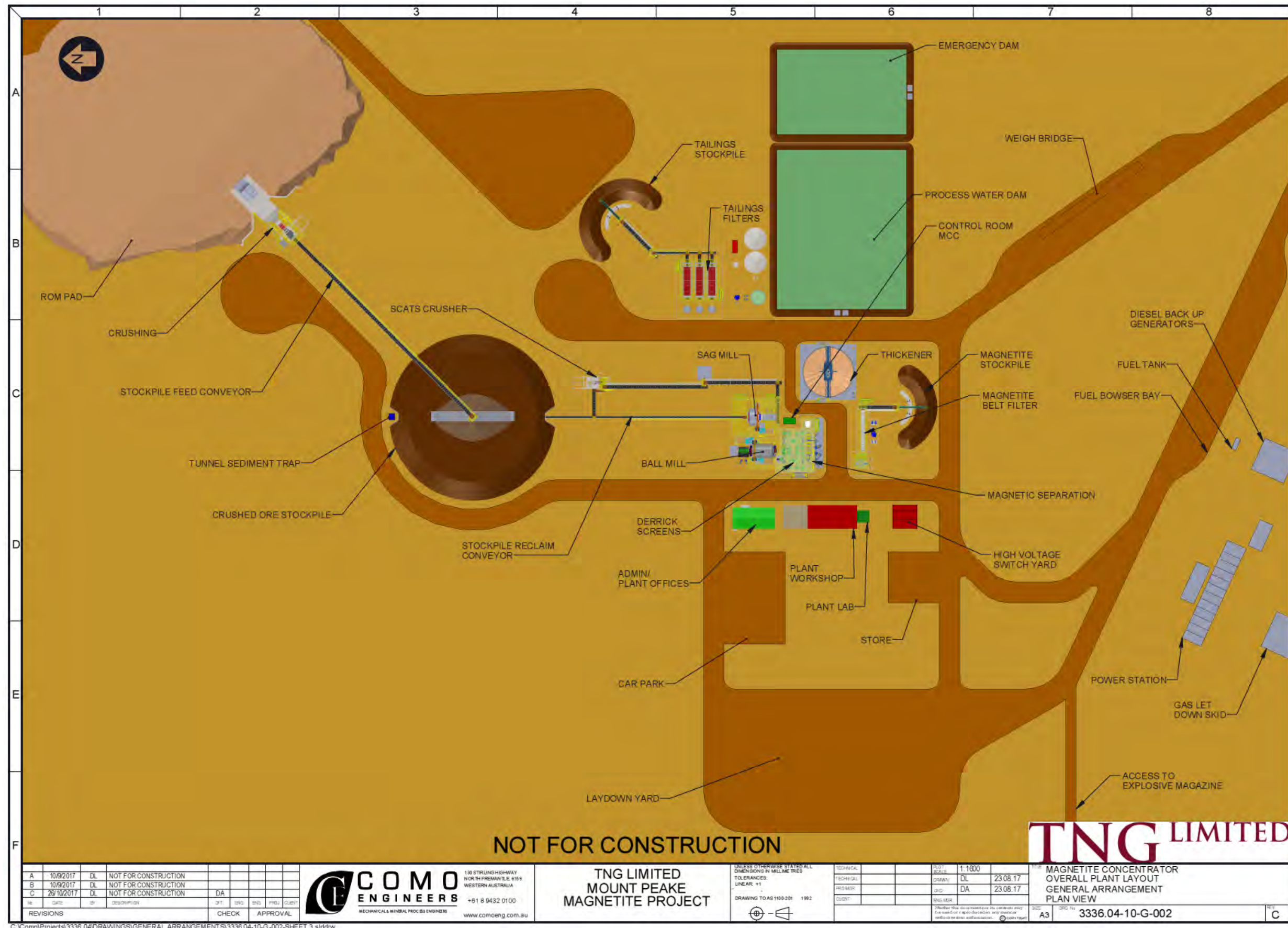


Figure 2-2: Process Facilities General Arrangement

MOUNT PEAKE CONCENTRATOR FLOW DIAGRAM

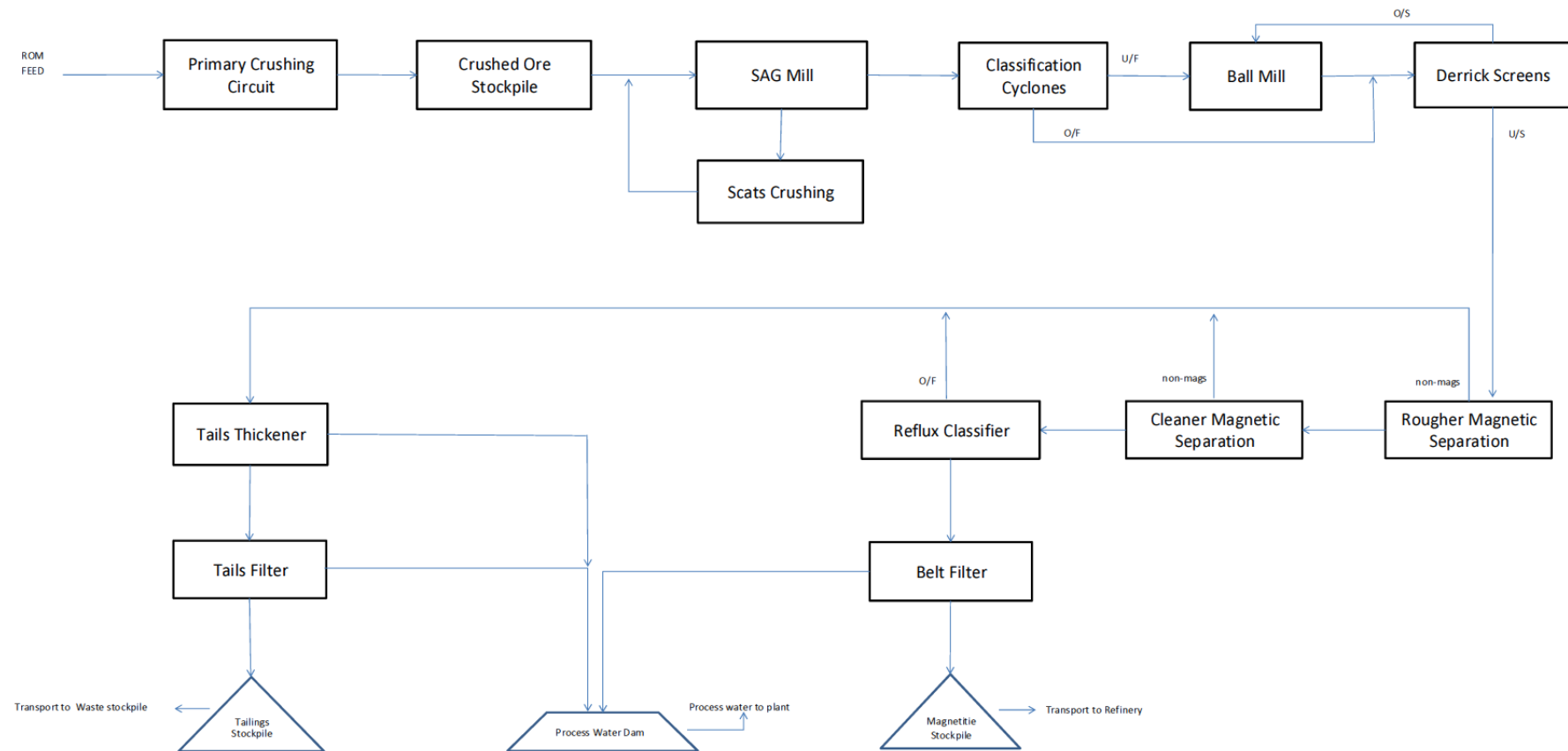


Figure 2-3: Process Flowsheet

Alteration of tailings management from a TSF to co-disposed dry-stack tails within an IWL is a significant change for the Project. Whilst a TSF with a central discharge tower (CDT) presented an economic solution for tailings management, the TSF required water to be added to the tails stream in order that a slurry of 65% w/w was created and could be pumped to the facility. It was recognised that there was risk around the ability to maintain pumping capacity required to pump up the incline ramp of the CDT, the water demand associated with the TSF was significant and the 2.1km diameter footprint for the facility was extensive.

These considerations initiated a review of the Process and an alternative method of waste discharge, dry stacking of the filtered non-magnetic tailings, was assessed by TNG. While the economics of this waste disposal method were not as attractive as the CTD, it was identified that the water usage at Mount Peake would be markedly decreased.

Advantages to producing dry-stacked tailings and co-disposal of tailings with waste rock include:

- Can be used in areas where water conservation is critical and where any water losses can jeopardise plant performance;
- Risks of catastrophic failure and tailings runout associated with conventional storage facilities are eliminated if the IWL is operated as intended;
- Dry stacking is suited to areas of high seismic activity as the construction of retention embankments is prevented;
- Suitable where there is limited construction material available to develop a conventional retention impoundment;
- Progressive rehabilitation is possible, spreading the cost of closure over a longer time period when compared to conventional storage facilities;
- Higher rates of rise can be achieved due to the high dense state of the placed tailings when compared to conventionally deposited tailings;
- Filtered tailings allow better recovery of dissolved metals and process chemicals;
- Groundwater contamination through seepage is anticipated to be negligible.

2.1.1.1 General Description of Process

Once mined, ore is either stockpiled as low-grade material or delivered by truck from the mining operation to a run of mine (ROM) storage pad. A front-end loader will blend the ore if needed, then transfer ore from the ROM pad stockpile to the single stage crushing plant. A conveyor delivers crushed ore to the coarse ore stockpile. Crushed ore reclaimed from the ore stockpile is fed to a SAG mill operating in open circuit with 500mm diameter cyclones. SAG mill cyclone overflow gravitates to the ball mill discharge hopper.

