



Application for Licence Amendment

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L9010/2016/1
Licence Holder	Mt Morgans WA Mining Pty Ltd
ACN	154 262 978
File Number:	DER2016/002022-1~2
Premises	Mt Morgans Gold Project Legal description – Mining tenements M39/236, M39/395, M39/390, M39/272, M39/18, M39/228, M39/264, M39/304, M39/240, M39/248, L39/245, L39/246, M39/441, M39/250, M39/504, M39/745, M39/403, M39/282, M39/36 and M39/1107 LAVERTON WA 6440
Date of Report	25/05/2020

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Anniversary date	means 10 February in each year;
Annual Period	means a 12 month period commencing from 11 February until 10 February in the following year.
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer of the Department of Water and Environmental Regulation; for the purpose of correspondence means; Chief Executive Officer Department Administering Division 3 Part V of the Act Locked Bag 10 JOONDALUP DC WA 6919 Email: info@dwer.wa.gov.au
Compliance report	means a report in a format approved by the CEO as presented by the Licensee or as specified by the CEO from time to time and published on the Department's website.
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	means Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>

EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
Licence Holder	Mt Morgan WA Mining Pty Ltd
mRL	Means metres Relative Level
mtpa	million tonnes per annum
NATA	means the National Association of Testing Authorities, Australia;
NATA accredited	means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;
NEPM	National Environmental Protection Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997</i> (WA)
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	Mt Morgan's Gold Project
quarterly	means the 4 inclusive periods from 1 April to 30 June, 1 July to 30 September, 1 October to 31 December and in the following year, 1 January to 31 March;
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
Schedule 1	means Schedule 1 of this Licence unless otherwise stated;
Schedule 2	means Schedule 2 of this Licence unless otherwise stated;
spot sample	means a discrete sample representative at the time and place at which the sample is taken
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> (WA)
usual working day	means 0800 – 1700 hours, Monday to Friday excluding public holidays in Western Australia;
µg/L	micrograms per litre
WRL	means Waste Rock Landform.

2. Purpose and scope of assessment

This **Decision Report** explains how Department of Water and Environmental Regulation (DWER) has assessed and determined the application and DWER’s decision-making process and how relevant factors are considered.

The risk assessment in Table 11 includes the assessment of the prescribed activities as per the Existing Licence and the assessment of the current application to increase the throughput of the plant and the addition of TSF Cell 2. This ensures the Decision Report reflects the complete licence and not the amended conditions alone.

2.1 Application details

The Licence Holder (Mt Morgans WA Mining Pty Ltd (MMWA) requested a licence amendment to Licence 9010/2016/1 to increase the annual production capacity from 2.5 Million tonnes per annum (Mtpa) to 3.5 Mtpa of the Category 5: processing or beneficiation of metallic or non-metallic ore where tailings or residue are discharged into a containment cell. This increase will not require upgrades to the processing facility infrastructure as the annual production rates higher than the design capacity currently licensed are due to debottlenecking of plant operations. The plant currently operates at 24 hours a day so there will be no increase in the operating hours.

MMWA also applied to include the associated TSF Cell 2 infrastructure on the Licence. The TSF has been assessed and managed through conditions on the Existing Licence which include both TSF cells however the diagram of monitoring bores in the Schedule 1 of the Existing Licence needs to be amended to include the bores 4 - 6.

As a result of the compliance inspection on 18th – 19th February 2020 of the Premises, Category 57: Used tyre storage, is to be included on the licence with this amendment. The number of used tyres needed to be stored is greater than 100 as they are spread over three contractors’ yards and two mining areas.

Table 2 lists the documents submitted for this assessment.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Works Approval W6008/2016/1 construction compliance Report for Cell 2 by Dacian Gold.	26/04/2019
Application to amend licence number L9010/2016/1 Dacian Gold	26/04/2019
Construction Compliance report completed by Dacian Gold by comparing W6008/2016/1 conditions	26/04/2019
Construction Report Cell 2 stage 1 by CMW Geoscience.	30/04/2019
Email titled “Increased processing plant production” plus attachment received on 15 August 2019.	15/08/2019
Response to draft amendment – more details of documents provided in Schedule 2 of this report	26/03/2020

3. Background

The Mount Morgan’s Gold Project (MMGP) is located approximately 30 km south-west of Laverton. Figure 1 indicates the location of the project in relation to the township of Laverton in

Western Australia. The nearest community is Mt Margaret that is approximately 2.6 km from the processing plant.

The MMGP is owned by MMWM a wholly owned subsidiary of Dacian Gold Limited. Historically, the site has been operated since the 1980s by a number of companies prior to MMWM acquiring it in 2012. The site has been in care and maintenance since 2011 and recommenced operations in 2017.

The timeline of the commencement of operations for MMGP is:

- dewatering of Westralia Pit to allow access to the underground decline early in 2017;
- mining at Jupiter late in 2017;
- processing of ore in early 2018;
- Cell 2 of the two cell TSF completed in late 2019;
- planned discharge of dewatering of Jupiter pit to Lake Carey in 2020 (this requires an amendment of works approval W6008/2016/1 currently being assessed).

MMWM was granted Works Approval W6008/2016/1 on 3 February 2017 and Licence L9010/2016/1 commenced on 10 February 2017 for the prescribed categories listed in Table 3 below.

Table 3: Prescribed Premises Categories in Licence L9010/2016/1

Classification of Premises	Description	Approved Premises production or design capacity or throughput
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which — (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	More than 50,000 tonnes per annum. Maximum design capacity 3.5 million tonnes per annum (an increase with this amendment from 2.5 Mtpa)
Category 6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	1.2 million tonnes per annum
Category 54	Sewage facility	100 kL per day
Category 64	Class II or III putrescible landfill site: Premises on which waste is accepted for burial.	4,500 tonnes per year
Category 57	Used tyre storage (general): premises (other than premises within Category 56) on which used tyres are stored.	100 tyres or more

4. Overview of Premises

4.1 Operational aspects

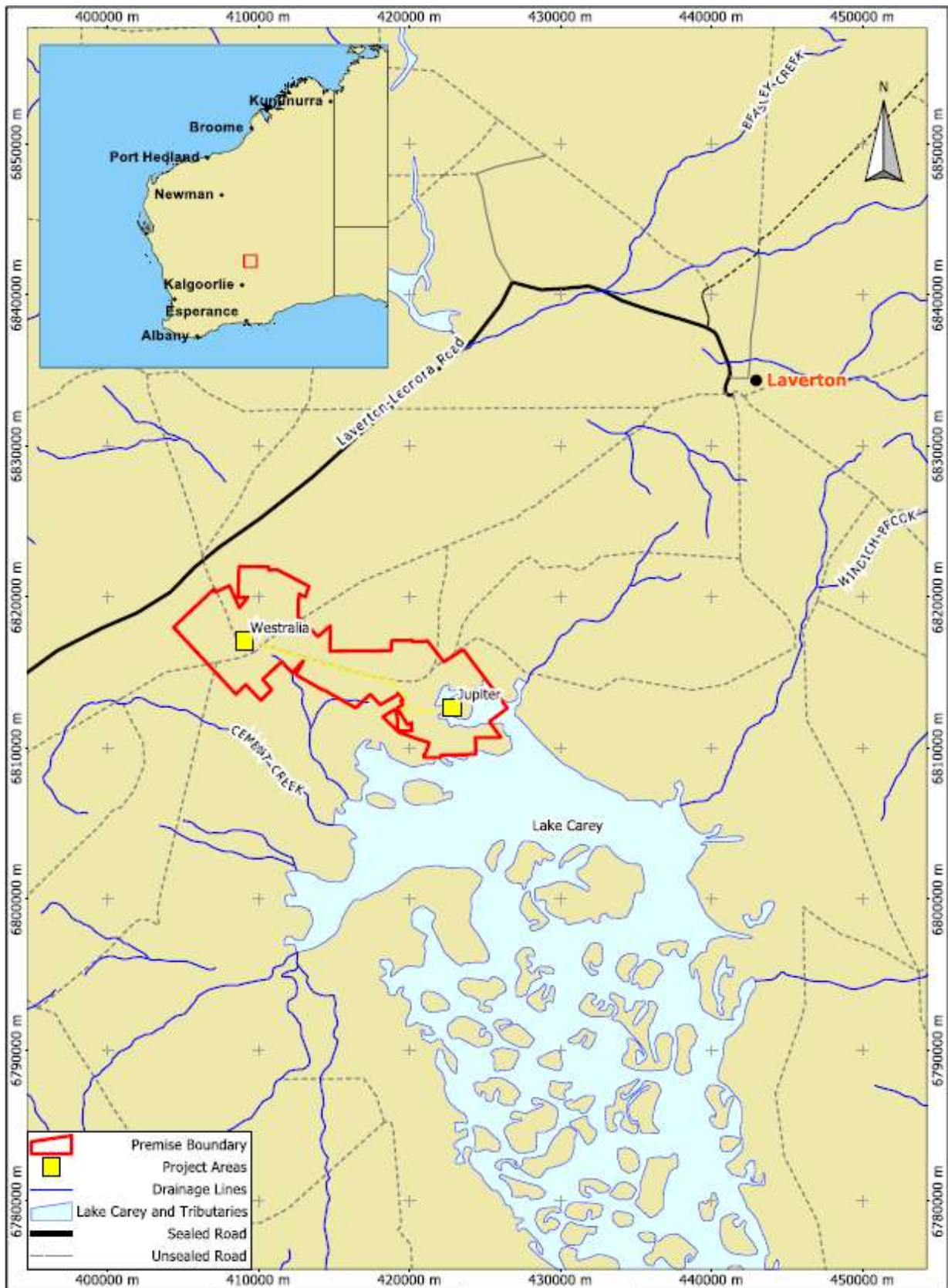
There are two mining areas within the MMGP prescribed premises. They are: Jupiter (comprising of Heffernans, Double Jay (Jenny and Joanne pits) and Ganymede open pits) and Westralia (comprising of Beresford underground, Allanson underground, Morgans North open pit cutback and Transvaal underground).

The processing plant is positioned to the west of Jupiter Pit complex with the TSF to the north of the processing plant.

The boundary of the premises depicted by Mining tenements described in the licence is shown in Figures 1 and 2 below. Figure 2 also depicts the mining areas and infrastructure locations.

The operational aspects of the proposal are described within Section 4.2 table 4 below.

Figure 1: Location of the Mt Morgan Gold Project



4.2 Infrastructure

The MMGP infrastructure, as it relates to Category 5, 6, 54, 64 and 57 activities, is detailed in Table 4 and with reference to the Site Plan attached in the Licence L9010/2016/1.

It is not proposed to alter the infrastructure to increase the production capacity of the plant other than upgrading existing conveyor drives to increase speeds. The TSF Cell 2 and monitoring bores are already included in the Existing Licence conditions.

Table 4 lists infrastructure associated with each prescribed premises category.

Table 4: Mt Morgans Gold Project facility Category 5, 6, 54 and 64 infrastructure

	Infrastructure	Site Plan Reference
Prescribed Activity Category 5		
<p>Located at Jupiter mine site is a Carbon in Leach processing plant (Figure 3) that includes crushing, grinding, a gravity circuit, carbon –in leach circuit and a carbon stripping and gold-room circuit. Hill side paddock style TSF using an upstream construction method are located directly north of the process plant. Processing area includes Run of Mine pads, Water storage dams, Workshop, Administration offices plus discharge and return pipelines.</p>		
1	Carbon in Leach processing plant: Process water ponds, thickener, carbon in leach (CIL) tanks, elution column.	Figures 3a and 3b
2	Ore crushing and grinding operations: ROM bin, jaw crusher, crushed ore stockpile and reclaim feeders, quicklime silo, pebble crusher, semi-autogenous grind (SAG) mill, ball mill, cyclone assembly and gravity circuit.	Figure 3
3	Hill side TSF Cell 1 and Cell 2 with central decant tower and pump back to process circuit plus associated pipelines.	Figure 4
4	Carbon stripping and Gold-room circuits	Figure 3
Prescribed Activity Category 6		
<p>Production bores and collection sumps including discharge pipelines. Most dewater used for dust suppression and mining purposes currently excess from Heffernan Pit is discharged to Jenny Pit, both pits are part of the one Jupiter pit complex. Excess from Westralia is discharged to King Street, Ramornie, Ramornie North, Sarah and Craic pits. All pipelines carrying hypersaline water will have bunds and fitted with leak detection flow meters and/or shut-off isolation valves. Dewatering discharge configuration shown in Figure 7 and 8.</p>		
1	20 Production Bores plus monitoring bores and Sumps	Figure 7 & 8
2	Discharge pipelines and plant return pipelines.	Figure 7 & 8
3	Pipeline bunds and leak detection devices	Not depicted
Prescribed Activity Category 54		
<p>Two wastewater treatment plants located at Westralia accommodation village and Jupiter process plant and mine site.</p> <p>Westralia accommodation village wastewater treatment plant (WWTP) rated at 75.6 kL/day, being 420 people capacity at 180 litres per person per day. The plant consists of two 50 kL/day capacity containerised units (100 kL/day), treating sewage through a combined anoxic/aerobic suspended growth treatment process. Treated wastewater discharges to a 3.6Ha irrigation field. As a contingency, a 350kL HDPE lined pond is available to store treated wastewater during periods of heavy rainfall or during emergency for reprocessing back at the Westralia treatment plant.</p> <p>Jupiter WWTP has a capacity of 7.5 kL/day (150 people at 50 L/person/day) and consists of one containerized unit, sewage is treated in a combined anoxic / aerobic suspended growth process and treated wastewater is discharged into the TSF.</p>		

