Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 2

Licence Number	L8698/2012/1
Licence Holder	Doray Minerals Limited
ACN	138 978 631
File Number:	2012/007203
Premises	Andy Well Gold Project Mining Tenement M51/870 MEEKATHARRA WA 6642
Date of Amendment	13/07/2018

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 13 July 2018

Alana Kidd

Manager, Resource Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Definitions and interpretation

Definitions

In this Amendment Notice, 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
Amendment Notice	refers to this document
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
C&M	Care and Maintenance period: a period during which no processing of ore takes place
CS Act	*Contaminated Sites Act 2003* (WA)
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Licence Holder	Doray Minerals Limited
Licensee	has the same meaning as Licence Holder

m^3	cubic metres
mbgl	metres below ground level
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mtpa	million tonnes per annum
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (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	refers to the Premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*
TDS	Total dissolved solids
TSS	Total suspended solids
UDR	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed Premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an amendment for Category 6 for mine dewatering. No other changes have been requested by the Licence Holder.

The following guidance statements have informed the decision made on this amendment*:*

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

On 5 September 2017, Doray Minerals Limited (Licence Holder) submitted an application to DWER for an amendment to the Andy Well Gold Project (the Project) operational licence L8698/2012/1. The licence amendment relates to the following:

- An increase to Category 6: mine dewatering throughput and associated discharge to land volume from 600,000 kL/yr to 1,000,000 kL/yr;
- An increase to the total dissolved solids (TDS) limit for discharge to land from 3,000 mg/L to 3,500 mg/L; and
- The inclusion of the Suzie Open Pit as an additional dewatering discharge location.

Category 6 – increase in volume of discharge to land

Open pit mining at the Project commenced in November 2012 and focused on the Andy Well Stage 1 pit until April 2013. Mining operations then transitioned to underground development with the first decline portal cut undertaken in April 2013. To access the underground ore the project undertakes dewatering activities (32 L/s abstraction at groundwater quality TDS 3,500 mg/L) from the decline workings. Groundwater is pumped to three surface water settling ponds before being utilised or discharged to land. All water for the site, including process water requirements are sourced from the dewatering of the mine. Excess water is then disposed of via the following options:

- Discharged via surface spigots running along a north-south ridgeline running parallel and 1.2km from the mine site (19.5 L/s) (see Figure 1);
- Measured volumes diverted onto the Tailings Storage Facility (TSF) decant (<15 L/s); and
- Dust control on roads via a water cart and/or ROM sprinklers (1.5 L/s).

On 6 July 2017 the Licence Holder announced that the Project was to be placed into ‘Care and Maintenance’ (C&M) from 1 November 2017. The Project is scheduled to begin operation late 2018 subject to the Gnaweeda Prospect Open Pit development commencement.

Due to the short period the site is expected to be under C&M (12 months), the Licence Holder wishes to continue dewatering activities to keep the underground mine dry. Due to the decrease in process water requirements there is excess dewatering water that needs to be disposed of. The Licence Holder wishes to discharge this excess water to an approved controlled discharge

to land area located on a ridgeline to the east of the mine site. The area consists of a main pipeline that runs along the ridge with valved connections to a series of smaller diameter perforated discharge spigots. Approximately 1.1km of discharge front is available. Currently 600,000 kL/yr is allowed to be discharged via the ridgeline and the Licence Holder wishes to increase this amount to 1,000,000 kL/yr while in C&M.

The volume of water discharged along the ridgeline is recorded via a calibrated Mag-flow meter. The Licence Holder does not anticipate that the full 1,000,000 kL/yr will be discharged along the ridgeline as they plan to also utilise the Suzie Open Pit (340,000 m^3) for storage. The 40% ridgeline discharge volume increase has been sought to build redundancy into the discharge system if required and to allow flexibility of management.

Figure 1: Layout of the surface spigots and pipework at the Premises

Background – Current discharge volume and water quality and its impacts

The dewatering discharge water quality has been monitored since December 2012. The pH of the discharge water has remained consistent with a range of 7.5 to 9 (alkaline). The salinity measured as TDS (total dissolved solids) has ranged from 1,200 mg/L – 3,500 mg/L (fresh to brackish). TDS levels within the dewatering water discharge have gradually increased during operation. The Licence Holder has stated that the upward trend in TDS is likely due to the Premises mining and dewatering activities condensing ions in solution as the wider regional pastoral bore pH and TDS field readings have remained relatively steady since monitoring commenced.

Analysis of the dewatering effluent quality data indicates that the discharge quality generally meets the ANZECC (2000) long term irrigation guidelines. There have been some instances between 2013 and 2015 where iron and chromium levels within the dewatering discharge have been reported in concentrations that exceed ANZECC long term irrigation trigger values, however more recent monitoring data for these metals meet the guidelines.