The SAG mill cyclone underflow combined with the derrick screen oversize gravitates to the ball mill for further grinding. Ball mill discharge slurry is pumped to sixteen derrick screens, which operate in closed circuit with the ball mill to achieve correct sizing. Derrick screen undersize slurry is processed in the magnetic separation circuit.

Tailings generated from the magnetic separation and RC circuits are pumped to the tailings thickener for dewatering. Thickener underflow is pumped to the filter plant for further dewatering to produce a filter cake, which is stockpiled and then transported to the IWL.

Magnetite concentrate generated from the magnetic separation circuit is pumped to the magnetite filter for dewatering and stockpiling before transportation.

2.1.1.2 Crushing

A front-end loader will feed ore onto an inclined static grizzly above the ROM bin. Screened oversize material (+500 mm) will be broken by a mobile rock crusher and re-fed into the grizzly.

ROM bin material will be fed to a vibrating grizzly. Screened oversize material (+150 mm) will be crushed in a primary jaw crusher with crushed product mixed with -150 mm material and conveyed to the SAG mill.

2.1.1.3 Grinding

The Grinding Circuit will consist of a SAG mill followed by a ball mill.

Grinding will be conducted as a wet process. Material will be reclaimed from the coarse ore stockpile with a 20,000 tonne (t) live capacity and conveyed to SAG mill, with water added to the feed chute of the mill. A 30mm vibrating screen will remove the oversize and divert it to the scats conveyor.

The SAG mill screen undersize falls into the SAG mill discharge hopper, which is then pumped to the classification cyclones. Process water will be added to the combined mill discharge hopper to dilute the cyclone feed. The classification circuit will consist of two flat bottom cyclones, with one operating and one standby.

The cut size for the SAG cyclones will be a P80 of 500µm. The cyclone underflow will be directed to the ball mill and the overflow will gravitate to the ball mill discharge hopper.

The ball mill discharge is pumped to two primary distributors, which in turn feed two secondary distributors that evenly distribute the slurry. The derrick screen undersize will gravitate to the derrick screen undersize collection hopper.

The cut size for the screens will be a P80 of 150µm, and the circulating load to the ball mill circuit will be 150%, with the derrick screen underflow returning to the ball mill for further grinding. The derrick screen undersize from the screening circuit will be pumped into a boiler box ahead of the wet magnetic separation circuit.

Dilution water will be added to the grinding circuit as required. Grinding media will be added to both mills to maintain the grinding efficiency. Steel balls will be periodically added to the SAG and ball mills.

2.1.1.4 Magnetic Separation

Derrick screen undersize gravitates to a collection hopper before being fed into the rougher LIMS to remove entrained highly magnetic material (magnetite). Process water will be added to the rougher LIMS feed density if needed. Dilution water will be added to the derrick screen undersize hopper as required.

Rougher magnetic slurry (RMS) concentrate then gravitates to a bank of Cleaner Magnetic Separators (CMS) to increase the final concentrate grade. The CMS concentrate gravitates into the Magnetite stock feed tank. Rougher LIMS concentrate is pumped to two cleaner LIMS to lift the final concentrate grade by providing a high degree of selectivity in the separation.

The CMS concentrate gravitates via launders into the Magnetite stock feed tank. Magnetic separation circuit tailings will gravitate to the RC feed tank.

2.1.1.5 Reflux Classification

The LIMS magnetite concentrate stream is pumped to the RC via the RC feed tank, which has a live capacity of 125m³ and acts as a surge facility between the LIMS roughing and cleaning operations. Process water will be added to the RC feed tank to dilute the recleaner LIMS mags feed density. Dilution water will be added to the RC feed tank as required.

Reflux classifier overflow gravitates to the non-magnetic tails collection hopper and the underflow gravitates to the reflux classifier underflow hopper, producing the final, clean magnetic concentrate.

2.1.1.6 Non-magnetic Tails Thickener

Non-magnetic tailings will be pumped to a tailings thickener at a solids density of 14%.

In the event that the thickener is shut-down for maintenance, or if there is tailings thickener overflow, the thickened tailings will be diverted to the emergency overflow dam. The overflow would be removed when the thickener is back online.

2.1.1.7 Non-magnetic Tails Filtration.

The thickened tailings would be pumped to a pressure filter. The tailings filter-cake will have a moisture content of 13% and the excess water recovered through tailings filtration is recirculated to the tailings thickener.

The filtered tailings product will be conveyed to a designated storage area where it will be handled by a front-end loader. Tailings are loaded into trucks and report to the IWL, negating the requirement for a designated TSF.

2.1.1.8 Magnetite Concentrate

The magnetite slurry is filtered to achieve a moisture content of approximately 8-10% w/w, which is required to minimise transport costs. Magnetite concentrate filter cake is then stockpiled in a concentrate storage area.

2.1.1.9 Product Transfer

Concentrate will be loaded into trucks using a front-end loader. A concentrate weighbridge will record the tonnage that is trucked off site. The concentrate will be trucked via the haul/access road to a new rail siding and loadout facility at Adnera.

Trucks will be triple side tippers with 140 t capacity. Loads will be covered to prevent dust generation and product loss. Up to 25 loads of magnetite concentrate (50 return truck movements a day or two per hour) will be delivered to Adnera per day under the 3Mtpa mine plan, with the potential to increase to 50 loads of concentrate per day (up to 100 return truck movements a day or four per hour) if Stage 2 is progressed.

2.1.2 Integrated Waste Landform

The Draft EIS proposed a 90 ha WRL to accommodate waste rock generated from the Mount Peake Pit. Following revision of Project components, an IWL will now be constructed to contain both waste rock from mining operations and filtered non-magnetic tailings material.

The IWL will have a final footprint of 237 ha, with capacity to store up to 65 Mt of waste and approximately 60 Mt of tailings. Up to 5 Mt of non-acid forming waste from pre-production may be used for Project construction requirements.

The parameters used for waste dump design are:

- batter height: 10 m;
- ramp width: 27 m; and
- ramp gradient: 1 in 10.

Topsoil will be pre-stripped and stored within designated topsoil stockpiles for later use in rehabilitation.

IWL construction will be undertaken as follows:

- The IWL will begin with the overburden waste (pre-strip) from the first area mined for the open pit. This material will be dumped inside the IWL footprint adjacent to the pit;
- Any non-benign material that is excavated during the mining process will be placed towards the centre of the IWL, away from the IWL edges, to reduce potential for erosion of the outer batters of the final IWL form;
- As mining continues, a combination of pre-strip overburden and waste rock will be tipped on the IWL, with dump trucks building lifts to expand the landform from its starting point. Lifts for the dump will be 10m high. 15 degree batters will be developed with a 17m wide berm on each 10m lift.
- Filtered, non-magnetic tailings from the process plant will be delivered to the IWL via mine dump trucks once processing begins.

The tails will have a sandy-silty texture and an estimated water content of 13%. Tailings material will be dumped either in a paddock-tip zone that would then be flattened with a front-end loader before further waste rock is overlaid on it, or tipped over the tip-head of the waste ramp in the same method as the waste rock. The tailings material will not be dumped near the edges of the final IWL form to prevent erosion of the outer batters.

Figure 2-4 illustrates the layout of the Mine Site, including the IWL.

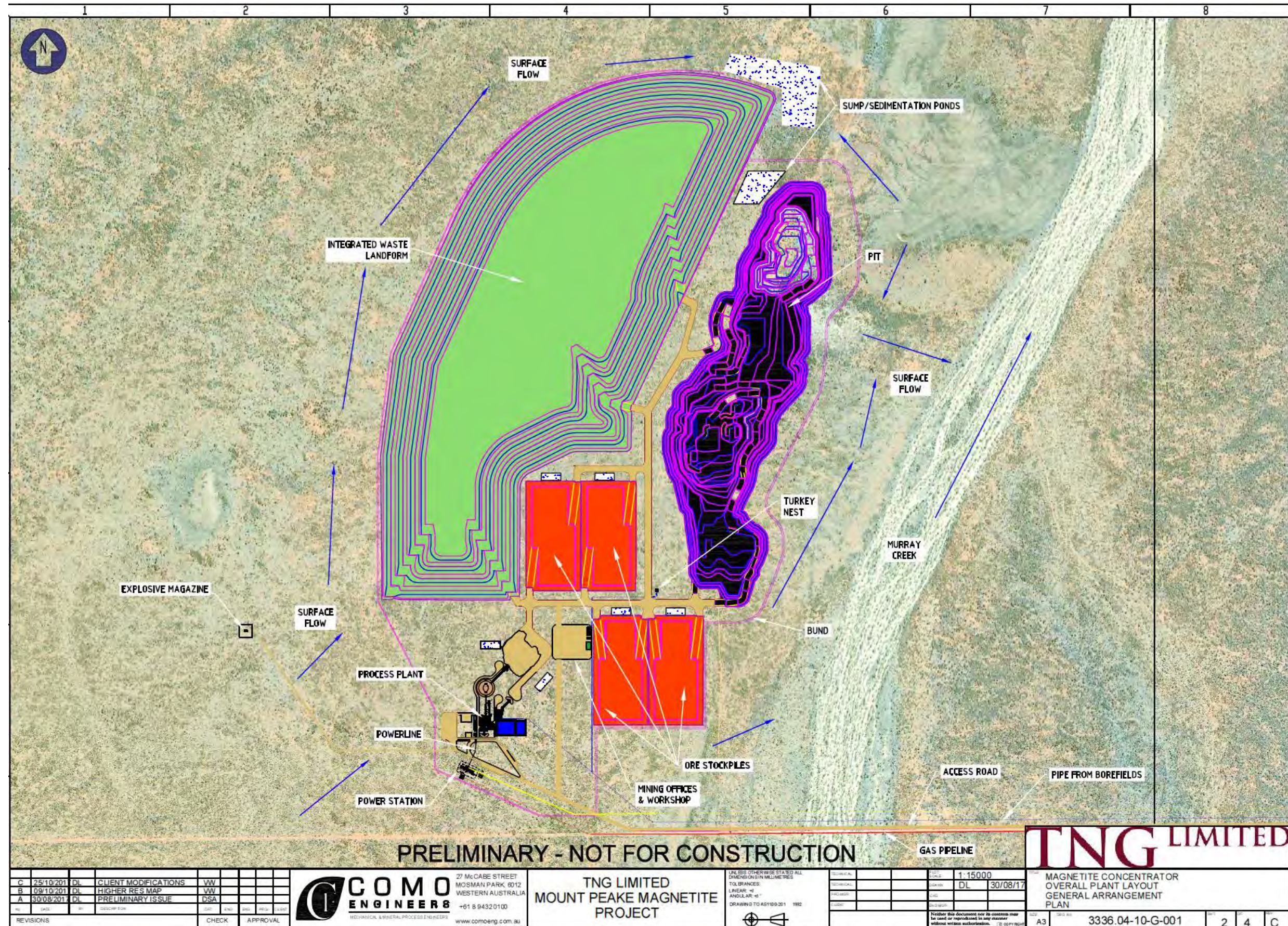


Figure 2-4: Mount Peake Mine Site Layout

2.1.3 Water Requirements

Alterations to the Project have resulted in beneficial impacts on overall water demand. This has largely been achieved through the omission of the TSF within the Processing configuration.