	Infrastructure	Site Plan Reference
1	Westralia 2 x 50kL/day anoxic/aerobic suspended growth treatment plants	Figure 5
2	3.6 Ha irrigation field near the accommodation village	Figure 5
3	A contingency 350kL HDPE lined wastewater storage pond	Figure 5
4	Pipelines and irrigation discharge system	Not depicted
5	Jupiter containerised anoxic / aerobic suspended growth treatment plant	Not depicted
6	Pumps and pipelines to TSF	Not depicted
Prescribed Activity Category 64		
Westralia and Jupiter putrescible landfill facilities have been constructed and operating since 2017. Mt Mongans Gold operation will generate approximately 2,500 tonnes per year of inert waste and 2,000 tonnes per year of putrescible waste. Authorisation of the disposal of tyres at Jupiter West Waste Rock dump and a putrescible landfill at the 'Back o Beyond' pit has been granted.		
1	Inert and Putrescible landfills at Westralia, Jupiter and 'Back o Beyond'	Figure 6 (Westralia and Back O' Beyond landfills) & 4 (Jupiter landfill)
2	Tyre disposal at Jupiter West Waste Rock Dump	Figure 4
Prescribed Activity Category 57		
1	There are three workshop areas that store tyres prior to disposal at the West Waste Rock Dump	<ol style="list-style-type: none"> 1. Westralia MSA Workshop (RUC) Figure 5 2. Juniper MSA Workshop (McMahon) Figure 5 3. Surface Haulage Workshop (Merkanooka) Figure 4
Other activities		
1	<p>Power generation (category 52)</p> <p>Initially this proposal intended to generate 15 MW diesel fired power station. After confirming design specification, it was determined that 5 x 3.3 MW gas fuelled and 3 x 1 MW diesel driven would generate sufficient electrical power for the project. Being below the threshold, category 52 was removed from licence. See application dated October 2017 (A1544026).</p>	Figure 3a (not labelled)
2	<p>Bulk storage of Chemical (category 73)</p> <p>Category removed from Licence as less than 1000m3 in aggregate of chemical is stored onsite.</p>	Figure 3a (Reagent storage)