With addition of the tailings filter plant, approximately 70% of the water can be recovered from the thickener underflow, which would otherwise be pumped to the TSF.

The increased size of the IWL requires a marginal increase in water use for dust suppression, however this is offset by the significant decrease in water demand for tailings management. The total water draw from the borefield for the revised Project has reduced, as detailed in Table 2-2. The amended water balances for Stage 1 and Stage 2 are presented in Appendix 2.

Table 2-2: Comparison of Water Demand from Borefield

Stage of Project	Draft EIS Water Demand from Borefield	Revised Water Demand from Borefield
Stage 1 (3 Mtpa)	178.36 m ³ /hr	138.90 m ³ /hr
	1.56 GL/yr	1.22 GL/yr
	49.54 L/sec	38.59 L/sec
Stage 2 (6 Mtpa)	299.68 m ³ /hr	199.77 m ³ /hr
	2.63 GL/yr	1.75 GL/yr
	83.24 L/sec	55.49 L/sec

The groundwater modelling undertaken as part of the Draft EIS (Draft EIS – Appendix F) has been adjusted based on the reduced water use requirements for the Project. Results of the updated modelling are provided in Appendix 3.

Table 2-3 provides a comparison of modelled drawdown for impacted stockwater bores within the borefield. Results for the previously proposed Project (Draft EIS) and the current proposal are presented in the table. As indicated by the modelling, the drawdown impacts have reduced as a result of proposed Project amendments.

Table 2-3: Comparison of Modelled Borefield Drawdown for Draft EIS and Current Project Proposals

Stage of Project	Draft EIS	Current Proposal
Browns Bore	4 years: Not available 17 years: 2.4 m 100 years: 3.4 m	4 years: 0.1 m 17 years: 1.5 m 100 years: 2.7 m
Wollogolong Bore	4 years: Not available 17 years: 3.2 m 100 years: 2.9 m	4 years: <0.05 m 17 years: 1.9 m 100 years: 2.0 m
Middle Well (inactive)	4 years: Not available 17 years: 10.5 m 100 years: 4.7 m	4 years: 3.6 m 17 years: 8.4 m 100 years: 3.3 m
Maximum predicted drawdown at borefield	Stage 1: Not available Stage 2: 12 m	Stage 1: <4 m Stage 2: 9 m

Groundwater modelling demonstrates that the majority of water abstracted from the bores is coming from storage within the aquifer and not from either throughflow or rainfall recharge; it is not anticipated that groundwater levels in the area adjacent to Stirling Swamp and outflow of the Ti Tree Basin will be impacted by borefield abstraction. Drawdown associated with the pit is relatively localised and therefore no drawdown impacts are expected within the area of Mud Hut Swamp.

Impacts from groundwater drawdown on facultative phreatophyte trees is anticipated to be localised only to the immediate vicinity of the borefield. Whilst these species are not specifically dependant on groundwater at all times, during periods of drought groundwater resources would be essential for the continued survival of individuals and therefore excessive drawdown may result in increased localised mortality rates. As some of these trees may be of interest to Traditional Owners, TNG commits to consult with Traditional Owners regarding groundwater drawdown impacts on vegetation. Further detail and management strategies are incorporated into the Biodiversity Management Plan (Appendix 4).

Dewatering the pit is expected to yield only low volumes for water based on airlift testing of exploration drill-holes in 2014. With groundwater occurring at 20-22 mbgl, less than 0.5 L/sec yield was sustained from five of the 11 holes tested; the remaining six failing to provide sustained flows. The quality of this water was reported as between 6000 – 8000 mg/L Total Dissolved Solids (TDS), with very recent water sampling indicating slightly less brackish water with electrical conductivity (EC) reported as 1590 µS/cm and TDS at 1030 mg/L (from samples taken 29 September 2017). Water from the pit will most likely be used as supplementary water for dust suppression or as make up water for the Processing Plant.

2.1.4 Dust Management

2.1.4.1 Haul/access road dust suppression

In addition to mine site dust management outlined in the Draft EIS, further detail is provided for dust management relating to the haul/access road below.

Dust suppression over the approximate 100km haul/access road will be undertaken by water trucks. Two to three semi-trailer sized water trucks are expected to be required to complete the road watering. A number of bores may be installed along the haul road at appropriate intervals and water from the bores will be pumped to a lined turkey's nest using pumps powered by auto-start gensets.

Water would be transferred to the water truck using a pump and standpipe facility. The water transfer areas would be lined so run-off is contained and diverted back into the turkey's nest.

Spray from the water trucks would be contained to the trafficked surface by appropriate nozzle selection to ensure there is minimal chance of over-spray.

2.1.4.2 Impacts of saline mine dewater used for dust suppression

Dust suppression water used within the mine site will be contained by bunds/levees and sediment ponds. Water carts will utilise directional sprays to contain water within bunds to ensure no overspray of saline water to adjacent areas. Deposited salts will only be mobilised as far as sediment ponds/sumps. When sediment ponds/sumps are maintained by routine removal of sediment, potentially saline sediment will be deposited in the IWL.

On the haul/access road dust suppression with water carts will be undertaken on compacted road base. During a rainfall event, run-off will occur quickly from the compacted surface in a 'first flush' of run-off. This first flush will occur before the surrounding landscape reaches saturation and will be directed to sediment basins/table drains adjacent to the haul/access road. This first flush will then be either leached to depth or quickly diluted by subsequent run-off from the haul/access road and by sheet flow from the surrounding area. Studies on the use of saline water in dust suppression on unsealed roads indicate that it is unlikely to impact significantly on the wider surrounding environment (Loch & Squires 2010).

2.1.5 Disturbance Footprint

Project amendments have resulted in an overall decrease in disturbance area for the Project.

Whilst the IWL has increased in size from 90 ha to 237 ha to accommodate tailings disposal, the TSF, which had a footprint of 475 ha, will no longer be constructed. As such, the final footprint at the Mine Site has reduced from 1,060 ha to approximately 735 ha.

Table 2-4 identifies key characteristics for Project elements, including disturbance areas.

Table 2-4: Key Characteristics and Disturbance Areas

Feature	Description	Area (ha)
Open cut mine	2000m length, 600m width, 125 m depth providing up to 9.6 Mtpa of ore and waste.	77
Integrated Waste Landform	Co-disposal of waste rock and dry-stacked tailings material; landform to have 40m final height, with 10m batter height and 65 Mm ³ capacity.	237
Long-term ore stockpiles	4 x long term ore stockpiles 4 Mt capacity.	47
Mine facilities	Including ROM pad, process plant, mine offices and workshops, fuel storage facility, water treatment plant, power station, magazines, weighbridge and site roads. Producing approximately 1.8 Mtpa of magnetite concentrate.	71
Accommodation village	To accommodate 130 personnel expanding to 175 personnel in year 5, including sewage treatment plant.	6
Haul/access Road	100 km haulage route between mine site and Adnera load-out facility, including access from Stuart Highway for small vehicles and supplies. Two 5 m traffic lands with two 0.5 m shoulders.	234
Borefield, delivery line and access road	Borefield infrastructure including delivery pipe-line, access road and power line.	50
Road base borrow areas	Borrow pits to be established to provide road base for the haul/access road outlined above.	3
Turkey's Nest	6m x 6m turkey's nest and standpipe for storage of dust suppression water.	-
Adnera load-out facility	Rail siding, site-office and hardstand for magnetite ore concentrate storage and loading adjacent to the Alice Springs to Darwin railway.	10
Total		735

Figure 2-5 provides a site layout for the Mount Peake Project.