Figure 3a: Oblique aerial image of the Jupiter processing plant



Figure 3b: Raw and process water ponds with settling pond

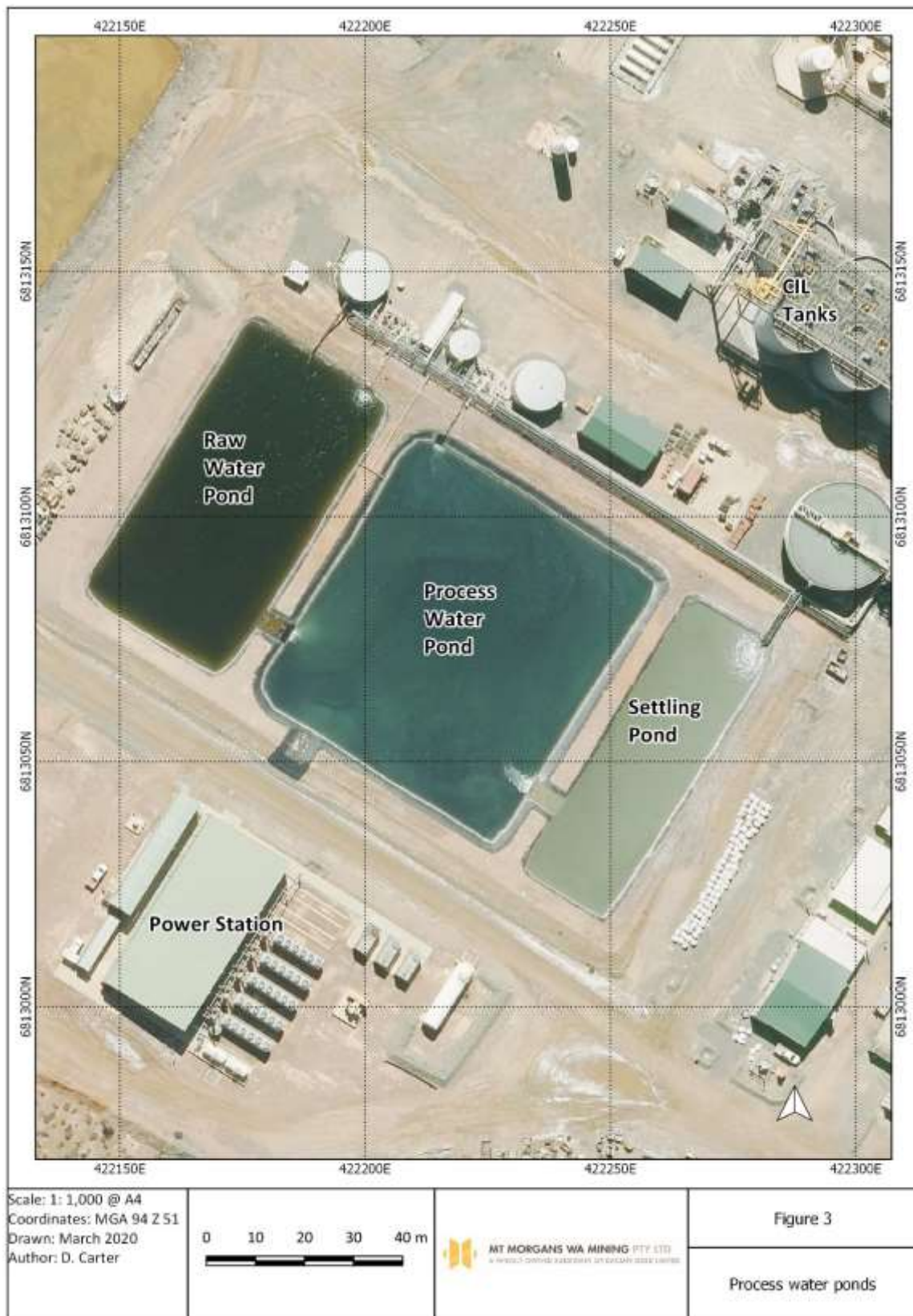


Figure 4: Jupiter site plan

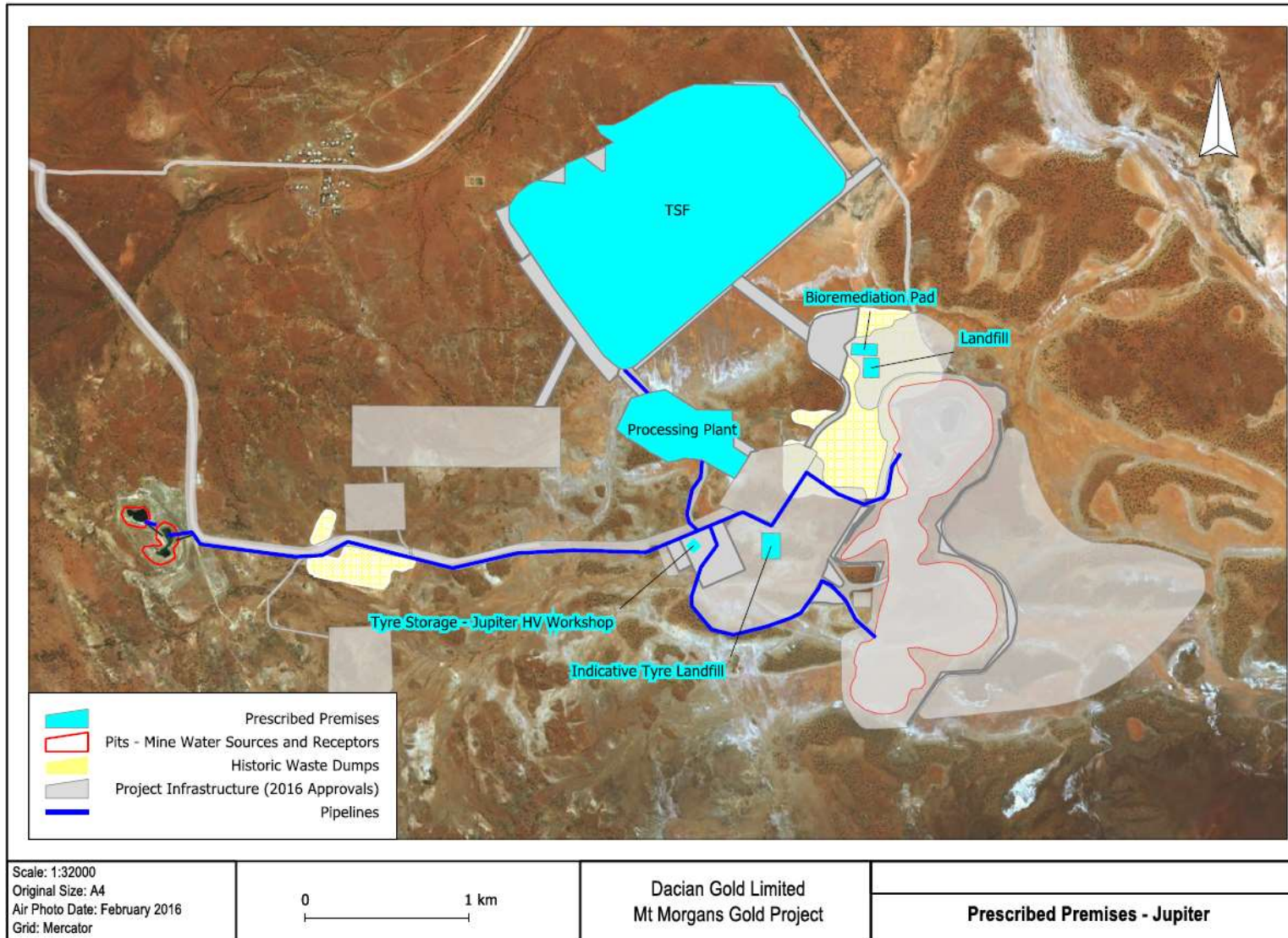


Figure 5: Westralia site plan

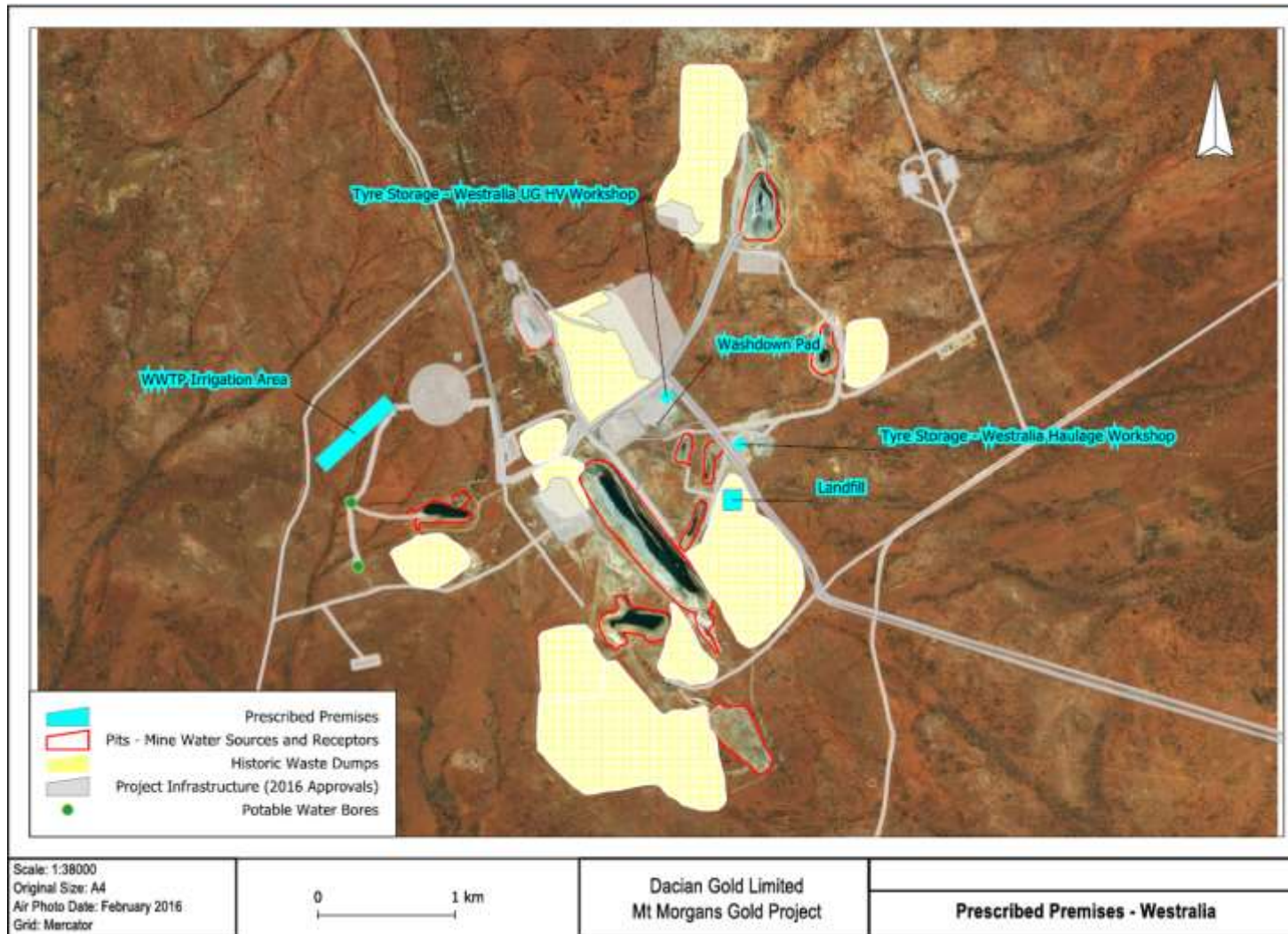


Figure 6: Westralia and Back O' Beyond landfills

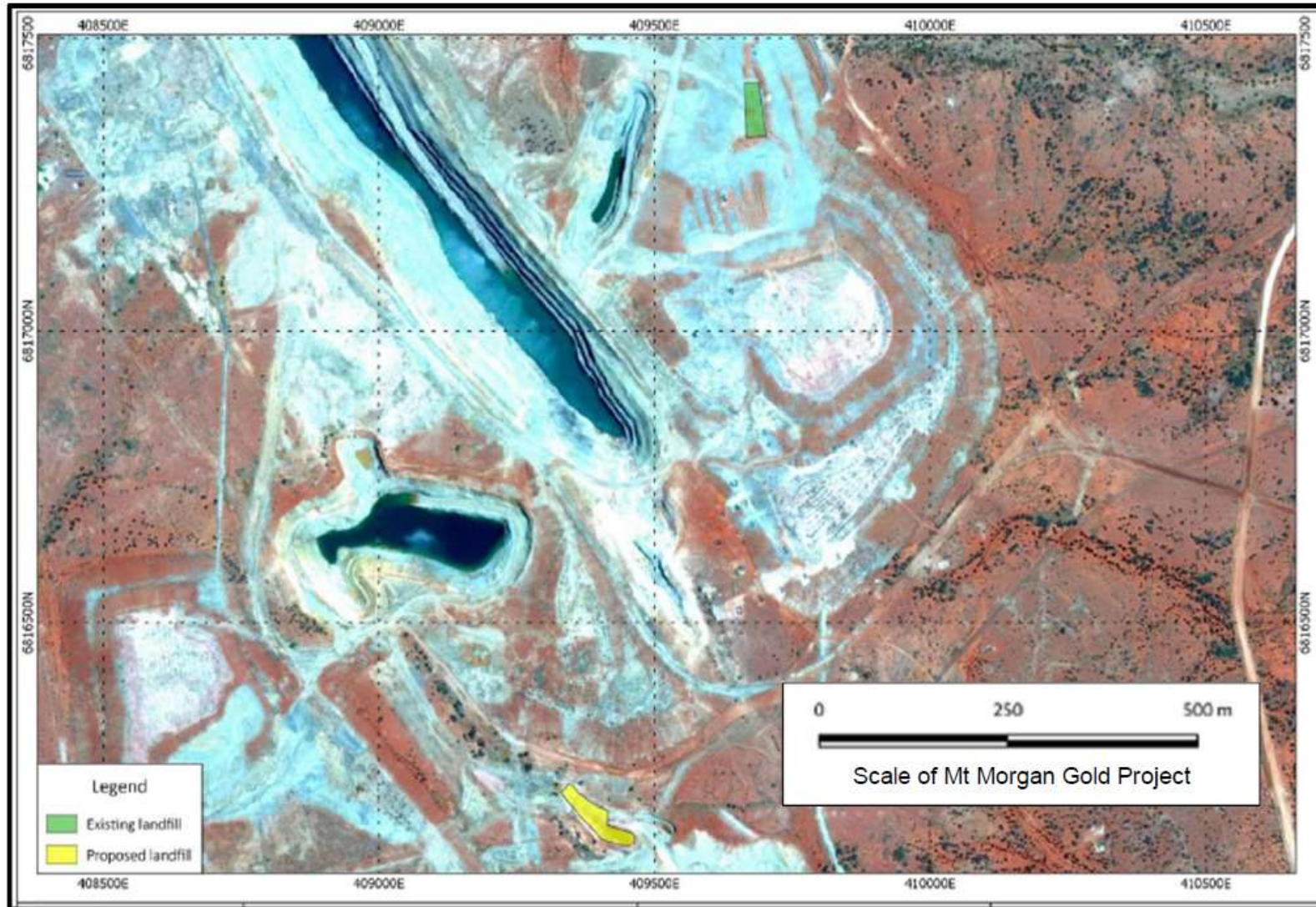


Figure 7: Dewatering discharge configuration for Westralia minesite

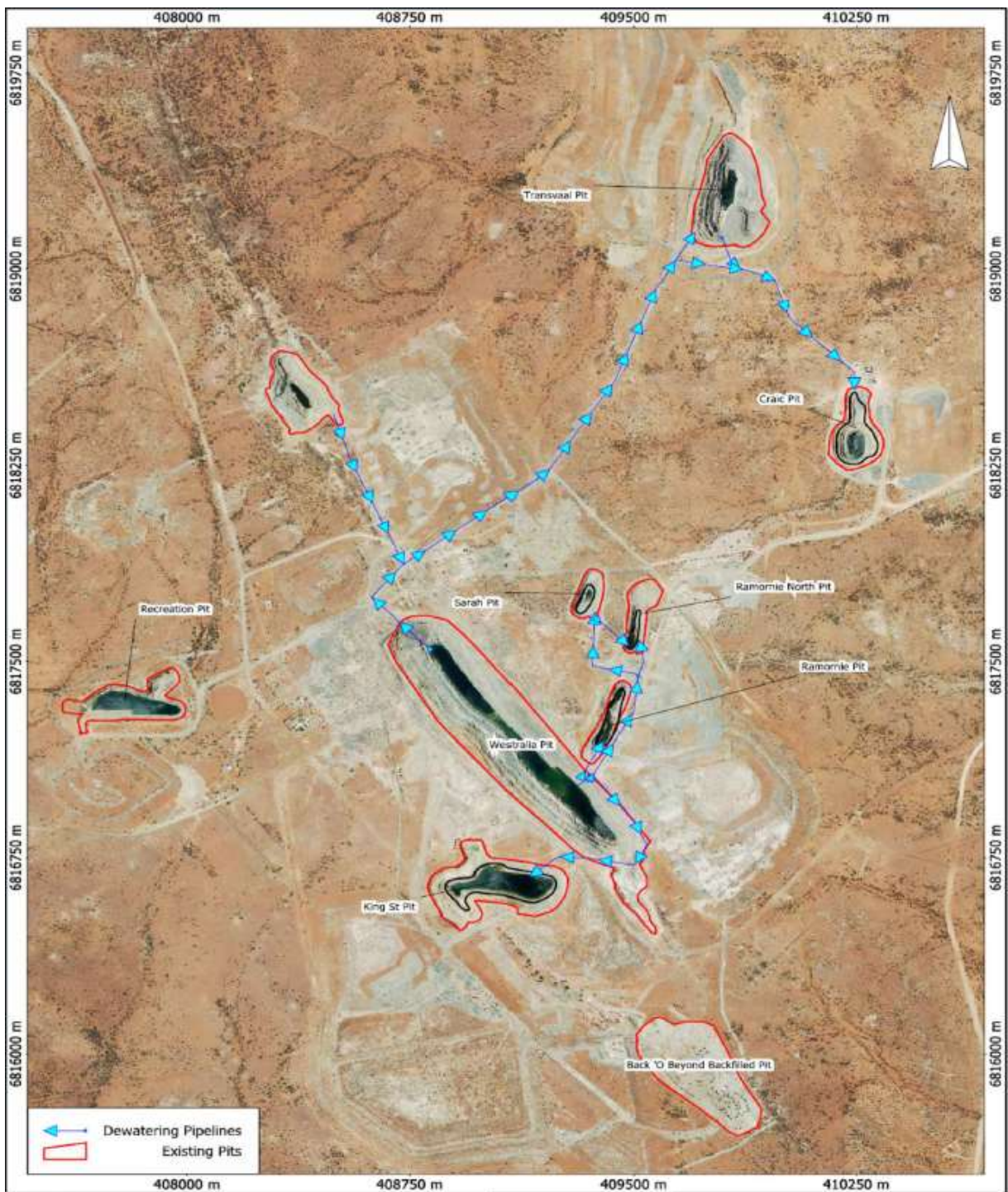
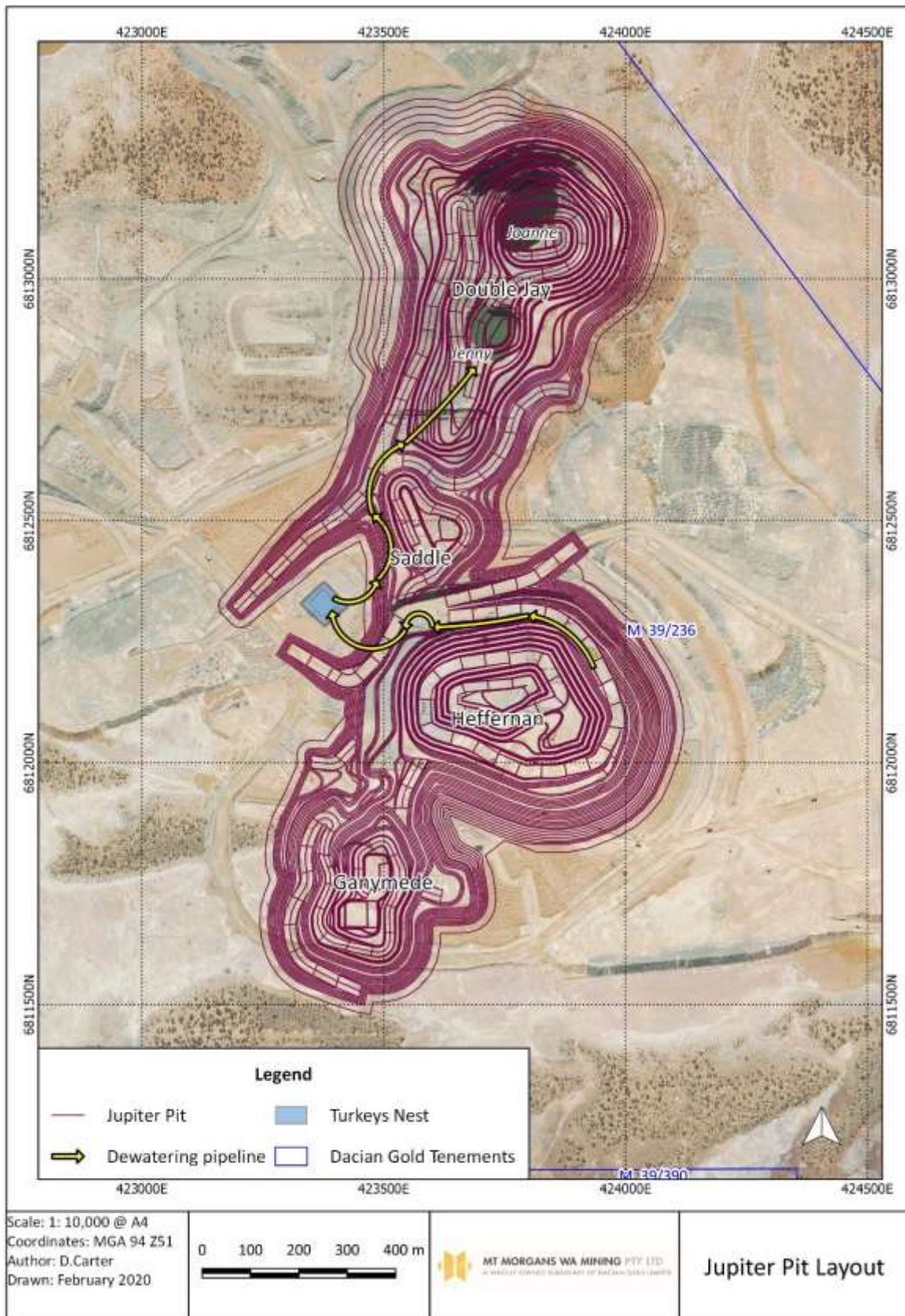


Figure 8: Dewatering discharge configuration for Jupiter minesite



4.3 Exclusions to the Premises

W6008/2016/1 assessed and approved category 52; electrical power generation for the MMGP however, an amendment was received in October 2017 that demonstrated the final power station design did not trigger the threshold for category 52 and this prescribed activity was removed from the Licence.

Prescribed activity category 73; bulk storage of chemicals was also removed from the Licence as less than 1000m³ in aggregate of chemical is stored at the premises which is regulated by the Department of Mines, Industry Regulation and Safety (DMIRS) under the provisions of the *Dangerous Goods Safety Act 2004*.

5. Legislative context

Table 5 summarises approvals relevant to this assessment.

Table 5: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
<i>Mining Act 1978 (WA)</i>	The Mining Proposal Reg ID 60641 for Mt Morgans Gold project submitted September 2016.	Mt Morgans WA Mining Pty Ltd	Mining Proposal Reg ID 60641 approved on 23 December 2016. DMIRS indicated an amendment of the Mining proposal to increase the annual throughput from 2.5 to 3.5 Mtpa is not required if there is no changes of disturbance footprint, the process plant, the TSF, the waste streams or waste dumps. The performance of the design and continued stability of the TSF with the increased rate of tailings deposition is the responsibility of DMIRS.
<i>Rights in Water and Irrigation Act 1914 (WA)</i>	GWL169901 (6) GWL183915(2)	Mt Morgans WA Mining Pty Ltd	GWL169901 (6) Allows the abstraction of groundwater from the fractured rock aquifer on the Prescribed Premises. Approves the abstraction of up to 1.4 GL per year expiring on 7 September 2027 GWL183915(2) Allows the abstraction of water from the calcrete aquifer to the north of the Prescribed Premises for use in prescribed activities on the Premises. The approved abstraction is 3.5 GL per year expiring on 29 August 2027
<i>Part V of the EP Act (WA)</i>	W6008/2016/1	Mt Morgans WA Mining Pty Ltd	11 Stage Works Approval including Commissioning Plan (A1336543)
	L9010/2016/1	Mt Morgans WA Mining Pty Ltd	Licence amended as works approval compliance reports received from Licence Holder.
	Clearing Permit CPS7408/2	Mt Morgans WA Mining Pty Ltd	Granted December 2016 to clear 633Ha of vegetation.

5.1 Part V of the EP Act

5.1.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the *Environmental Protection Act 1986 (EP Act)* and the following regulations;

- *Environmental Protection Regulations 1997*

- *Environmental Protection (Noise) Regulations 1997*
- *Environmental Protection (Unauthorised Discharges) Regulations 2004*

The guidance statements that inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Publication of Annual Audit Compliance Reports (May 2016)*
- *Guidance Statement: Decision Making (June 2019)*
- *Guidance Statement: Risk Assessments (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

5.1.2 Recent Works Approval and Licence history

Table 6 summarises the works approval and licence history for the premises.