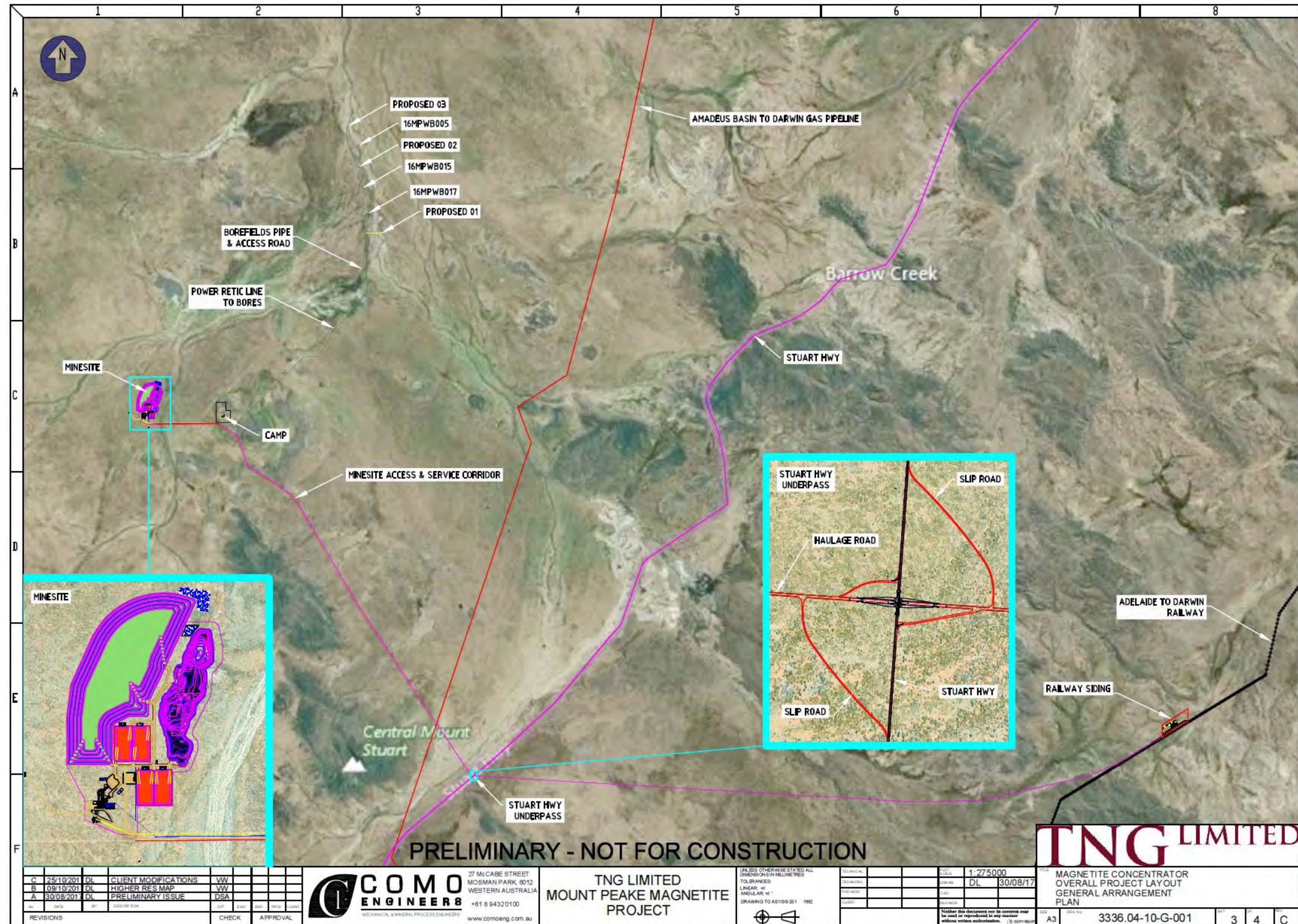


Figure 2-5: Site Layout of the Mount Peake Project

3 CONSIDERATION OF ALTERNATIVES

TNG are continually re-assessing the Project to:

- improve efficiency;
- reduce impacts; and
- improve economic feasibility.

A substantive change to the Project following the Draft EIS and Supplementary Document has been the removal of the TSF, which is described in section 2 above. Although this amendment is not as economically feasible, it has improved efficiency as well as significantly reduce impacts.

Other alternatives being considered by TNG relate to energy supply options, which are summarised in section 3.1 below. Closure options for the open-cut pit and IWL have also been reviewed and summarised in section 3.2.

3.1 ALTERNATIVE ENERGY SUPPLY

An Alternative Power Study (technical and feasibility) was commissioned in October 2017 to assist TNG in determining the viability of alternative energy supply options. Energy options assessed for the Mount Peake Mine Site are identified in Figure 3-1.

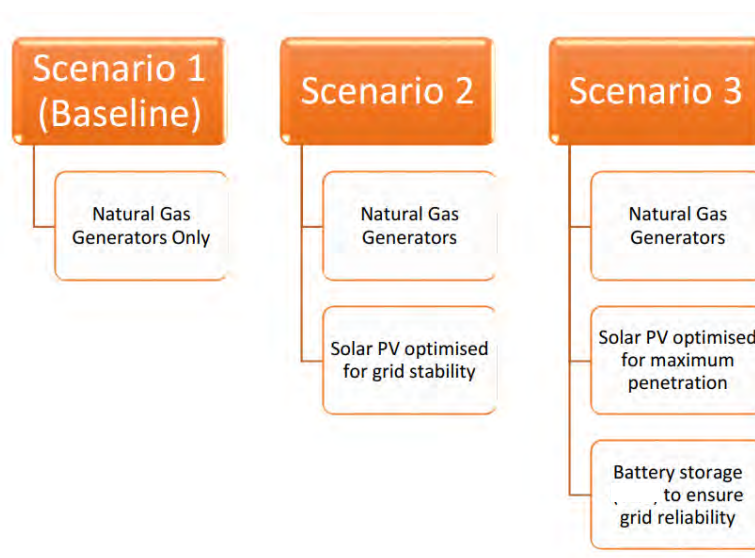


Figure 3-1: Alternative Energy Options for the Mount Peake Mine Site

At this stage the report is commercial in confidence, however the alternative energy options have been summarised below.

The baseline scenario, as provided in the Draft EIS, is to use natural gas from the Amadeus pipeline to fuel a gas power plant with back-up diesel generators, which would power the mine site, processing plant and accommodation village.

The study reviewed the potential use of Solar photovoltaics (PV) in conjunction with gas power generation; and potential use of Solar PV and proprietary battery storage in conjunction with gas power generation.

The feasibility of the alternative options reviewed is dependent on domestic gas supply and pricing. At the point where Solar PV and battery storage, in conjunction with gas power generation, become feasible, the renewable energy fraction is 26 percent of total energy generation for the site. This would provide a significant reduction in greenhouse gas emissions from the Project.

Feasibility of the adoption of Solar PV and battery storage in conjunction with gas power generation would be improved with the receipt of support via Australian Renewable Energy Agency (ARENA) investment. The proposed technology mix would provide proof of concept of the commercial viability of the proposed energy generation technology combination. Funding opportunities will be pursued to move forward with establishing the preferred energy generation mix.

The study also reviewed options for power supply at the borefield. The assessment considered diesel only generators; diesel with Solar PV; and the provision of a powerline to the borefield from the mine site. The preferred option at this stage remains a power-line to the borefield. Installation of a power-line, whilst the most expensive option, would provide continuous power feed when the borefield access track is inaccessible, such as during heavy rainfall events. It will also remove the requirement for diesel storage in the borefield, eliminating the potential for spills or leaks associated with power generation.

3.2 MINE CLOSURE OPTIONS

3.2.1 Mine Pit closure concepts

3.2.1.1 Pit backfilling

Pit backfilling has been reconsidered with regard to the proposed sequence of mining; it has been determined not to be a viable option.

Initial mining focuses on the southern portion of the mine (Stage 1 area) where the overburden is most shallow and the highest grades exist. Some of the waste mined in the pre-production period will be used for construction activities. By the end of Year 4, mining of ore is taking place in the southern area of the total pit form (Stage 1 and 2 areas), with waste stripping of the Stage 3 area beginning. The low-grade stockpiles begin to be filled as material is mined to uncover higher grade material. At the end of year 6, ore mining continues in Stage 2 and 3 areas. The higher-grade stockpile is regularly depleted to manage variations in ore delivery. Towards the end of year 8 stripping of the Stage 4 area commences as ore mining in Stage 2 and 3 areas continues. At the end Year 10 stripping of Stage 5 area commences as ore mining in Stage 3 and 4 areas continues. Around the end of Year 12, waste mining ceases, and all staged areas are being depleted to final depth. Final ore mining from the pit is completed at the end of Year 14. The sequence is shown diagrammatically in Figure 3-2 below.

This provides the most geotechnically and economically feasible sequence of mining, however it precludes the potential for pit backfilling. Resource definition is also continuing and therefore sterilisation of resource potential through waste backfill is not feasible.

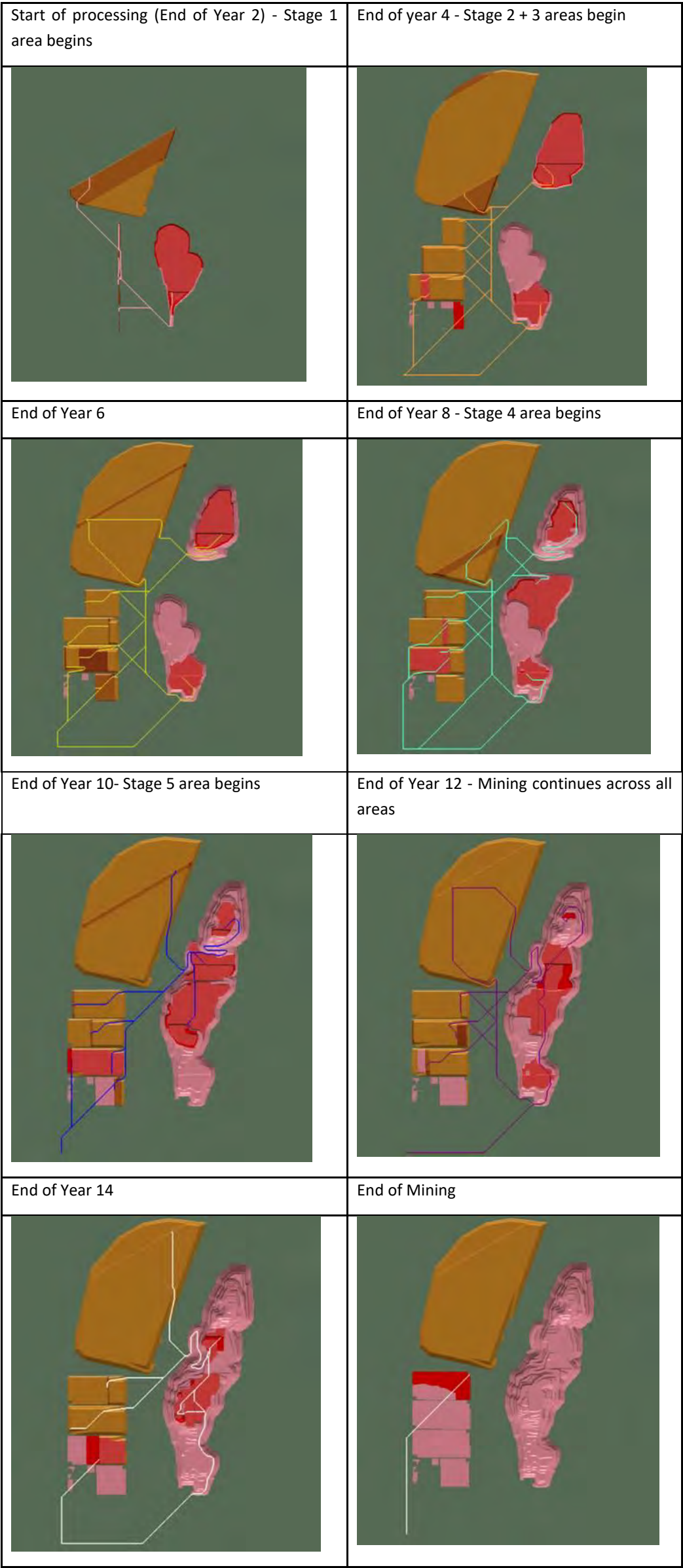


Figure 3-2: Sequence of open pit mining at Mount Peake Project

*Diagram reflects the proposed mining sequence, however the waste rock dumping sequence has now altered due to Project revision to store tailings within the Integrated Waste Landform, thereby increasing IWL footprint.

3.2.1.2 Removal and appropriate disposal of rubbish and waste

Upon cessation of mining all rubbish and waste materials shall be removed from the pit. Any installations, such as in-pit sumps, pumps, stand-pipes and pipelines shall be removed and either sold, recycled or buried in appropriate locations – either landfill or waste rock dump.

3.2.1.3 Installation of abandonment bunding

Closure of the open pit will involve blocking off all vehicular access to the pit. The haul road ramp from the pit will be blocked with at least 1.8 metre (m) high waste rock bund tipped from a haul truck.

Abandonment bunding will be established around the pit so that accessibility within the Zone of Instability associated with the pit is restricted, as described in *Department of Industry and Resources (1997) Safety bund walls around abandoned open pit mines – Guideline*.

3.2.1.4 Pit Lake – animal exclusion

While pit lake water quality is expected to be of increasing salinity until it reaches an equilibrium, it is not expected to be harmful to native fauna. Pits provide an ideal habitat for some animals like Peregrine Falcon, that utilise the cliff-like pit walls in order to nest in relatively safety and away from disruptions. However, feral animal attraction to water, even saline water, may be problematic. Goats, camels and horses are known to utilise saline water sources. A two-tiered exclusion fence surrounding the pit is being considered.

The first fence line will be constructed adjacent to the abandonment bund. This provides an additional level of safety associated with human ingress to the pit area. It provides further assurance that vehicles remain outside the calculated zone of instability. This will deter fauna for a significant amount of time.

The secondary fence line will block access to the pit ramp behind the ramp bunding. This will deter any fauna that manage to infiltrate the first perimeter fence.

Fences will be routinely checked during closure inspections and maintenance performed as required.

3.2.2 Integrated Waste Landform Closure Concepts

3.2.2.1 IWL design

The post rehabilitation IWL landform will be safe, stable and non-polluting. Soil and mine waste rock characterisation results have been used to determine properties for input into IWL conceptual design. Design takes into account footprint, materials characteristics, including potential for Acid Mine Drainage (AMD), and ability of soils to support revegetation and rehabilitation. The design can facilitate encapsulation cells if required to contain PAF material so that conditions for development of AMD are minimised.

The IWL will be located along the western side of the pit. The profile of the IWL (e.g. height and slope angles) will be designed to ensure that the final structure is stable and not prone to significant erosion. The final height of the IWL is planned to be approximately 40m, with an overall angle of approximately 11 degrees between the final surface top and the ground.

The top of the IWL will be shaped for water to drain inwards, therefore preventing runoff during operation. Runoff from the disturbed and working areas downgradient of the bund will be conveyed to an appropriately sized sedimentation basin. Discharge from the basin will be directed to natural drainage lines ensuring that no further erosion occurs.

Detailed design parameters for the IWL will be included as part of the *Mine Management Plan* process.

3.2.2.2 Construction/Operation of IWL

The construction of the IWL will enable progressive rehabilitation. Topsoil will be cleared and stockpiled progressively to provide the greatest opportunity for soil to remain viable for rehabilitation. Areas cleared will be sufficient for construction only and further clearing to accommodate expansion of the landform for the shallower slopes at closure will only occur prior to rehabilitation. Clearing will be staged to allow for progressive (~5 year) stages of operation.

The IWL will be built up progressively from the southern end of the pad northwards. Out-facing batters will be constructed along at least one half of the boundary and the remaining open area will be used to expand into as the need arises. The initial placement will be along the southern boundary (i.e. aligned with the berm drainage system) to prevent runoff from up-gradient areas into the working operations of the IWL. Outer batters will be constructed of waste rock material, ensuring tailings are contained within the structure and not exposed on the outer surfaces.

A small bund (~0.5 m) will be constructed around the outer edge of berms to contain surface water flow from IWL batters. Runoff from all disturbed areas will be directed to the sedimentation basin via appropriately designed and constructed drainage banks/berms. Ongoing inspection of the sedimentation basin and drainage banks/bunds will be conducted throughout operations. Sediment collected from the basin will be disposed of back on the IWL.

3.2.2.3 IWL rehabilitation

The sediment basin and other drainage, erosion and sediment control (DESC) treatment infrastructure for operation of the IWL can be removed and rehabilitated during closure. The completed outside faces will be rehabilitated early in the operation when the viability of the topsoil is highest.

Previously cleared topsoil will be spread over all surfaces at a thickness of up to 20 cm (depending on the nature of the under-lying waste rock and availability of viable topsoil). The surfaces will be deep ripped (minimum 1 m) on contour at appropriate spacing. Rip lines on outer slopes are to be survey controlled to ensure that they are horizontal to prevent propagation erosion. Re-seeding will occur at a time to maximise the benefit of annual rainfall events.

After re-contouring, stormwater collected on the benches will be conveyed to vertical drains. The number of vertical drains will be appropriate for the final slope angles. All water from vertical drains at the base of the slope will dissipate and discharge in a manner that will not cause any erosion.

Drainage structures will be maintenance free to ensure that no failures occur before vegetation is well established. Waterways will be lined with rock. Vertical drains will be excavated so that they are lower in profile

than the dump slope after placement of rock material. Wing banks will be constructed to direct runoff to the drain.

4 HYDROLOGY SUPPLEMENTARY INFORMATION

NTEPA response to the Mount Peake Project Supplementary Document required additional detail associated with hydrology for the Project area. Supplementary information is provided below.

4.1 NTEPA GENERAL COMMENTS ON HYDROLOGY

- The Draft EIS and Supplement provide general details on potential contamination in surface water runoff. However, much of the detail is dependent on the location of mine infrastructure. Updated information is needed in order for the NTEPA to assess the full range and extent of environmental impacts, and to provide advice with sufficient certainty.
- Any contaminated surface water flow off the mine site has the potential to impact downstream environments, including riparian ecosystems and lands on pastoral stations or current or intended organic certification.
- Baseline water quality conditions have been obtained from the Hanson River but not from creeks near the mine site. The Supplement states that further water and sediment sampling will occur prior to operations – details to be incorporated into the adaptive site water monitoring and management plan.
- The Draft EIS requested a plan showing the proximity of Project infrastructure to water features and flow directions, including both surface water and groundwater and their interaction. This was not sufficiently provided in the Supplementary Document.

4.2 SITE SURFACE WATER PLAN

An integrated mine site surface water plan is presented to display surface water flow directions, origins and fate relative to the Project infrastructure. The most up to date site layout has been used, including locations of sediment traps/attenuation ponds and surface water diversion infrastructure (such as proposed flood levee/bund).

The ore stockpiles, IWL and the concentrate stockpiles are the mostly likely potential sources of sedimentation/contaminants. Sediment ponds are located adjacent to these landforms, as shown in Figure 2-4.

Blue arrows indicate the surface water flow direction; the lowest lying point is where the blue arrows converge on the east of the pit and then flows back toward Murray Creek. A flood levee/bund has been incorporated to prevent surface water ingress to the pit.

The levee/bund will be designed to ensure that a 1 in 100 year, 72 hour Average Return Interval rain event and resulting surface flows will not overtop the levee.

Sediment ponds/sumps have been located to capture sediment from surface water flows. These are designed to contain water with a resident time that allows a significant portion of solids to fall out of suspension before reuse in dust suppression where possible (for internal mine site drainage) or release to the environment (northern most sediment pond).

Hazardous materials, including diesel, will be stored within the infrastructure footprint. Storage will be in accordance with Australian Standard AS1940:2004 – *The Storage and handling of Flammable and Combustible Liquid*. Bunding will be installed to ensure incidental spills are contained and recovered; oil/water separators will also be incorporated into designs. It is not expected that contaminated run-off will occur or migrate to regional surface water pathways.

4.3 REGIONAL HYDROLOGICAL PLAN

4.3.1 Surface Water Features

A regional hydrological plan has been produced to clearly represent features requested by the NTEPA and appears as Figure 4-1. The Project areas appear in black and includes the mine site, borefield, haul/access road and the Adnera loadout facility.

All major and minor surface flow lines are presented on the map, including Hanson River, Anningie Creek, Murray Creek and Bloodwood (Ennungan) Creek.

Bore water abstraction for the Project occurs within the Southern Ranges Water Management Zone of the Western Davenport Water Control District. A Draft Western Davenport Water Allocation Plan was developed in 2017 and is currently under consideration.