Table 6: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
W6008/2016/1	3/2/2017	Works Approval for Mt Morgan Gold Project for the following activities: Category 5 - Processing Category 6 -Dewatering Category 52 - Electric power generation Category 54 -Sewage facility -Putrescible landfill; and -Bulk storage of chemicals
L9010/2016/1	9/2/2017	New Licence for Stage 1 of the Works Approval - Westralia dewatering
L9010/2016/1	27/06/2017	Amend licence to include category 64 Westralia Landfill plus conditions
L9010/2016/1	04/08/2017	Amend licence to include category 54 Westralia WWTP plus conditions
L9010/2016/1	17/01/2018	Amend licence to include category 64 Jupiter Landfill plus conditions
L9010/2016/1	23/02/2018	Amend licence to include tyre landfill facility and changes to the dewatering configuration.
L9010/2016/1	27/03/2018	Amend licence to include category 5 conditions and Jupiter WWTP
L9010/2016/1	24/07/2019	Amend Licence to include category 64 'Back O Beyond' Landfill.
L9010/2016/1	26/05/2020	Amend Licence to include TSF Cell 2 and increase annual production throughput to 3.5 Mtpa

5.1.3 Works Approvals W6008/2016/1

Works Approval W6008/2016/1 lists 11 stages of construction works for the MMGP requiring the submission of Compliance Reports at completion of construction and prior to commissioning. A commissioning plan (A1336543) for the MMGP was submitted by MMWM on 5 December 2016 which describes the commissioning stages and timescales for each of the 11 stages of the Works Approval.

The status of each construction stage is described in Table 7. Section 5.2 of this report assesses stage 7 of the Works Approval and addresses an increase of annual production throughput from 2.5 to 3.5Mtpa.

Table 7: Works approval stages

Stage	Description	Status
1	Construction of pipeline infrastructure for Westralia dewatering purposes.	Completed, compliance report submitted and category 6 added to licence
2	Construction of landfills	Completed, compliance report submitted and category 64 added to the licence
3	Construction of waste water treatment plants (WWTP's)	Completed, compliance reports for Westralia and Jupiter WWTP submitted and category 54 added to the licence
4	Construction of TSF Cell 1 to 408 mRL	Completed TSF Cell 1, compliance report submitted and category 5 added to the licence
5	Construction of pipeline infrastructure for Jupiter dewatering purposes	Construction not commenced
6	Construction of the processing plant	Completed, compliance report submitted and category 5 processing conditions added to the licence
7	Construction of TSF Cell 2 to 408 mRL	Construction completed, compliance with Works Approval assessed in this Decision Report
8	Construction of TSF Cell 1 raise to 412 mRL	Construction not commenced
9	Construction of TSF Cell 2 raise to 412 mRL	Construction not commenced
10	Construction of TSF Cell 1 raise to 414 mRL	Construction not commenced
11	Construction of TSF Cell 2 raise to 414 mRL	Construction not commenced

Works Approval W6008/2016/1 stage 5, 8, 9, 10 and 11 are yet to be constructed.

5.2 Assessment of W6008/2016/1 Stage 7: Tailings Storage Facility Cell 2 Compliance Report

A compliance report for the construction of the TSF Cell 2 was submitted with the amendment application on 26 April 2019. An assessment of the compliance document is required as part of the assessment of the amendment application. The compliance document must comply with works approval W6008/2016/1 conditions 1.2.1, 1.2.2 Table 1.2.1, 1.2.3, 2.1 table 2.1.1, 3.1.1, 3.1.2, 3.1.4 and 3.1.5, 4.1.1 and 4.1.2. The findings discussed following sections.

5.2.1 Compliance with conditions 1.2.1, 1.2.2, 1.2.3 and Table 1.2.1 of W6008/2016: construction of infrastructure

Works approval conditions 1.2.1, 1.2.2, 1.2.3 and Table 1.2.1 required that the infrastructure be constructed in accordance with the table described below, where any material changes to the constructed infrastructure are minor and do not increase the risk to public health, amenity or the environment plus commissioned in accordance with the approved plan (A1336543). The infrastructure checked for construction is described in the following table.

Infrastructure	Requirements (design and construction)
Tailings storage facility	Hill side paddock facility comprising two cells (Cell 1 and Cell 2), constructed in stages.
	Total capacity over a 7 year mine life to be 17.5 million tonnes.
	Multiple rotating spigots to be installed around the perimeter of each cell, spaced approximately 36 m apart for the slurry to be discharged through.
	Decant tower to be constructed at centre of each cell, accessed via causeways.
	Designed and constructed with 0.5 m total freeboard.
	Embankments to have cut-off trenches at a depth of 1.5 m.
	Base of cells to be proof compacted to provide permeability of 1×10^{-8} m/s.
	Flood bund to be constructed around downstream perimeter of TSF embankments to an elevation of 401.5 mAHD.
Pipelines	All pipelines carrying hypersaline water or tailings to be bunded and fitted with leak detection flow meters and shut off/isolation valves.
	All joints to be undertaken by a licenced and qualified polywelder.
	Pipelines to be installed in accordance with AS4130 and the Plastic Industry Pipe Association of Australia Limited (PIPA) Guidelines POP003.

MMWA proposed changes in the infrastructure design on 20 November 2017. DWER considered the changes and determined an amendment to the works approval was not necessary in correspondence dated 11 December 2017. Amendment to the infrastructure design comprised;

- Inclusion of underdrainage system
- Change in the embankment filter zone material, and,
- Amendment to playa clay preparation and permeability requirements.

The underdrainage of Cell 1 and Cell 2 consists of a single drain upstream of the TSF southern embankments. This drain reports to a pipe leading through the southern wall to a HDPE lined pond (Cell1) and a smaller concrete lined sump (Cell 2). The pond and the sump are both enclosed by a flood bund to prevent stormwater flowing into them.

The playa clay that is the base of the TSF cells was intended to be compacted to establish a permeability of $1 \times 10^{-8} \text{ ms}^{-1}$ as per the requirement in the previous table. MMGP advised that there was risk of the clay being rutted due to the wet conditions during construction. As the natural clay surface was found to have an average permeability of 2.6×10^{-8} it was felt that this very low level of permeability could not be practically improved by rolling and it may be increased by damage to the clay surface.

Other minor variations are also noted during the construction of TSF Cell 2 are:

- **Spigots Intervals:** The Works Approval W6008/2016/1 states that spigots will be placed around the perimeter of the TSF at 36 m intervals. The final design includes spigots at 24 m intervals. Reducing the spigot spacing should lead to more even beaching and a reduced likelihood of water ponding near the perimeter embankments. Spigot operation should ensure the discharge points are regularly changed such that the decant pond is maintained around the decant location within each cell.
- **Flood Protection Bund Height:** The Works Approval W6008/2016/1 required the TSF to have a flood protection bund, constructed around the downstream perimeter embankments to an elevation of 401.5 mAHD. A variation to the height requirement was determined following further flood assessment undertaken in April 2017. This involved a survey of the playa lake elevations around the processing plant and TSF area. This survey yielded maximum and minimum lake surface elevations of 399.66 mAHD and 398.71 mAHD respectively with an average elevation of 399.10 mAHD. Based on this information, the previously recommended 401.50 mAHD flood level is significantly higher than any credible flood event over the adjacent playa lake surface. It was determined that a revised flood elevation in the order of 400.50 mAHD should

be adopted for detailed design. This revised flood elevation ensures an average height above the playa lake surface of 1.40 m.

- **Decant tower change of materials:** blue waste rock material was used instead of Zone 4 material to construct the decant access up to 120 m east of the existing TSF1 embankment.
- **Other infrastructure:** TSF Cell 2 perimeter starter embankment has been constructed to a height of 8 m above ground level to RL 408m as described in the works approval. Therefore, the TSF Cell 2 construction is in accordance with design specifications in Works Approval W6008/2016/1 and include the low risk design variations described above.

The volume of tailings material that can be stored in the TSF following initial construction and each wall lift is depicted in the following table. At completion of construction of TSF stage 1, Cell 1 and Cell 2, there is the ability to receive and contain 5.6M tonnes of tailings waste.

TSF Cell	Construction Stage	Embankment Crest Elevation (m RL)	Storage Capacity (Mt)
Cell 1	Stage 1 (starter)	408	2.6
	Stage 2	412	3.9
	Stage 3	414	2.3
Cell 2	Stage 1 (starter)	408	3.0
	Stage 2	412	3.7
	Stage 3	414	2.1
Total			17.6

The TSF pipelines are installed to the requirements as stated in the above infrastructure table.

The Compliance Report and supporting documents provided on 26 April 2019 were reviewed and found:

1. *To comply with condition 1.2.1, 1.2.2 and 1.2.3.*
2. *To comply with Infrastructure described in table 1.2.1 with minor material changes to spigot intervals, flood protection bund height and decant tower material. These changes do not increase the risk to public health, amenity or the environment.*

5.2.2 Compliance with condition 2.1 and table 2.1.1 of W6008/2016: dust management

Works approval condition 2.1.1 and table 2.1.1 require the management of dust in accordance with the requirements of the table described below. The compliance report and supporting documentation confirms that use of water carts, sprays and dust suppressants during the construction of the TSF during adverse weather conditions. Monitoring data provided in the compliance report for the period from 1 March 2018 to April 2019 indicate dust emissions did not exceed the limits specified in the works approval.

Description	Operation Details
Water carts/sprays and/or use of dust suppressants other than water	-Shall operate when visible dust is generated from ground surfaces on the Premises; -Shall operate proactively on haul roads subject to weather forecasting over a 24 hour period.
Cessation of activities	-Cease an activity causing visible dust lift-off where dust management measures have not prevented dust lift-off and there is a risk of dust affecting sensitive receptors.
Vehicles and mining equipment	-To adhere to all on-site speed limits

	-Water sprays or other appropriate methods to be used to suppress wheel-generated dust
Management response to dust trigger exceedance	In the event the trigger level is reached, based on the real time monitoring required by condition 3.1.4, and the exceedance is confirmed as attributable to activities on the premises, management measures (such as use of use of water cart / sprays or, if necessary, temporary cessation of the dust generating activity) are to be promptly employed to control the dust to prevent further exceedance of the of the trigger value.
Continuous improvement	The works approval holder shall continuously improve site dust management through identification of dust sources and implementing improved dust controls.

The Compliance Report and supporting documents provided on 26 April 2019 were reviewed and found:

1. To comply with condition 2.1 and table 2.1.1

5.2.3 Compliance with conditions 3.1.2, 3.1.3 and 3.1.4 of W6008/2016: dust monitoring

Works approval condition 3.1.2, 3.1.3 and 3.1.4 require dust monitoring for PM₁₀ due to the proximity of the Mt Margaret Community to the Jupiter Project area. Condition 3.1.2 of Works Approval W6008/2016/1 requires monitoring airborne dust as specified in the table below

Compliance Monitoring of Airborne Dust

Monitoring point	Parameter	Limit	Units	Sampling duration	Applicable standards
Located to measure airborne dust exposure levels at the Mt Margaret Community	PM ₁₀	50	µg/m ³	24 hours	Monitoring methods: AS 3580.9.8, AS 3580.9.11, or AS 3580.9.6 Siting: AS 3580.1.1

Condition 3.1.3 provides an exemption to the compliance limit applies where:

- a) The corresponding management action is taken (see Table below); and
- b) There is sufficient evidence to demonstrate that this exceedance is not attributed to operations on the Premises.

Compliance Monitoring of Airborne Dust

Monitoring point	Event	Management Action
Located to measure airborne dust exposure levels at the Mt Margaret Community	Exceedance of limit specified in Table 4.	Undertake an investigation of the exceedance, including but not limited to: a) The root cause analysis for the exceedance; and b) Any common or contributory factors for the exceedance.

In addition, Works Approval condition 3.1.4 required monitoring of air-borne dust for operational management purposes using equipment which:

- a) Supplies continuous real-time data to allow real-time monitoring for PM₁₀;
- b) Provides automatic feedback (SMS test message or equivalent) to the mine manager or supervisor if pre-set trigger is reached; and
- c) Complies with AS 3580.1.1

Continuous monitoring of airborne dust exposure at the Mt Margaret Community using an Environmental Beta Attenuation Mass Monitor (E-BAM) has occurred. The E-BAM was

installed in May 2017 near the Mt Margaret Community, corresponding with the commencement of construction activities at Jupiter.

The E-BAM generates automatic mobile phone SMS messages and emails to the Environmental and Safety Advisors and Registered Manager when the PM₁₀ 24 hour average 50 µg/m³ limit is exceeded. It generates a warning SMS message and email at 40 µg/m³ so that management actions can be implemented before the compliance limit is reached. The E-BAM also has a wind speed / wind direction sensor, intended to provide local wind data to assist with dust management.

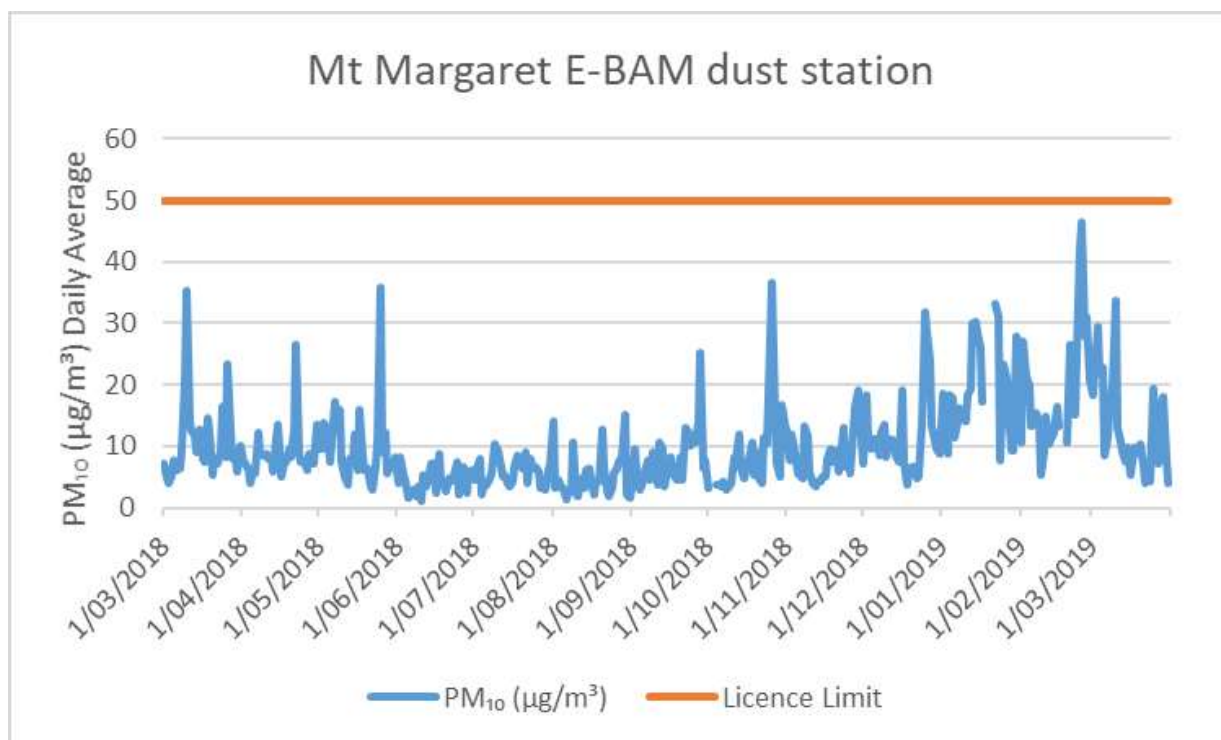
The E-BAM station meets the requirements of Australian Standard (AS) 3580.9.11 and AS 3580.1.1. To ensure accurate readings, the E-BAM is calibrated on a quarterly basis by a NATA accredited specialist consultant. The E-BAM depicted in photograph following.