No permanent surface water bodies that are culturally significant are being impacted by the Project.

4.3.2 Surface Water Catchments

Surface water catchments upstream of Project infrastructure are presented and include:

- Wood Duck Creek Catchment;
- Anmatyerr North Catchment;
- Hanson River Catchment;
- Murray Creek Catchment; and
- Bloodwood (Ennungan) Creek Catchment.

Wood Duck Creek catchment appears within the Ti-Tree Water Control District and is characterised by flat relief with predominantly surface sheet flows in significant rain events, with elevation at the eastern edge of the catchment that directs surface flow west to the plain and then proceeds to flow towards the Wood Duck Swamp, a Site of Conservation Significance. Culverts will be installed to ensure surface sheet flows are not interrupted by the eastern (Adnera) end of the haul/access road.

Anmatyerr North catchment appears within the Ti-Tree Water Control District and is characterised by flat relief and sheet flows in significant rain events. Sheet flows proceed from south to north, feeding the Bush Potato Site of Botanical Significance and the Anmatyerr North Site of Conservation Significance. The Anmatyerr North Site of Conservation Significance extends further to the north and contains the Stirling Swamp Site of Botanical Significance. Culverts will be installed to ensure surface sheet flows are not interrupted by the haul/access road.

Western Creek, Woodforde River and Hanson River are the major surface drainage features of the Hanson River catchment, which is predominantly within the Ti-Tree Water Control District. Surface flow is predominantly within incised drainage lines flowing from the south-west in a north-east direction. The haul/access road intersects the Hanson River; it is proposed to construct the cross at-grade, to minimise any potential for impeding surface flows. The at-grade crossing would be constructed to replicate the existing surface level of the river bed. Some culverts will be required where there are minor incised drainage lines that intersect the haul/access road, extending off Central Mount Stuart.

The Murray Creek catchment contains the Mount Peake mine site. Anningie Creek and Saltwell Creek flow north to feed Murray Creek. The catchment is predominantly outside of the Ti-Tree Water Control District. Murray Creek has the potential to transport sediment or contaminants north of the mine site. The point where Murray Creek turns east and flows towards the Hanson River (and borefields), is the closest position to Bloodwood

(Ennungan) Creek, which feeds the Mud Hut Swamp Site of Conservation Significance. Murray Creek remains incised at this location and is disconnected from the incised drainages of Bloodwood Creek by 1600 – 2000 m. Murray Creek is separated by a 1-3 m high interfluvium between 300-600 m wide, from the broader floodplain of the Bloodwood Creek. Surface water confluence between Murray Creek and Bloodwood Creek is unlikely to occur except in extreme flow events; and then confluence would emanate from downstream of Mud Hut Swamp before backing up the surface drainage lines.

Bloodwood Creek catchment appears to the west of Murray Creek catchment and the mine site. Its major flow paths are the Bloodwood Creek and Saddle Hole Creek, which flow into Bloodwood Creek directly west of the minesite. Bloodwood Creek is the tributary feeding the Mud Hut Swamp, a site of conservation significance, as it is able to retain water for lengthy periods after rainfall and flow events.

4.3.3 Surface and Groundwater Interaction

The alluvial floodplains that separate the channels of the Bloodwood Creek, Murray Creek and Hanson River are referred to as flood-outs. Several of the water courses are considered to be joined, with shared flood-outs in large flood events. These are considered an important source for groundwater recharge during surface flow events (Duguid *et al.* 2005). Flood-outs with potential as groundwater recharge zones appear on Figure 4-1.

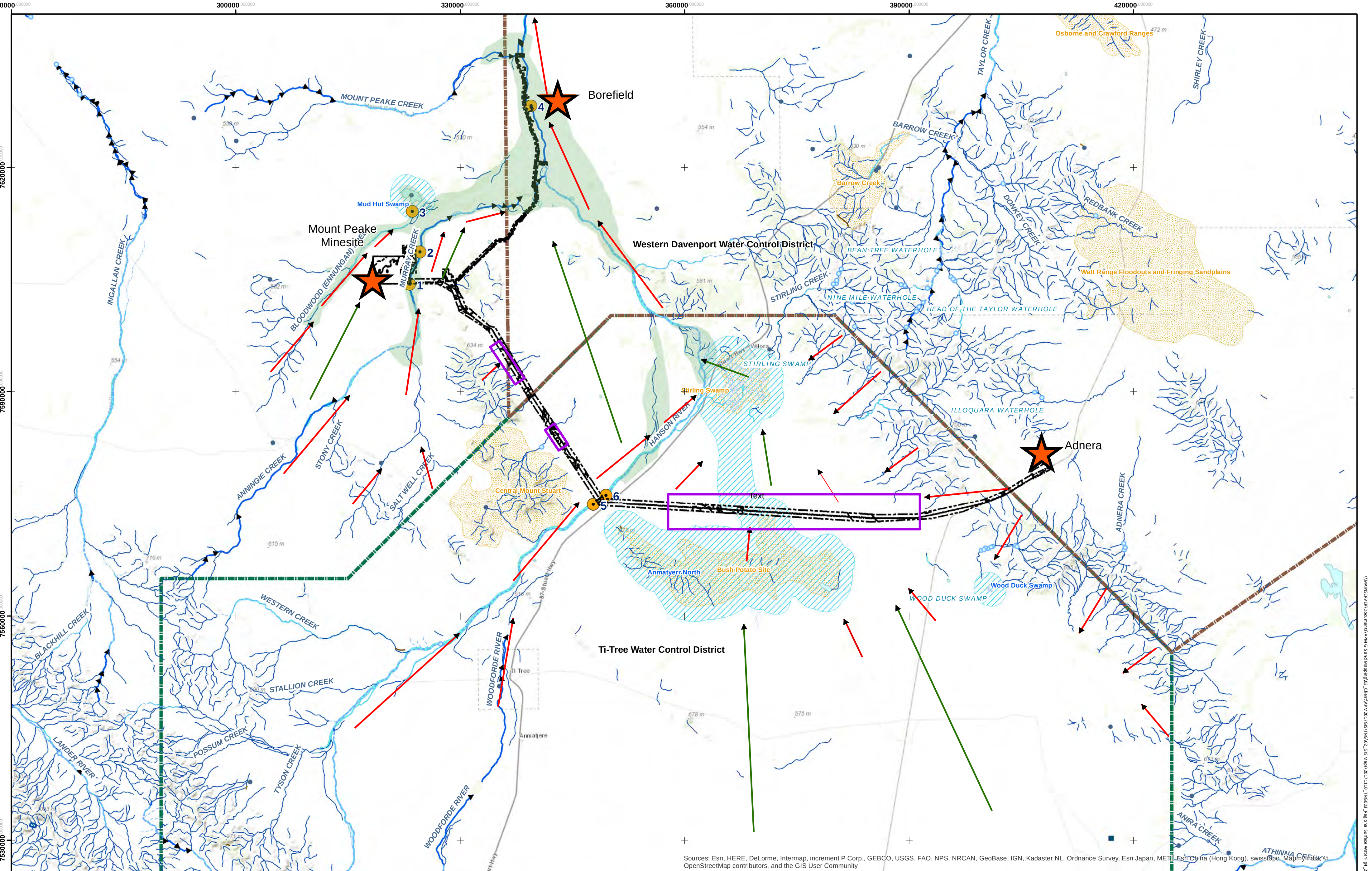


Figure 4-1: Mount Peake Project Regional Hydrology

LEGEND

Minesite and Infrastructure Corridor

Floodout recharge zones

Indicative Surface Water Monitoring Points

Site of Botanical Significance

Site of Conservation Significance

NT Water Control Districts

Ti-Tree

Western Davenport

Surface Water Flow Direction

Area requiring culverts

Groundwater Flow Direction

Scale: 1:315,000
Date: 17/11/2017

GDA 1994 MGA Zone 53

4.3.4 Surface Water Monitoring

Surface water monitoring is currently proposed for six sites within and adjacent to Project areas. Indicative locations appear on Figure 4-1. These are:

1. Murray Creek – upstream of mine site;
2. Murray Creek – downstream of mine sit;
3. Bloodwood Creek - feeding into Mud Hut Swamp;
4. Hanson River – borefield;
5. Hanson River – upstream of crossing; and
6. Hanson River - downstream of crossing.

Two surface water monitoring stations are due to be installed during 4th quarter 2017 – Hanson River downstream of the haul/access road crossing and Murray Creek downstream of the mine site. The remainder of the sites are to be established in the wet season prior to commencement of construction. Basic stream or pool level monitoring sites with stream gauge points are to be installed – see Figure 4-2.



Figure 4-2: Example of surface water installation incorporating a stream gauge plate and internally-mounted water level instrument

Each of these Surface Water Monitoring Sites will be fitted with a with all-in-one style sensors (incorporating a battery, data logger and basic sensors), requiring routine manual data downloads during site service visits. Data will be manually collected on a minimum quarterly basis. Instruments can be quickly installed at each site and readily relocated between sites if required.

Sensors will undertake continuous logging of water level and temperature. Manual quarterly monitoring will take pH, electrical conductivity (EC) and total dissolved solids (TDS) readings, when water is available. Additionally, a water sampling regime including soluble metals, ions and nutrients will be sampled at least annually from each established surface water sampling location dependent on flows. Baseline data will be established and used for comparison with ANZECC/ARMCANZ 2000 Australian Water Quality Guidelines for Fresh and Marine Waters, Livestock Use.