Figure 9: E-BAM at Mt Margaret Community



The daily average (24 hour) PM₁₀ levels recorded at the E-BAM station for the period March 2018 to March 2019 are presented in the chart below. The data is validated to remove any data affected by instrument faults, calibrations and other maintenance activities. No exceedances above the 50 µg/m³ limit were recorded during the monitoring period.

Figure 10: Chart of daily average PM10 results



The Compliance Report and supporting documents provided on 26 April 2019 were reviewed and found:

1. To comply with condition 3.1.2, 3.1.3 and 3.1.4

5.2.4 Compliance with conditions 3.1.1 and 3.1.5 of W6008/2016: ambient groundwater monitoring

Works approval conditions 3.1.1 and 3.1.5 require monitoring of ambient groundwater from around the TSF and ensures correct sampling standards and laboratory analysis by an accredited laboratory. Condition 3.1.5 required ambient groundwater monitoring for the parameters and at the frequency described in the table below.

Monitoring of Ambient Groundwater

Monitoring Point Reference	Parameter	Units	Average Period	Frequency
Monitoring Bores 1 – 6	Total Dissolved Solids	mg/L	Spot sample	Once to provide background levels prior to the commissioning period.
	pH	pH units		
	Standing Water Level	mbgl		
	WAD Cyanide, Arsenic, Antimony, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Nickel, Selenium, Zinc, Thallium.	mg/L		

The remaining three monitoring bores were constructed at TSF Cell 2 and are identified as MB4, MB5 and MB6, as indicated in Figure 11. The location of these new monitoring bores will need to be included in Schedule 1 plans of the Licence.

A Tailings Groundwater Management Plan (TGMP) was submitted in accordance with licence condition 3.5.2 and 3.5.3 which can now be removed from the Licence L9010/2016/1.

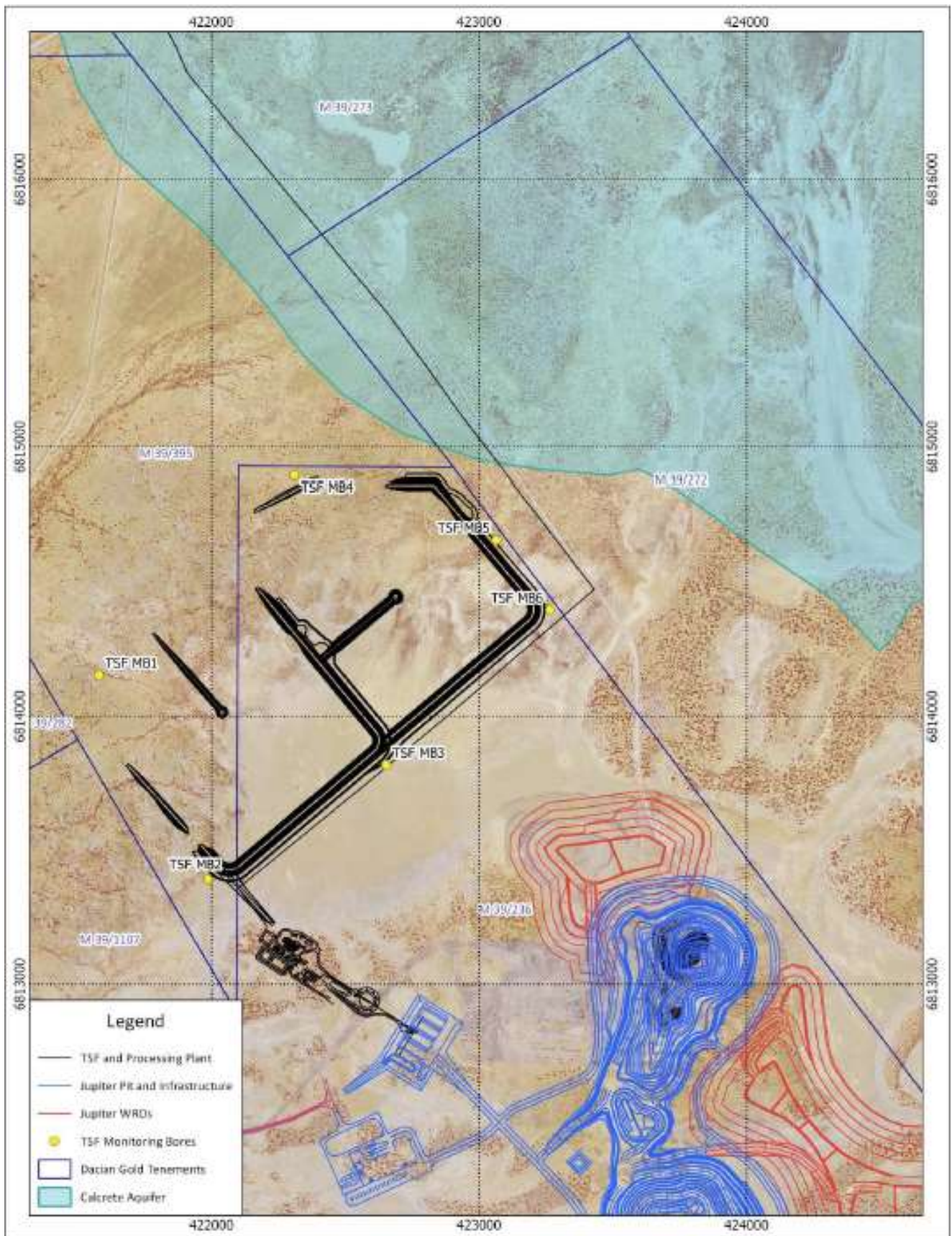
4 rounds of sampling have been collected from MB 4 - 6 between June 2018 and March 2019 and analysed by a NATA accredited laboratory for the parameters indicated in ambient groundwater monitoring table described above.

The ambient groundwater results indicated that groundwater in the vicinity of TSF Cell 2 is neutral with moderate to high salinity with Total Dissolved Solids (TDS) values ranging between 3,900 mg/L – 47,000 mg/L with low concentrations of metals and metalloids.

The Compliance Report and supporting documents provided on 26 April 2019 was reviewed and found:

- 1. To comply with condition 3.1.1, and 3.1.5*
- 2. Amend/remove condition 3.5.2 & 3.5.3 from licence L9010/2016/1 as TGMP has been provided to DWER for review/comment*

Figure 11: Tailings Storage Facility Monitoring Bores



5.2.5 Compliance with conditions 4.1.1 and 4.1.2 of W6008/2016: reporting

Works approval condition 4.1.1 and 4.1.2 require a compliance report and supporting documentation be:

- submitting to Chief Executive Officer, following construction and prior to commissioning of the infrastructure.
- certifying the works are in accordance with the works approval, and,
- endorsed by person authorised to represent the Works Approval Holder and contain their name and position within the company.

The General Manager MMWA certified the compliance report and supporting documents on 26 April 2019 following TSF Cell 2 construction. DWER received these documents on 26 April 2019.

The Compliance Report and supporting documents provided on 26 April 2019 was reviewed and found:

1. *To comply with condition 4.1.1, and 4.1.2*

5.3 TSF performance

The TSF construction was compliant with the conditions of W6008/2016/1 however the post construction performance of the facility is of concern. The groundwater standing water levels (SWL) has risen around the base of the TSF as measured in the monitoring bores. Of particular concern is the groundwater measurements of TSF MB1 and TSF MB2.

TSF MB1 on the north west of the TSF showed a rising SWL and a rapidly increasing salinity. The water was brackish (1600 mg/L total dissolved solids (TDS)) but rapidly became saline (>6000mg/L TDS) after commencement of deposition of tailings into Cell 1. The potential for impact on native vegetation along the northern edge of the TSF increases with rising water levels and salinity. With the vegetation in this area including *Acacia aneura* trees, a species known to have deep roots where there is suitable groundwater.

TSF MB2 shows the SWL at the south western edge of the TSF to be approximately 10cm below surface level and during a compliance inspection by DWER on 18 February 2020, there were areas near the base of the TSF where the water was expressed on the surface of the ground. A tailings spill in this area in 2018 could not be recovered due to the high water content of the ground in the area. This tailings has the potential for being spread during a heavy rainfall event into uncontaminated areas of the playa.

In response to the concerns raised by the results of groundwater monitoring and the compliance inspection a hydrogeological review of the groundwater and surface water around the TSF was carried out in late February and March 2020. This review of the currently available data and observations made during a site visit has made the following findings and suggested actions:

Findings and suggested actions from Mt Morgans Gold Project TSF Water Management Technical Memorandum (Groundwater Resource Management, March 2020)

Groundwater model (Figure 12)	Potential environmental impacts	Proposed program of works
<ul style="list-style-type: none"> • Infiltration of seepage occurred during the initial deposition of tailings as the TSF pond was lying on the ground surface. As the deposition continued the pond was on top of the tailings layer which restricted further infiltration into the ground. • As the TSF pond water infiltrated the ground a groundwater mound formed underneath the TSF, resulting in rising groundwater levels, which subsequently reached the ground surface at the playa lake where groundwater levels are shallower. • Surface water expressions of the groundwater mound occurred on the southern corner and southwestern side of the TSF embankment. This groundwater contains diluted TSF seepage. • The rising groundwater mound also caused increasing groundwater levels along the up-gradient monitoring bores, caused by the rising groundwater mound under the TSF and natural groundwater “backing up” against the higher groundwater levels under the TSF. Some diluted TSF seepage did spread up-gradient. • WAD cyanide at the downstream groundwater monitoring bores are lower compared to the surface expressions of groundwater, which indicate that TSF seepage occurs mainly along shallow preferential zones underneath the embankment foundation, and not the groundwater. • The high TDS concentrations observed in the surface 	<ul style="list-style-type: none"> • Rising groundwater levels along the northern, southern and eastern boundaries could possibly reach the root zone of vegetation and affect vegetation health. • Groundwater expressions at the southern corner of Cell 1, which contain diluted TSF seepage, could mix with surface runoff and flow onto the playa. 	<ol style="list-style-type: none"> 1. A surface water study to address the expression of rising groundwater surrounding the TSF. Groundwater Resource Management is recommending: <ol style="list-style-type: none"> a. a hydrological model to assess the extent of flooding and inundation around the TSF. As part of the hydrological model, water infrastructure requirements should be identified to convey floodwater around the TSF and protect the TSF embankments. The south-eastern embankments already have flood protection bunds and the focus should be the conveyance of floodwater around the southern corner of the TSF and across the access road which connects the TSF and the operational area. b. The surface water study should include conceptual designs and sizing of the required surface water infrastructure. <p>Note: only remove surface water expressions of groundwater around the TSF and not be used to lower groundwater to below background groundwater levels.</p> 2. An update of the groundwater management plan of the TSF, taking in consideration the rising groundwater levels around the TSF. The groundwater management plan should include: <ol style="list-style-type: none"> a. The conceptual design of a recovery

<p>water samples is caused by the solution of playa evaporites in the water.</p> <ul style="list-style-type: none"> •Surface water along the south-western embankment of Cell 1 is likely caused mainly by the groundwater mound expressing at the toe of the TSF embankment. This expression of groundwater is separated from surface runoff by the flood protection bunds and there is no mixing with surface runoff water. •Surface water along the southern corner of Cell 1 is probably a mixture of surface runoff and groundwater expression. It is possible that groundwater expressions at surface, which might contain diluted concentrations of TSF seepage, could enter the surface water during large storm events. 		<p>borefield around the TSF to intercept and capture rising groundwater levels.</p> <ul style="list-style-type: none"> b. The identification of trigger levels in existing monitoring bores – If trigger levels are reached, Dacian Gold should commence with the drilling of boreholes that can be used for the recovery of rising groundwater levels around the TSF. c. With a continuing rising groundwater level trend, Dacian Gold should also allow for equipping the recovery bores to lower groundwater levels around the TSF. The TSF groundwater management plan should include the conceptual design of the recovery borefield (pumps, gensets and pipelines). d. Actions water levels should be identified which are the levels where groundwater infrastructure should be activated to lower groundwater levels around the TSF.
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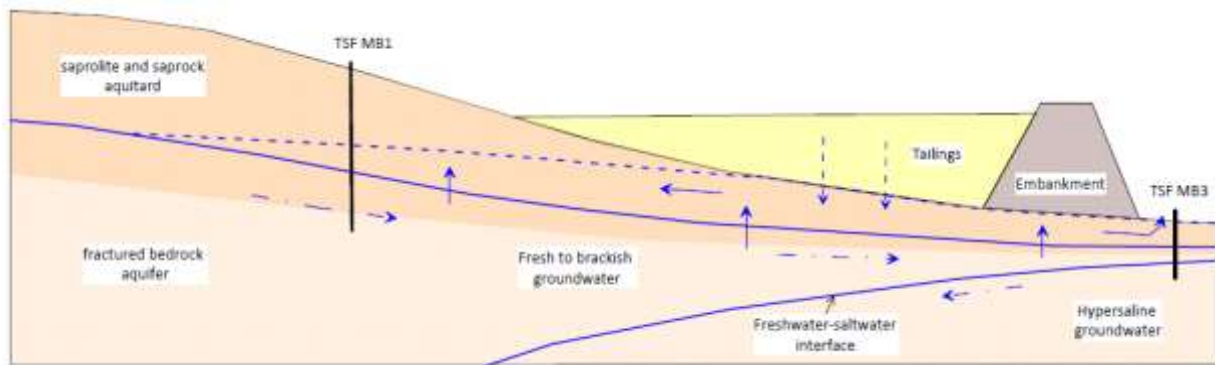


Figure 12: Conceptual groundwater model of groundwater flow under the TSF

The potential for the groundwater mound to impact the calcrete aquifer was assessed. The aquifer is positioned approximately 600m to the North West and the spread of the groundwater mound was calculated to be approximately 180m after a 10 year period. The groundwater mound is therefore not expected to impact the calcrete aquifer.