Table 4-1: Surface Water Monitoring Analytes

Method Name	Analyte Name	Units	Reporting Limit
pH in water	pH	pH Units	0.1
Conductivity and TDS by Calculation - Water	Conductivity @ 25 C	µS/cm	2
Total Dissolved Solids (TDS) in water	Total Dissolved Solids Dried at 175-185°C	mg/L	10
Alkalinity	Bicarbonate Alkalinity as HCO ₃	mg/L	5
Alkalinity	Carbonate Alkalinity as CO ₃	mg/L	1
Alkalinity	Hydroxide Alkalinity as OH	mg/L	5
Alkalinity	Total Alkalinity as CaCO ₃	mg/L	5
Sulphate in water	Sulphate, SO ₄	mg/L	1
Chloride by Discrete Analyser in Water	Chloride, Cl	mg/L	1
Metals in Water (Dissolved) by ICPOES	Calcium, Ca	mg/L	0.2
Metals in Water (Dissolved) by ICPOES	Magnesium, Mg	mg/L	0.1
Metals in Water (Dissolved) by ICPOES	Potassium, K	mg/L	0.1
Metals in Water (Dissolved) by ICPOES	Sodium, Na	mg/L	0.5
Calculation of Anion-Cation Balance (SAR Calc)	Sum of Ions	mg/L	10
Calculation of Anion-Cation Balance (SAR Calc)	Anion-Cation Balance	%	-100
Acidity and Free CO ₂	Acidity to pH 8.3	mg CaCO ₃ /L	5
Fluoride by Ion Selective Electrode in Water	Fluoride by ISE	mg/L	0.1
Low Level Nitrate Nitrogen and Nitrite Nitrogen (NO _x) by FIA	Nitrate, NO ₃ as NO ₃	mg/L	0.05
Low Level Nitrate Nitrogen and Nitrite Nitrogen (NO _x) by FIA	Nitrite, NO ₂ as NO ₂	mg/L	0.05
Trace Metals (Dissolved) in Water by ICPMS	Arsenic, As	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Cadmium, Cd	µg/L	0.1
Trace Metals (Dissolved) in Water by ICPMS	Copper, Cu	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Nickel, Ni	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Lead, Pb	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Zinc, Zn	µg/L	5
Trace Metals (Dissolved) in Water by ICPMS	Manganese, Mn	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Antimony, Sb	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Cobalt, Co	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Iron, Fe	µg/L	5
Trace Metals (Dissolved) in Water by ICPMS	Selenium, Se	µg/L	1
Trace Metals (Dissolved) in Water by ICPMS	Thallium, Tl	µg/L	1

4.3.5 Groundwater Monitoring

Groundwater monitoring is proposed for key mine site infrastructure locations and receptors that are potentially sensitive to groundwater drawdown.

Key monitoring locations include:

- Borefields – several bores monitoring standing water level (SWL), pH, EC, TDS and selected analytes;
- North of the IWL – monitoring SWL, pH, EC, TDS and selected metals;
- East of the pit - monitoring SWL, pH, EC, TDS and selected metals; and
- Adjacent to Mud Hut Swamp - monitoring SWL, pH, EC, TDS.

All monitoring will be undertaken at least quarterly, with the likelihood that more intensive monitoring will be undertaken and the borefields.

The IWL monitoring bore will be monitored for changes in physical or chemical properties that may indicate metalliferous drainage or seepage issues.

The bore to the east of the pit will also be monitored in a similar manner to the IWL bore to identify any changes in water physical and chemical properties and to monitoring the SWL as it relates to potential groundwater dependant vegetation adjacent to Murray Creek.

TNG commits to install a monitoring bore adjacent to Mud Hut Swamp to monitor groundwater levels. This area has been highlighted as potentially sensitive to groundwater drawdown and although groundwater modelling indicates that drawdown is unlikely to affect the location, TNG is seeking to avoid any impacts to this site.

Other sites may be added to the groundwater monitoring regime during development and/or operations.

4.3.6 Impacts on riparian vegetation

4.3.6.1 Altered surface hydrology

Changes to hydrology do have potential to impact vegetation and not necessarily just riparian vegetation. The Bush Potato Site of Botanical Significance which appears on Figure 4-1 is predominantly to the south of the haul/access road. Analysis by APM 2017 found that the extent of the bush potato habitat extends north of the haul/access road and could be impacted by a change in surface hydrology. To mitigate impacts, the construction of the haul/access road will allow the continuity of surface hydrology through appropriate design and construction, integrating the use of culverts and/or pipes.

Connectivity will be maintained for any other incised drainage lines along the haul/access road through appropriate design and construction, incorporating the use of culverts and/or pipes for minor drainages and the 'at-grade' road construction for the major crossings of Hanson River and Murray Creek. At-grade crossings will minimise potential sediment loads from constructed roads during flow events, allowing the natural flow regime to persist.

4.3.6.2 Mine site and borefield

Surface water from the mine site is unlikely to impact on surrounding vegetation. All mine site water is expected to be internally captured and reused for dust suppression or evaporated. Externally there will be a sediment pond at the north end of the IWL to contain any sediment transported in surface water around the outside of the IWL bund or the pit bund/levee. This sediment pond will be designed to provide an appropriate residence time to enable a significant proportion of solids to fall out of suspension. Water will then be released and make

its way toward the Murray Creek. A surface water monitoring site will be constructed downstream of the outfall to monitor flow, salinity, sediment and other selected analytes.

As outlined above in section 4.3.2, surface water from the mine site is extremely unlikely to enter the catchment for Mud Hut Swamp. If it does enter the Mud Hut Swamp catchment it will have first been filtered in a sediment pond.

Vegetation at the borefield is not expected to be impacted negatively by surface water contaminants as it is further downstream from the mine and only connected to Murray Creek after significant flooding events. Any water reaching the borefield from the mine site would initially have been filtered through the sediment pond.

4.3.7 Additional commitments

TNG commits to the following actions to address remaining areas of concern:

- Undertake a baseline water quality survey (following rainfall) of Mud Hut Swamp; and
- Provide an updated Drainage, Erosion and Sediment Control Plan when detailed mine site layouts are completed and have this reviewed and approved by a Certified Professional in erosion and sediment control.

5 BIODIVERSITY SUPPLEMENTARY INFORMATION

5.1 NTEPA GENERAL COMMENTS ON BIODIVERSITY

The NTEPA stated that, in general, the Draft EIS and Supplementary Information on the Mount Peake Project did not adequately address the risks to biodiversity, as outlined in the Terms of Reference and as required under the *EA Act* and the *EPBC Act*.

The issues highlighted were:

- 1 Targeted surveys for some threatened species have been inadequate to ascertain the presence, extent and potential impacts of the project; and
- 2 Some assessments of species habitats were inaccurate.

As a result, the risk assessments provided were based on incomplete and inadequate information. The mitigation measures were inadequate to reduce risks to some threatened species to an acceptable level.

The NTEPA has identified, in the response to the Draft EIS and the Supplementary Information, that the limitations of the baseline biological surveys has resulted in less-well informed Risk Assessments, which then rely on mitigation measures that are not the most appropriate to reduce the potential for impact.

NTEPA requested TNG to resolve the issues on biodiversity (using specialist contractors) by completing additional biological field survey work, revising the Risk Assessments to incorporate quantitative data derived from the field surveys, use those data to inform and develop the Mitigation Measures and then create a framework for ongoing long-term monitoring.

It is a requirement of the Terms of Reference that the Risk Assessments be based on sufficient information on their subject, to allow quantitative analysis of impacts and influences of the Project on the receiving environment.

5.2 ADDITIONAL SURVEY WORK AND BIODIVERSITY MANAGEMENT PLAN REVISION

The Mount Peake Project involves activities, during construction and operation, that have the potential to have an impact on the biodiversity of the receiving environment. TNG developed a Biodiversity Management Plan (BMP) to outline all of the processes and procedures that are practical and available to minimise the extent and severity of impact. The BMP forms part of the Environmental Management Plan and is a working document. It was developed based on the outcomes of all of the previous biological survey work undertaken by GHD in 2013 and 2016.

In response to NTEPA comments and meetings, TNG mobilised to undertake further ground survey work in September and October 2017 and the BMP was updated accordingly, based on the outcomes of this survey work.

The tools that emerge out of this BMP (i.e. recommendations to minimise or mitigate impacts and the management procedures to reduce impacts) have been generated following a generalised risk assessment of the impacts of the Project on all flora and fauna. A species specific risk assessment has also been developed for each of the targeted threatened fauna of most concern, as identified by the comments of the NTEPA and the DENR following their review of the Draft EIS and Supplementary Information.

Therefore, the risk assessments in the BMP supersede those of the Draft EIS, the Supplement and all of their associated appendices. The risks of impact and the severity of those impacts have been considered in the context of a total Project area of 13,900 ha and a total proposed impact footprint of 735 ha.

The BMP incorporates the further investigations into the Black-footed Rock Wallaby, Greater Bilby, Great Desert Skink, Brush-tailed Mulgara and *Ipomoea polpha* subsp. *Latzii*. The BMP is attached as Appendix 4.

6 ADVERSE MATERIALS SUPPLEMENTARY INFORMATION

Assessment of waste characteristics was undertaken as part of both the Draft EIA and Supplementary Document; however, following submission of the Supplementary Document, additional information and clarification of results is required by the NTEPA.

6.1 SAMPLE COLLECTION, HANDING, STORAGE, ANALYSIS AND DISCUSSION OF RESULTS

In order to successfully fulfil NTEPA information requirements and therefore facilitate completion of their assessment, the following information was requested:

- Information from sampling undertaken, comprising the following:
 - Dates of sample collection;
 - Sample handling and storage procedures;
 - Detailed and exact laboratory methods used for analysis and raw data results;
 - A detailed outline of the criteria against which AMD was assessed and the basis for this decision;
 - An explanation of the cause of Net Acid Generation (NAG) pH values >9, which are highly irregular;
 - An explanation of how Acid Neutralising Capacity (ANC) values of 399 kg/t H₂SO₄ for a granite sample might occur;
 - X, Y and Z coordinates (in UTM or GDA94) for all samples collected.
- Assessment of the potential for alkaline mine drainage to occur. Discuss the potential impacts of highly alkaline mine drainage and expected solubility of metals at elevated pH values. If alkaline mine drainage is not expected to occur, reasons why this is the case and a discussion on what is expected should be included.
- All substances which may be present in seepage above baseline groundwater concentrations must be identified. Discussions must consider:
 - The potential for seepage into underlying aquifers;
 - Potential sensitive receptors;
 - Pathways for contamination;
 - The mobility, bioavailability and toxicity of substances;
 - If there is potential for arsenic, lead, selenium, iron, SiO₂, MgO, Al₂O₃ and TiO₂ contamination; and
 - How identified risks can be managed.

An Adverse Materials Supplementary Investigation Memorandum has been prepared to address these requirements. This document appears in full within Appendix 5. In addition, TNG established barrel leach testing in January 2017; information on this testwork is provided in Appendix 5a.

6.2 NON-BENIGN MATERIALS MANAGEMENT PLAN

Secondarily, the NTEPA required that a *Non-Benign Materials Management Plan* (NBMMP) be prepared to address specific management of adverse materials. The NBMMP was required to:

- Discuss the potential implications of sodic leachate in waste rock to be used for mine-site construction. Identify volumes of material expected to be sodic, provide a schedule of when these

would be mined throughout the project life and include strategies specific to the management of sodic leachate.

- Identify potentially adverse materials (e.g. Potentially Acid Forming (PAF), highly alkaline materials, sodic materials) which could be exposed during Project activities.
- Explain how to recognize AMD discharge and how to identify PAF material.
- Describe adverse materials management:
 - Mine scheduling – when will adverse materials be mined? Will there be different stages of removal?
 - Containment – how will adverse materials be contained (i.e. co-mingling vs. isolation)? When will each containment option be used? Describe both temporary and permanent containment options. Include simple diagram(s) to illustrate proposed containment options.
 - Location – on a map indicate where adverse materials will be temporarily and permanently contained.
- Consider intense rainfall events and describe how they have been considered when developing management options for adverse materials.
- Apply a risk level rating for the potential risk of AMD for the pit and waste dumps.
- Describe monitoring that will be undertaken to establish if adverse materials are impacting on the environment. Monitoring may include site inspections, surface water monitoring and groundwater monitoring. Trigger values must be set for water quality monitoring in line with baseline levels.
- Outline the response and incident reporting process for exceedance of trigger values.
- Briefly consider management of contained materials post-mining.

TNG is cognisant of the potential impacts of non-benign materials and has addressed the areas outlined above with the *Non-Benign Materials Management Plan*, attached as Appendix 6.

Waste characterisation conducted to date indicates AMD is not a significant risk for the Project; however, it is acknowledged that some adverse materials, particularly sodic material, may occur and warrant additional management considerations. Specifically, management measures may include:

- Additional analysis to delineate problematic materials prior to commencement of construction;
- Sediment control, particularly during the construction phase when sodic materials are being excavated and handled;
- Capping with non-saline materials;
- Amelioration of sodic soils with agricultural lime or gypsum.

Understanding and management of adverse materials will evolve over time as the Project progresses. TNG will continue to monitor material throughout the Project life to ensure the best management actions are employed on site.

7 CULTURAL AND SOCIAL IMPACT SUPPLEMENTARY INFORMATION

The NTEPA sought further information or assurance on a range of cultural, social and economic issues that have potential to arise from the Project. Additional information is provided in the section below.

7.1 CULTURAL AND SOCIAL ISSUES

NTEPA provided the following comments relating to cultural and social issues:

- Assurance that the flood protection levee will not impact on the restricted area on the northeast of the pit is required.
- Although there is no formal mechanism to report to Traditional Owners on what was found in archaeological surveys, it would be most appropriate to communicate the findings of that report to Traditional Owners and then conduct discussions on how the material should be managed.
- The Supplement specifies the target of 15% of the workforce for indigenous employment, but does not address how training and employment opportunities will be offered to Indigenous people.
- The Economic and Social Impact Assessment Report (ESIA) concluded that there was likely only net positive social and economic benefits of the project. However, not all potential impacts were covered in that report. Therefore, it is not certain that the Project has no potential for significant social impact.
- The Social Impact Management Plan was required as part of the Terms of Reference, however was not included in the Draft EIS or Supplement.

7.2 SACRED SITE PROTECTION/ ARCHAEOLOGICAL SITES SURVEYS

7.2.1 AAPA Certificate Status and Central Land Council Clearance

Central Land Council Clearances have been sought for Mount Peake Project areas and an Aboriginal Areas Protection Authority (AAPA) certificate application has been made by TNG in order to conduct the Project. A Mining Agreement is currently being negotiated with the Central Land Council for the required Mining Lease application areas. The status of the applications appears in Table 7-1 below.

The location of the flood bund/levee has been reviewed with regard to the sacred site northeast of the pit. TNG commits to constructing the flood bund/ levee so it does not impact on the sacred site.

Table 7-1: Status of clearances, AAPA certificates and Mining Agreement

Approval Type	ID Number	Approval Date	Area Covered	Current Status
CLC Clearance	SSC2015-034	30/06/15	Minesite, Campsite, Transport Corridor, Rail Siding	Obtained
CLC Clearance	SSCC2015-169	29/01/16	Pipeline and Borefield	Obtained
AAPA Authority Application	201417013	Submitted 13/11/2014 Amended 16/05/16	Minesite, Campsite, Transport Corridor, Rail Siding. Amendment included Pipeline and Borefield	In progress – awaiting input from the CLC
CLC Mining Agreement	NA		Mining licence application areas MLA28341, MLA29855, MLA29856, MLA30686	In progress – with CLC legal team

7.2.2 Additional Archaeological Surveys

Where the proposed Project areas have changed and not been covered by the previous archaeological survey, TNG commits to undertaking additional archaeological survey work in all areas proposed to be impacted by the Project that have not been previously surveyed. TNG will provide a copy of the survey report(s) to the *Heritage Branch, NT Department of Tourism and Culture*, which will include recommended mitigative measures. Findings of additional surveys will also be communicated to Traditional Owners.

7.2.3 Indigenous Community Engagement Strategy

TNG has developed an Indigenous Community Engagement and Workforce Management Strategy outlining the communication strategy for consultation with Traditional Owners and engagement with local indigenous communities. The Strategy is appended as Appendix 7.

Key features of the Strategy include:

- Key personnel to be consulted;
- Identification of relevant discussion/consultation items (including communicating findings of archaeological survey work undertaken, discussing appropriate measures to manage archaeological and cultural material and consultation on mine closure aspects of the Project);
- Determination of the phases of the Project where key consultation is expected to occur;
- Employment opportunities for local indigenous communities (including identification of suitable roles, details how training will be delivered and discussion on how cultural values will be accommodated); and
- Partnership opportunities with local indigenous businesses.

There is a schedule for consultation over the life of mine and an action plan for implementing the workforce management activities.

Training commitments have also been incorporated into the Strategy. In 2016, in collaboration with McMahon Services Australia, Intract Australia and the Central Desert Regional Council, TNG conducted *Certificate III in Civil Construction Plant Operations* training in Ti Tree and Wilora. It is the intention to conduct further training in these centres as the Project progresses.

7.2.4 Social Impact Management Plan

TNG have developed a *Social Impact Management Plan* (SIMP) for the Mount Peake Project attached as Appendix 8.

The SIMP outlines the following:

- stakeholder engagement strategies;
- an assessment of potential economic and social impacts;
- mitigation and management strategies for all identified risks including a register of agreed activities and commitments;
- a monitoring evaluation review and improvement (MERI) plan.

The SIMP satisfies the requirements outlined in the Terms of Reference and the additional comments provided by the NTEPA during 2017. From the SIMP it can be concluded that the Mount Peake Project will provide an overall net benefit to the local and wider community.

8 REVISED PROJECT RISK ASSESSMENT

The revised Project Risk Assessment is presented in Appendix 9. This risk assessment incorporates changes to the original risk assessment presented in Chapter 5 of the Draft EIS.

Biodiversity risk assessments have been completely revised as a result of the extensive further studies completed following submission of the original risk assessment; those presented as part of this Addendum supersede any previous versions.

Where there has been no change to the assessed risk or mitigation option, they do not appear in the revised risk assessment and they are assumed to remain valid.

9 CONSOLIDATED COMMITMENTS TABLE

A commitments table, consolidating commitments from the following documents appears as Appendix 10.

- Draft EIS
- Supplementary Document
- Addendum to the EIS (this document).

Where discrepancies occur between approval documents, commitments and information presented in this Addendum supersede previous commitments. This commitments register will be a dynamic management tool for TNG and will be updated throughout the Project life, as required.

10 REFERENCES

Department of Industry and Resources (1997) *Safety bund walls around abandoned open pit mines – Guideline*.

Duguid, A., Barnetson, J., Clifford, B., Pavey, C., Albrecht, D., Risler, J. and McNellie, M., (2005) *Wetlands in the Arid Northern Territory*. Northern Territory Government, Department of Natural Resources, Environment and the Arts, Alice Springs.

GHD (2015) Appendix I Draft EIS – Air Quality Assessment

GHD (2016) Mount Peake Project – Draft EIS

GHD (2017) Mount Peake Project – Supplement to the Draft EIS

Loch R.J. & Squires H. (2010) *Runoff quality impacts of dust suppression using saline water*. Copernicus.

11 APPENDICES

Appendix 1: Considerations for the Response Document and Additional Scopes of Work

Appendix 2: Mount Peake Project Water Balance

Appendix 3: Updated Groundwater Drawdown Modelling

Appendix 4: Mount Peake Project Biodiversity Management Plan

Appendix 6: Non-Benign Materials Management Plan

Appendix 5: Adverse Materials Supplementary Investigation Memorandum

Appendix 5A: TNG Memorandum on Barrel Leach Test-Work

Appendix 7: Mount Peake Project Indigenous Community Engagement and Workforce Management Strategy

Appendix 8: Mount Peake Project Social Impact Management Plan

Appendix 9: Mount Peake Project Revised Risk Assessment

Appendix 10: Mount Peake Project Consolidated Commitments Table