5.4 Compliance inspection 18 February 2020

A compliance inspection on 18 February 2020 found the TSF had groundwater expressing onto the surface of the ground at the southern edge of the facility and a tailings spill from 2018 had not been removed for disposal into the TSF. This is discussed above in Section 5.3.

The WWTP at Westralia was not built as the compliance documentation supplied on completion had stated. The irrigation area for the treated waste water is 1 hectare smaller than the design specifications. This was picked up on satellite imagery and confirmed during the inspection.

The Jupiter pit area was not sufficiently defined at the time of the Works Approval W6008/2016/1 and rather than one operational pit there are 4 pits: Double J (a mining void made from two pits), Saddle Pit, Heffernans Pit and Ganymede Pit. Heffernans Pit is dewatering into Double J Pit.

6. Location and siting

6.1 Siting context

MMGP is located approximately 30 km south-west of Laverton, in the northern goldfields of Western Australia (Figure 1). Access to the MMGP is via the sealed public Laverton-Leonora Road and the unsealed public Korong-Mount Morgans Road. It is located in the Eastern Murchison subregion of the Murchison Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion. It lies within the Laverton Greenstone Belt, which forms the north-eastern part of the Eastern Goldfields Province of the Yilgarn Craton of Western Australia. It consists of granitic rocks and sedimentary banded iron formation (BIF) rocks.

The premises lies within the Lake Carey catchment and this is the nearest surface water body, with the lakeshore approximately 2.5 km to the south of the Jupiter prospect. Lake Carey's separated from the Jupiter processing plant by a banded ironstone formation (BIF) ridge, approximately 80 m high. Lake Carey may fill during occasional intense rainfall events. There is no major river system in the project area however there are ephemeral creeks that drain in a southeast direction towards Lake Carey.

A small section of the project (Craic open pit, magazine compound, a section of the TSF and

the production borefield) is located on the Glenorn pastoral station lease producing sheep and beef.

6.2 Residential and Sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 8.

Table 8: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Mt Margaret Community	2km to the northwest (measured from Jupiter processing plant) and 900m northwest of the nearest point of TSF
Laverton Township	30km northeast (measured from the Jupiter processing plant)

6.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance impacted from premises activities that cause emissions and discharges.

A Level 1 vegetation assessment was carried out in the area in March 2016 by a qualified botanist, in accordance with the Environmental Protection Authority (EPA) “Terrestrial Biological Surveys as an Element of Biodiversity Protection; Position Statement No 3” (EPA 2002) and Guidance Statement No 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004)”. A total of 32 Families, 77 Genera and 195 Species recorded in the area. The results of the survey showed no Declared Rare Flora, no Threatened flora or Priority flora species recorded near the TSF and Jupiter process plant.

In March 2016, a fauna and habitat assessment was completed. The majority of the conservation significant species identified are migratory shorebirds protected under international conventions, 11 in total, which may be present when Lake Carey is inundated. Two migratory shorebirds recorded in the project area during the fauna survey: the Common Greenshank and the Red-necked Stint. Lake Carey is a specified ecosystem because it is a suitable habitat for listed migratory shorebirds.

The distances to specified ecosystems is documented in Table 9 aligned with the Guidance Statement: Environmental Siting.

Table 9: Environmental values

Specified ecosystems	Distance from the Premises
Threatened Ecological Communities and Priority Ecological Communities	Priority 1 ecological community being the Mount Morgans calccrete groundwater assemblage located on Lake Carey palaeodrainage at Mt Weld Station – located on eastern side of project tenements. Priority 3 community being the Mount Jumbo Range vegetation complex (banded ironstone formation) located 5km from eastern boundary of project tenements.
Biological component	Distance from the Premises
Threatened/Priority Flora	Priority flora located on shoreline of Lake Carey near the southern boundary of the Prescribed Premises
Threatened/Priority Fauna	Priority one fauna located with southern portion of Prescribed Premises. (A peregrine falcon siting in 2012 at the Jupiter pit and a fairy shrimp species is known to be present on the shores of Lake Carey and northern tributaries that come within the Premises boundary)

6.4 Groundwater and water sources

6.4.1 Hydrology

The premises lies within the Lake Carey catchment and this is the nearest surface water body, with the lakeshore approximately 2.5 km to the south of the Jupiter prospect separated by a banded iron formation ridge, approximately 80 m high. Lake Carey may fill during occasional intense rainfall events. There are no major river systems in the project area but there are ephemeral creeks that drain in a southeast direction towards Lake Carey.

Ephemeral watercourses and drainage lines may flood during the summer months between January and March when high intensity rainfalls occurs following cyclonic weather. The probability of occurrence of a 100 year ARI (Annual Recurrence Interval) rainfall event is approximately 3% over the life of the mine. (GRM consultants 2016). The initial results of surface water modelling indicate that the 100 year ARI flood level is approximately 401.5 m AHD, which is approximately 1.5 m above the playa surface of the palaeodrainage valley alongside the TSF. A further flood assessment was undertaken in April 2017 which involved a survey of the playa lake elevations around the processing plant and TSF area. This survey yielded maximum and minimum lake surface elevations of 399.66 mAHD and 398.71 mAHD respectively with an average elevation of 399.10 mAHD. Based on this information, the previously recommended 401.50 mAHD flood level is significantly higher than any credible flood event over the adjacent playa lake surface

6.4.2 Hydrogeology

Groundwater within the area of prescribed activities at MMGP is located in fractured rock aquifers generally of low and very low permeability within the basaltic rock mass. The equilibrium groundwater level across the site area is within a three metres of the low lying playa surface at approximately 398 m AHD; although water ingress other than localised minor seepage was not evident in test pits excavated below this elevation.

Paleodrainage

Figure 12 shows the inferred locations of regional palaeodrainage channels as indicated on the Laverton 1:250,000 hydrogeology map. The nearest explored palaeochannel (Korong South) lies approximately 7 km to the north of the MMGP.

Figure 13: Paleodrainage near the Mt Morgan’s Gold project

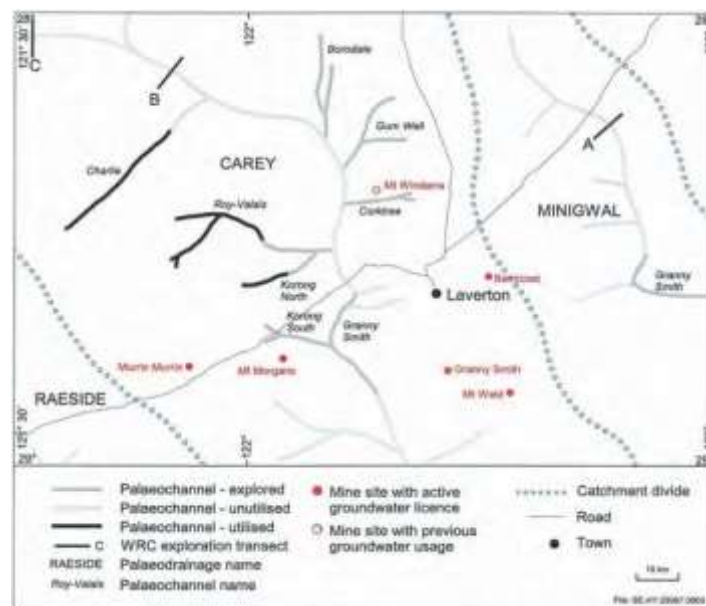
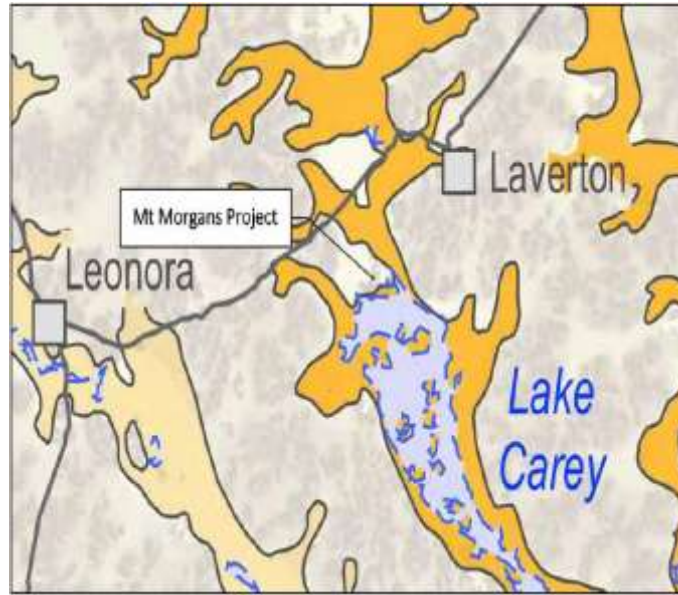


Figure 13 shows the site located on the palaeovalley map published by Geoscience Australia, National Water Commission in 2012, which shows the interpreted distribution of palaeovalleys in arid and semi-arid parts of Western Australia (WA), South Australia (SA) and the Northern Territory (NT). This map is generally referred to as the “WASANT” palaeovalley map.

The coloured areas are the palaeovalleys. It is apparent that the site is not located within any identified palaeovalleys.

Figure 14: Location of Site within the WASANT Palaeovalley Map



Calcrete aquifer

The southern limit of a local calcrete aquifer lies to the north east of the process plant site and the playa area. Figure 14 shows the location of the aquifer shaded blue. The aquifer occurs low in the drainage system where the water table is generally shallow (< 5 m below ground level) and its saturated thickness is mostly between 5m and 10m. This aquifer has been utilised in the Mt Morgans and Jupiter borefields as part of the Mt Morgan Gold Project.

Figure 15: Location of Calcrete aquifer



Groundwater quality in the project area is poor and hypersaline with TDS generally 200,000 mg/l and EC greater than 190,000 μ s/cm although significantly lower salinity (17,000 mg/l TDS) is present in the calcrete aquifer to the north.

The distances to groundwater and water sources are shown in Table 9.

Table 10: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Public drinking water source areas	N/A	N/A
Major watercourses/waterbodies	Lake Carey abuts southern mining tenement boundary	Lake Carey is located 2.5km from the Jupiter prospect and separated by a banded iron formation ridge approximately 80m high.
Groundwater	<p>Goldfield Groundwater Area</p> <p>Depth to groundwater encountered near TSF is approximately 0.7m – 5m (based on data provided in Compliance Report for works approval W6008/2016/1).</p> <p>Korong South palaeodrainage channel is located 7 km North of Jupiter process plant.</p> <p>No private bores located within 1km of Jupiter process plant (based on available GIS dataset – WIN Groundwater Sites).</p> <p>Mt Margaret community obtain water supply from wellfield in the calcrete aquifer located 14km to the north of TSF.</p>	<p>Groundwater across the site within 3 metres of playa surface and located within fractured rock aquifers generally of low and very low permeability with salinity being hypersaline ~200,000 mg/L.</p> <p>Groundwater in Korong South palaeodrainage channel is less than 5 metres below ground level with a saturated thickness of 5 to 10 metres and salinity around 17,000 mg/L.</p>

7. Risk assessment

7.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 11.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 11 below and reflect the assessment completed at Works Approval.

Table 11. Identification of emissions, pathway and receptors during operations of processing plant at a higher rate of throughput

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 5 Processing or beneficiation of metallic or non-metallic ore	Operation of MMGP's process plant at increased production rate. (Increased tailings deposition due to this activity dealt with in 'Tailings deposition'	Dust: Release of particulate matter from plant production circuit	Nearby Residents: Mt Margaret community is located greater than 2km from process plant but in a downwind direction.	Air: Wind dispersion	Health and amenity impacts	Moderate	Rare	Medium	Existing licence dust monitoring conditions (2.3.1 & 3.5.4) reflects monitoring in accordance with the airborne monitoring plan developed by the Licence Holder to protect human receptors. Existing Licence conditions adequately address emissions and require no further assessment.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
section of this table)		Local Flora species No threatened or priority flora or threatened plant communities are within 3km of the processing plant or TSF.	Air: Wind dispersion	Impact native vegetation health and survival	Minor	Rare	Low	No conservationally significant sensitive flora receptors within 3km of process plant Clearing permit authorised the removal of 633 Ha of vegetation from within the Westralia and Jupiter tenements including the Jupiter process plant and TSF footprints and infrastructure corridor.	
		Noise: Associated with increase plant production	Nearby Residence: Mt Margaret community located greater than 2km from the process plant	Air: Wind dispersion	Amenity impacts	Minor	Rare	Low	The noise emissions from the processing plant were modelled prior to construction for compliance with the Environmental Protection (Noise) Regulations 1997 (WA) in regards to impact at the Mt Margaret community. The increased plant production does not require additional equipment or infrastructure that would increase noise emissions from the plant. The operating hours are not being increased as they are already 24 hours/day.
		Storm water runoff: Contaminated storm water from process plant area.	Vegetation Soils contaminated by process liquors containing	Land Overland flow	Impacts of contaminated storm water on playa	Minor	Rare	Low	The overall risk of contaminated storm water from the process plant is rated as “low” because runoff within the plant is collected through drains and sumps and reported to the process water ponds.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
		cyanide and sulphides.						(A1186505)
	Process water: accidental discharge to land	Soil: No threatened or priority flora or threatened plant communities are within 3km of the processing plant of TSF	Land: Soil plus infiltration to water table	Inhibit vegetation growth and/or survival.	Minor	Rare	Low	No conservationally significant within 3km of process plant Existing conditions 1.2.1 and 1.2.2 will be amended to include plant infrastructure, waste containment cells (TSF) plus tanks, pipelines, pumps etc. Routine visual inspection regulated by existing licence condition 1.2.2.
	Spillage or discharge of product through pipelines, pumps or leaking tanks	Soil: No threatened or priority flora or threatened plant communities are within 3km of the processing plant of TSF	Land: Soil	Inhibit vegetation growth and/or survival.	Minor	Rare	Low	No conservationally significant receptors within 3km of process plant MMGP's existing Licence condition 1.2.1 and 1.2.2 requires visual inspection routine to alert to any spills or product discharge during operations. Existing conditions be amended to include new infrastructure including TSF pipelines and pumps and return to process plant for reuse.
	Gaseous Air emissions	Nearby Residence: Mt Margaret Community	Air: Wind dispersion	Adverse impacts to human health	Slight	Rare	Low	Overall risk rating is "low" as receptors are greater than 2km from process plant. Risk remains low with an increase in production proposed at the process plant due

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
								to the separation distance between source and receptors. Potential health and safety risk to MMWM workers is managed under <i>Mines Safety and Inspection Act 1994</i> .	
	Tailings deposition at higher rate due to increased throughput of plant.	Dust: Generated as a result of tailings being deposited	Nearby Residence: Mt Margaret Community	Air: Wind dispersion	Adverse impacts to public health	Moderate	Rare	Medium	<p>Mt Margaret Community is located 900m from the TSF. The overall risk rating of dust being generated as a result of tailings being deposited is determined as "medium" as the tails will be wet during deposition.</p> <p>Any dry tailings will be suppressed using water or suppression products during dry high wind weather conditions.</p> <p>Tailings will be managed as described by existing licence conditions 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.7 and 2.3.1 and dust monitored as per 3.5.2 and management actions as per 3.5.3 to ensure the Mt Margaret community is protected should a 50µg/m³ dust limit be exceeded. Management actions (3.5.3) will reduce the dust lift-off at the source to reduce risk to receptors.</p> <p>Existing licence dust monitoring conditions (2.3.1 & 3.5.2) reflects monitoring in accordance with the</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
								<p>airborne monitoring plan developed by the Licence Holder to protect human receptors.</p> <p>Existing Licence conditions adequately address emissions and require no further assessment.</p>
	<p>Waste: Release of tailings caused by leaks or failure of tailings pipe/pump</p>	<p>Terrestrial ecosystems: local soils, vegetation and surface water</p>	<p>Land: Direct discharge from pipe or pump causing infiltration into the soil</p>	<p>Inhibit vegetation growth, survival and health impacts.</p>	Moderate	Possible	Medium	<p>The overall risk of tailings release in the event of a pipeline/pump failure is “medium” and assessed consistent with similar Gold projects in this locality.</p> <p>The increased throughput of the plant raises the likelihood of this event from rare to possible as the plant infrastructure is to be run at a higher than design capacity. MMWA advised that this increase will not require upgrades to the processing facility infrastructure as the higher annual production rates than the design capacity as currently licensed are due to debottlenecking plant operations. This increase in likelihood rating does not affect the final risk rating however.</p> <p>Existing licence condition 1.2.1 and 1.2.2 manages the tailings pipelines and pumps and require 12 hourly inspections with an inspection log to be maintained for purpose of compliance auditing. These conditions will be amended</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
								<p>to include new TSF Cell 2 pipelines and pumps.</p> <p>Existing conditions 4.2.1 adequately controls reporting of environmental incidents, failures or malfunctions that occur during the annual reporting period.</p> <p>Given these controls the existing Licence conditions adequately address emissions and require no further assessment.</p>
	<p>Waste: Leachate seepage</p>	<p>Groundwater:</p>	<p>Land: infiltration through the TSF into groundwater</p>	<p>Contamination with metals and metalloids, affecting water quality.</p>	Moderate	Almost Certain	High	<p>Groundwater in most monitoring bores is saline to hypersaline with no current beneficial uses. MB1 bore to the north of the TSF has brackish water that may be of value to vegetation.</p> <p>The Licence Holder has completed the construction of TSF Cell 1 and Cell 2 in compliance with the works approval with underdrainage system, decant trench and decant water recycled back to the process plant reducing groundwater infiltration. However, assessment of the seepage management by Groundwater Resource Management in March 2020 found that there had been groundwater mounding and contamination that could lead to contaminated surface water runoff in high rainfall events.</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
								<p>Given the level of seepage that has occurred to date at the facility on a lower rate of deposition the increased rate of deposition raises the likelihood of increased seepage to Almost Certain and the risk to High. .</p> <p>Existing Licence conditions 3.4.1, 3.5.1, & 4.2.1 require TSF groundwater monitoring and annual reporting. Conditions 3.5.2 and 3.5.3 require the development and implementation of a plan to manage groundwater mounding when the trigger values in the monitoring program are reached. Limits are also set in the monitoring program which must not be breached.</p> <p>The triggers and limits are set on results from the bore MB 1 as deterioration of water quality and elevation of groundwater in the aquifer measured by that bore has the potential to cause harm to vegetation.</p>
		Vegetation	Land: infiltration through the TSF into groundwater	Groundwater mounding of increased salinity water into the root zones of vegetation	Moderate	Likely	Medium	<p>MB1 bore to the north of the TSF has brackish water that may be of value to vegetation.</p> <p>The Licence Holder has completed the construction of TSF Cell 1 and Cell 2 in compliance with the works approval with underdrainage</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway				
					causing health impacts on the vegetation.			<p>system, decant trench and decant water recycled back to the process plant reducing groundwater infiltration. However, assessment of the seepage management by Groundwater Resource Management in March 2020 found that there had been groundwater mounding and contamination that could cause impact to vegetation to the north of Cell1.</p> <p>Given the level of groundwater mounding that has occurred to date at the facility on a lower rate of deposition the increase of rate of deposition raises the likelihood of increased groundwater mounding to Likely and the risk to Medium.</p> <p>Existing Licence conditions 3.4.1, 3.5.1, & 4.2.1 require TSF groundwater monitoring and annual reporting. Conditions 3.5.2 and 3.5.3 require the development and implementation of a plan to manage groundwater mounding when the trigger values in the monitoring program are reached. Limits are also set in the monitoring program which must not be breached.</p> <p>The triggers and limits are set on results from the bore MB 1 as deterioration of water quality and elevation of groundwater in the</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
								aquifer measured by that bore has the potential to cause harm to vegetation.	
	Tailings overtopping of TSF.	Waste: Uncontrolled release of tailings/ decant water following storm event	Terrestrial ecosystems: Soil and playa.	Land: Direct discharge from overtopping of TSF.	Contamination with metals and metalloids, affecting playa	Major	Rare	Medium	The overall risk rating is “medium” based on MMWM management controls to maintain a 500mm freeboard or 1 in 100 year 72 hour storm event (whichever is greater) during operations. This commitment reflected by existing licence condition 1.2.4. Existing condition 1.2.3 Table 1.2.2 ensures routine TSF visual inspections completed providing adequate control to prevent tailings overtopping. Existing Licence conditions adequately address emissions and require no further assessment.
	TSF deposition and storage of tailings and decant water	Waste: Tailings and decant pond	Local fauna Birds and other Wildlife	Land: Direct ingestion (fauna drinking the water)	Fauna sickness or death from drinking water.			N/A	No risk to fauna from cyanide poisoning because the water is greater than 50,000 mg/L salinity and unattractive for drinking by fauna.

Table 122. Identification of emissions, pathway and receptors during operations – Categories unaffected by increased throughput at processing plant

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 6: Mine dewatering	Discharge of water to mine voids	Hypersaline water Seepage from receiving mine voids	Groundwater Hypersaline low permeability fractured rock aquifers with shallow water table	Land Infiltration to aquifer through walls of mine void	Contamination with metals and metalloids, affecting water quality	Slight	Unlikely	Low	<p>The quality of the water discharged to the mining voids is of similar quality to the surrounding aquifer.</p> <p>The quality of the groundwater being shifted between pits is brackish-saline with total dissolved solids ranging between 1,700 – 12,000 mg/L in the Westralia receiving pits. Generally groundwater in the Westralia area ranges from 6,000 – 14,500 mg/L TDS. The lower values in the pit water are indicative of collected rainwater.</p> <p>Hydrogeology in the project area consists of fractured rock aquifers generally of low and very low permeability within the basaltic rock mass. It is likely the pits will act as groundwater sinks, rather than sources, due to the low hydrogeological permeability</p> <p>The water in the Jupiter mining area is 180,000 – 260,000 mg/L TDS. The dewatering of Heffernans Pit is into the neighbouring Doublejay Pit. It does not raise assessed risk for this activity.</p>
			Vegetation Soils contaminated by hypersaline	Mounding of groundwater to enter root zones of	Inhibit vegetation growth and/or survival	Moderate	Unlikely	Medium	A minimum freeboard of 5 m will be maintained in the pits to prevent groundwater mounding close to the vegetation root zone. The proponent has also stated they will

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
		water	vegetation.					<p>commit to water quality monitoring and water volume monitoring of the pits.</p> <p>Condition 3.2.1 and Table 3.2.1 capture these commitments by providing for monitoring of the freeboard with a limit of 5m below crest level.</p> <p>The site began dewatering from the Heffernans Pit in Doublejay Pit in 2018/2019 which was not previously indicated on the licence as they are both within the Jupiter mining area. In the interests of clarity on the licence the the pits present in the Jupiter mine area and the dewatering pipeline is to be defined in a diagram in the licence and the addition of Doublejay and Heffernans pits in Condition 3.2.1 and Table 3.2.1.</p>	
		<p>Hypersaline water</p> <p>Uncontrolled release due to overtopping of mine voids</p>	<p>Vegetation</p> <p>Soils contaminated by hypersaline water</p>	<p>Land:</p> <p>Direct discharge from overtopping of mine void.</p>	Inhibit vegetation growth and/or survival	Moderate	Rare	Medium	<p>A minimum freeboard of 5 m will be maintained in the pits and a water balance has been calculated to ensure there are sufficient volumes available in all the receiving pits. The proponent has also stated they will commit to water quality monitoring and water volume monitoring of the pits.</p> <p>Condition 3.2.1 and Table 3.2.1 capture these commitments by providing for monitoring of the</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
								<p>freeboard with a limit of 5m below crest level.</p> <p>The site began dewatering from the Heffernans Pit in Doublejay pit in 2018/2019 which was not previously indicated on the licence as they are both within the Jupiter mining area. In the interests of clarity on the licence the the pits present in the Jupiter mine area and the dewatering pipeline is to be defined in a diagram in the licence and the addition of Doublejay and Heffernans pits in Condition 3.2.1 and Table 3.2.1.</p>
	<p>Hypersaline water</p> <p>Release of water caused by leaks or failure of pipe/pump</p>	<p>Vegetation</p> <p>Soils contaminated by hypersaline water</p>	<p>Land:</p> <p>Direct discharge from pipe or pump causing infiltration into the soil</p>	<p>Inhibit vegetation growth and/or survival</p>	Moderate	Unlikely	Medium	<p>The pipelines will be bunded, flow sensors will be fitted and the pipelines will also be welded to industry standards in accordance with the Plastic Industry and Pipe Association (PIPA) of Australia guidelines. MMWM has committed to maintaining a minimum freeboard of 0.5 m in all water storage/transfer dams. They are also to be lined with a low permeability liner.</p> <p>Condition 1.2.1 requires the pipelines to be fitted with telemetry or pressure sensors and automated shutdown to detect and minimize leaks and failures.</p> <p>Condition 1.2.2 with Table 1.2.1</p>

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
								requires 12 hourly pipeline inspections with a requirement to record and take action to mitigate any identified incident of environmental protection not being maintained.
Category 54: Sewage facility – Westralia Accommodation Village WWTP and Jupiter WWTP	Treatment of sewage	Waste: Nutrient-rich waste water is discharged to designated irrigation fields.	Soils and vegetation	Land: Direct discharge	Build-up of nutrients can cause localised contamination of soils and vegetation which could lead to the deterioration of land quality.	Moderate	Possible	Medium The WWTP constructed for Westralia accommodation camp has a reduced capacity and irrigation area than the plant design assessed at works approval. Given the WWTP capacity has decreased from 126 to 100 kL per day and the size of the irrigation field is reduced by 40% and the consequences of nutrient loading, waterlogging or surface pooling at the irrigation field; an adverse risk event of soil eutrophication, water logging or surface water pooling could occur at some time. Licence conditions: Condition 1.2.2 and Table 1.2.1: requires daily inspections of the pipelines connected to the Westralia Village WWTP and corrective action to be taken to mitigate adverse environmental impacts. Condition 1.2.3 and Table 1.2.2: Requires that treated waste water from from Westralia Village WWTP will only be discharged to the

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
								<p>contingency pond which will feed back into the treatment plant. The treated waste water from the Jupiter WWTP will only be discharged to the TSF after leaving the WWTP.</p> <p>Condition 1.2.4: requires a freeboard of 500mm for containment cells listed in Table 1.2.2.</p> <p>Conditions 2.2.1 and 2.2.2 and Tables 2.2.1 and 2.2.2: requires the emission point for Westralia Accommodation Village WWTP to be within the 3.6 ha irrigation field and sets limits on BOD, Total N and Total P for the emission.</p> <p>Condition 3.3.1 and Table 3.3.1: sets monitoring points, parameters, limits and sampling requirements for emissions from the Westralia Accommodation Village WWTP.</p> <p>Condition 3.6.1 and Table 3.6.1: require measurement of the flow rate of the Westralia Accommodation Village WWTP.</p> <p>Condition sets 4.1 -4.3: Recording and reporting conditions.</p>	
		Odour	Nearby Residence: Mt Margaret	Air: Wind	Amenity impacts	Minor	Rare	Low	Given the remote location of the facilities, the Delegated Officer is satisfied that odour should not cause any amenity impacts to the

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
			community located approximately 2km from the Jupiter WWTP and greater than 10km from the Westralia accommodation WWTP	dispersion				Mt Margaret Community	
Category 64: Class II or III putrescible landfill site – Jupiter landfill, Westralia landfill and Back O' Beyond landfill Jupiter West waste rock dump tyre landfill	Disposal of putrescible waste to landfill	Waste: uncontrolled release of uncovered waste.	Land, fauna and surface water	Air: Wind dispersion	Wind-blown waste can end up in waterways, causing potential fauna death. Predators and feral animals may also be attracted to the waste.	Minor	Unlikely	Medium	The Licence Holder commitments, for types of waste disposed plus the timeframe for covering waste to reduce odour have been converted into Licence conditions. Licence conditions 1.2.8 and 1.2.9 with tables 1.2.3 and 1.2.4: specify waste types to be received at the landfills and the cover requirements for putrescible, inert waste Type 1 and tyres. Additional requirements for the acceptance and landfilling of controlled waste (including asbestos and tyres) are set out in the Environmental Protection (Controlled Waste) Regulations 2004 or regulated by conditions of this licence.
		Leachate: water leaching from disposed waste.	Groundwater	Storm water: storm water landing in or flowing into landfill and soaking through waste then	Detrimental effects on surrounding flora and fauna. Contaminants can then also end up interacting	Minor	Unlikely	Medium	

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
			entering soil at base of trench.	with surface water bodies.				
Disposal of tyres to the Jupiter West waste rock dump	Air pollutants: released during a fire	Nearby Residence: Mt Margaret community located greater than 2km from the process plant	Air: Wind dispersion	Amenity and health impacts to the human population	Moderate	Unlikely	Medium	
	Liquid pollution: released during a fire	Land, surface water or groundwater	Soil: direct discharge	Contamination of land, surface water or groundwater with pyrolytic oils containing hydrocarbons, metals and particulate matter causing potential health and amenity impacts to users of soil and water.	Moderate	Unlikely	Medium	

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 57: Used tyre storage	Storage of tyres at contractors yards	Air pollutants: released during a fire	Nearby Residence: Mt Margaret community located greater than 2km from the process plant	Air: Wind dispersion	Amenity and health impacts to the human population	Moderate	Unlikely	Medium	Current storage at the site observed during inspection by DWER compliance officers was seen to be less than 100 tyres in each section with separation between stacks.
		Liquid pollution: released during a fire	Land, surface water or groundwater	Soil: direct discharge	Contamination of land, surface water or groundwater with pyrolytic oils containing hydrocarbons, metals and particulate matter causing potential health and amenity impacts to users of soil and water.	Moderate	Unlikely	Medium	Table 1.2.3 amended to include storage requirements that are consistent with similar tyre storage requirements on minesites in the Goldfields Region and with DFES Guidance Note: GN02: Bulk storage of rubber tyres including shredded and crumbed tyres (DFES November 2019).

7.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 14 below.

Table 13: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 15 below.

Table 14: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

“onsite” means within the Prescribed Premises boundary.

7.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 16 below:

Table 15: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

8. Determination of L9010/2016/1 conditions

The emissions and discharges associated with the construction of TSF Cell 2, increase in production capacity from 2.5 to 3.5Mtpa at the MMGP and tyre storage on the premises are;

- noise from entire MMGP;
- fugitive dust from plant production circuit, TSF and from vehicle movements;
- contaminated water from spills leaks and emergency weather events;
- gaseous emissions from the chemical processing of ore; and,
- tailing releases and seepage.

The monitoring of the groundwater around the TSF has raised concerns as to mounding becoming sufficient to cause harm to the native vegetation. This concern was confirmed by a compliance inspection in February 2020.

The DWER has considered the overall risk of the emissions upon local receptors together with MMWM proposed management controls plus existing licence conditions and determine the proposed amendment may result in emissions that are unacceptable to the environment.

Applying amendments to the existing conditions will address the addition of the TSF Cell 2 infrastructure. Addition of conditions to require the specified action of the production of a plan to manage groundwater mounding around the TSF will provide for the improvement of groundwater conditions around the TSF. Until the management of seepage and groundwater is proven adequate to avoid negative environmental impact an amendment to limit the height of the TSF has been included. This is to prevent the raising of the TSF walls without the opportunity to assess the environmental performance of the facility.

Therefore, the Licence is amended by:

- Amendment of Table 1.2.2 to add a height limit to the TSF cells of 408mRL – the current Stage 4 and Stage 7 construction of W6008/2016/1.
- Inclusion of Used tyre storage to the Table 1.2.3.
- Amending Table 3.5.1 by removing Note 2 which reminds the Licence Holder that monitoring shall commence once MB4 to MB 6 are constructed.
- Add columns to Table 3.5.1 to set trigger a limit values on the standing water level and total dissolved solids in bore MB 1.
- Delete condition 3.5.2 as the Tailings Groundwater Management Plan (TGMP) was provided and addresses licence condition 3.5.2 (a), 3.5.2 (b) and 3.5.2 (c).
- Insert a new Condition 3.5.2 with requirement for a plan to be provided and implemented to manage groundwater mounding around the TSF Cell 1 and TSF Cell 2.
- Delete condition 3.5.3 requiring the remaining monitoring bores MB4, MB5 and MB6 be constructed within three months from the date of issue of the previous licence amendment.
- Insert new Condition 3.5.3 requiring the limits in Table 3.5.1 are not exceeded.
- Renumber Table 3.5.4 to Table 3.5.2 and Table 3.5.5 to Table 3.5.3 (a previous typological error)
- Remove references to tables 2.2.1 and 3.3.1 in Table 4.3.1 as they have been listed in error.
- Amend schedule 1 map titled “Map of emission points TSF monitoring bore locations Cell 1” to include a new plan that indicates the location of MB1 to MB6 located near the TSF.
- Add Jupiter dewatering map to Schedule 1.

Changes to the Licence are made in accordance with DWER administrative changes including textural changes to the licence introduction to correct matters of fact about the licence and

adjust the licence instrument log table to include this assessment.

The conditions in Attachment 1 Licence L9010/2016/1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

The *Guidance Statement: Licence Duration* is applied and the issued licence expires on 10 February 2026, nine (9) years from the initial date of issue.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the licence under the EP Act.

9. Applicant's comments

The Licence Holder was provided with the draft Decision Report and draft issued Licence on 13 February 2020. The Licence Holder provided comments which are summarised, along with DWER's response, in Appendix 2.

10. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

This assessment is informed by Compliance Reports plus supporting documents submitted by the Licence Holder as each stage of the MMGP is constructed. Other supporting information was supplied by the compliance inspection findings by the Compliance Branch of DWER.

Based on this assessment, it has been determined that specified actions are required to mitigate the impacts of the TSF on ground and surface water before raising the TSF cell walls. The TSF is limited in height to 408mRL to allow for the assessment of improved seepage and groundwater management before the approval of further lifts to the facility. Conditions have been included requiring the development of a plan to manage groundwater mounding and set limits on water quality parameters in monitoring bore MB 1.

The management of tyres on the Premises will be managed through the inclusion of the Category 57 as an approved activity on the licence.

The amended Licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Tim Gentle
Manager, Resource Industries
REGULATORY SERVICES

Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document Title	In Text Ref	Availability
1	DER, July 2015, <i>Guidance Statement: Regulatory Principles</i> . Department of Environment Regulation, Perth.	Regulatory Principles	These Guidance Statements are available from the website: http://www.dwer.wa.gov.au
2	DER, October 2015, <i>Guidance Statement on Setting Conditions</i> . Department of Environment Regulation, Perth.	Setting Conditions	
3	DER, November 2016. <i>Guidance Statement: Environmental Siting</i> . Department of Environment Regulation, Perth.	Environmental Siting	
4	DER, August 2016, <i>Guidance Statement on Licensing Duration</i> . Department of Environment Regulation, Perth.	Licence Duration	
5	DER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	Risk Assessment	
6	DER, February 2017. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	Decision Making	
7	DER, May 2016. <i>Guidance Statement: Publication of Annual Audit Compliance Reports</i> . Department of Environment Regulation, Perth.	Annual Audit Compliance Report or AACR	
8	Works Approval and Licence supporting documentation October 2016 Dacian Gold Ltd, October 2016, <i>Works Approval and Licence Application – Mt Morgans Gold Project</i> – including all appendices, drawings and attachments	A1186505	DWER internal – A1186505
9	Dacian Gold Ltd, December 2016, <i>Commissioning Plan – W6008/2016/1 – Mt Morgans Gold Project</i>	A1336543	DWER internal – A1336543
10	Further information November 2016: Dacian Gold Ltd, 30 November 2016, <i>Response to Request for Information for Mt Morgan Gold Project – Works Approval and Licence Application</i>	A1356269	DWER internal – A1356269
11	<i>Compliance Report W6008/2016/1 Westralia Landfill Mt Morgans Gold Project</i> prepared by Mt Morgans WA Mining Pty Ltd & Dacian Gold Limited dated 25 May 2017 Version 1	A1438846	DWER internal – A1438846
12	<i>Compliance Report W6008/2016/1 Westralia Waste Water Treatment Plant Mt Morgans Gold Project</i> prepared by Mt Morgans WA Mining Pty Ltd & Dacian Gold Limited dated 11 July 2017 Version 1.	A1473038	DWER internal – A1473038

	Document Title	In Text Ref	Availability
13	<i>Water Quality Protection Note (WQPN 22) Irrigation of nutrient-rich wastewater</i> prepared by Department of Water dated July 2008	WQPN 22	Water Quality Protection Note 22 is available from website: https://www.water.wa.gov.au/_data/assets/pdf_file/0013/4045/82324.pdf
14	<i>AS/NZS 1547:2012 - On-site domestic wastewater management</i> – AS/NZS published 2012	AS/NZS 1547:2012	AS/NZS 1547.2012 is available from website: https://infostore.saiglobal.com/store/PreviousDoc.aspx?saleItemID=2364733
15	<i>Compliance Report W6008/2016/1 Jupiter Landfill Mt Morgans Gold Project</i> prepared by Mt Morgans WA Mining Pty Ltd & Dacian Gold Limited dated 5 July 2017 Version 1.	A1470158	DWER internal – A1470158
16	MMGP_Application Form 2017 10 18, submitted 18 October 2017	A1544026	DWER internal – A1544026
17	Appendix 1_Supporting Document_MMGP Works Approval 2017 10 18, submitted 18 October 2017	A1544026	DWER internal – A1544026
18	Construction Compliance Report W6008/2016/1 Mt Morgans Gold Project, Processing Plant and Tailings Storage Facility, 25 January 2018	A1602580	DWER internal – A1602580
19	Compliance Report W6008/2016/1 Jupiter Waste Water Treatment Plant Mt Morgans Gold Project, 6 February 2018	A1608199	DWER Internal – A1608199
20	Further information – Amendment to Licence, 9 March 2018	A1631829	DWER Internal – A1631829
21	MMWM Response to DWER Comments – 16 March 2018	A1636816	DWER Internal – A1636816
22	ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality	ANZECC 2000	Accessed at: http://www.agriculture.gov.au/water/quality/guidelines/volume-1
24	USEPA (2009) National Primary Drinking Water Regulations		Accessed at: http://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#Inorganic
25	Mt Monger Gold Project Licence amendment application dated signed on 9 October 2018	A1728143	DWER internal - A1728143
26	MMGP Licence Amendment Supporting documentation dated 9 October 2018		DWER internal – A1728144
27	Commissioning Report – Process Plant and Tailings Storage Facility by Mt Morgan WA Mining Pty Ltd dated September 2018 version 1	A1842133	DWER internal – A1842133
28	Tailings Grounwater Management Plan for Mt Morgans Gold Project by Mt Morgans WA Mining Pty Ltd date 27 June 2018 document ID – MTM-PLN-408	A1842128	DWER internal – A1842128
29	Works Approval W6008/2016/1 issued on 2 February 2017 amended on 28 February 2018.	W6008/2016/1	Available from DWER website at www.dwer.wa.gov.au

	Document Title	In Text Ref	Availability
30	Licence L9010/2016/1 issued on 9 February 2017 amended on 24 July 2019	L9010/2016/1	Available from DWER website at www.dwer.wa.gov.au
31	Email of the W6008/2016/1 compliance report including licence amendment application, cover letter and TEF construction report received by DWER on 26 April 2019	Application and supporting documents	DWER internal – A1807044
32	Email of 15 August 2019 titled “Increased processing plant production” from Dacian Gold	A1840618	DWER internal – A1840618
33	Environmental Protection (Noise) Regulations 1997	Noise Regulations	Available from website at: https://www.legislation.wa.gov.au/legislation/statutes.nsf/default.html
34	Environmental Protection (Unauthorised Discharges) Regulations 2004	UD Regulations	Available from website at: https://www.legislation.wa.gov.au/legislation/statutes.nsf/default.html

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition/Assessed risk	Summary of Licence Holder comment	DWER response
<p>Expected impact on tailings deposition by the increased throughput of the plant. Including data/modelling illustrating the changes in rate of fill, seepage and water recovery from the TSF. Also including any changes in the timeframes for raising of TSF cells and expected lifespan of the facility</p>	<p>Documents provided to DWER on 26 March 2020:</p> <p>CWM TSF Report: a report prepared for Dacian by geotechnical consultants CWM to summarise the expected rate of rise and impacts of the increased throughput of the facility. It concluded that : 'Based on the study, it has been concluded that the design as documented in the ATC (2018) design report is appropriate for the proposed increased production rate of 3.5 Mtpa.'</p> <p>Mt Morgans Gold Project TSF Water Management. The details of the finding of this report are discussed in Section 5.3 of this report.</p>	<p>The risk assessment was updated and conditions amended to reflect the information provided.</p>
<p>Updated plans needed as some areas of construction altered from original plans.</p>	<p>Updated site plans and maps provided</p>	<p>N/A</p>