Monitoring data indicate that total suspended solid (TSS) levels range from 10 mg/L to 380 mg/L. The Licence Holder has constructed three staged settling ponds, with the last pond being constructed in 2016, to reduce fine loads within the dewatering effluent. The embankment pipework between the three ponds has been configured to create a trickle feed between the initial water settling pond to the second pond and ultimately to the third largest settling pond. All three ponds are unlined and maintained with a 500mm freeboard. A pontoon pump is located in the third pond and through a series of valves and poly-piping is discharged to the ridgeline. The Licence Holder has provided data that indicates that during C&M TSS levels have decreased significantly. 2018 spigot discharge water quality results have reported monthly TSS loads <10 mg/L. The reduced loads are considered a consequence of limited underground traffic and mining activity mobilizing sediment, thereby reducing volume of fines brought to the surface.

An inspection conducted by DWER officers on 30 June 2016 observed vegetation at the dewatering discharge location was stressed and dead. Ponding and waterlogging of soils, along with a discharge of sediments was also observed at a number of spigot locations (see Figure 2). As a result of the inspection the Licence Holder has undertaken remedial action and has removed surface sediment and vegetation from the impacted area (the Licence Holder holds an active vegetation clearing permit that covers entire Premises). They have increased monitoring of the dewatering discharge to monthly samples and have self-imposed a TSS exceedance reporting limit of 50 mg/L. To improve ponding they have implemented improved discharge methods such as aerial sprinklers and wobbler sprinklers. Spigots from which water is discharged are also alternated to reduce ponding of water at any one spigot location.

The Licence Holder has is required through their mine closure plan to rehabilitate the ridgeline which includes removal of infrastructure and re-vegetation. The Licence Holder has been allocated 6.56 ha of disturbance along the ridgeline for groundwater infrastructure rehabilitation through their mine closure plan. They also hold a native vegetation clearing permit for their entire prescribed Premises on which the ridgeline is situated.

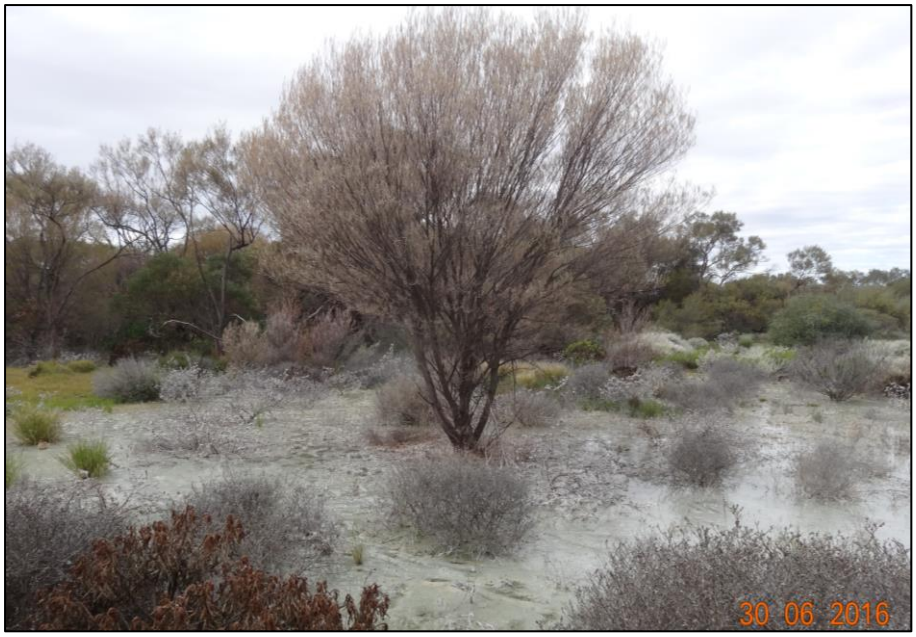


Figure 2: Dewatering discharge area in June 2016 – photographed during the DWER inspection

Category 6 – Suzie Open Pit as an additional dewatering discharge point

The Licence Holder is seeking to utilise the Suzie Open Pit as an additional dewatering discharge point and/or water settling pond. The Licence Holder plans to install a poly pipeline from the Stage 1 Open Pit to the Suzie Open Pit. Daily inspections of the pipework will occur when in use. The existing dewatering pipeline already at Suzie Open Pit may also be used.

A pipeline from Suzie Open Pit to the surface discharge spigots on the ridgeline will be constructed to allow water to be discharged to the ridgeline when required.

A hydrogeological study carried out by Pennington Scott in 2017 found that if dewatering discharge into the Suzie Open Pit was maintained at 13 L/s the pit would fill within 5 months (due to its limited capacity and natural inflows into the pit). Given the short duration of the expected C&M period (12 months) and preference for water to be diverted via settling ponds to the ridgeline spigots, the Suzie Open Pit will be an additional option for dewatering discharge. The Licence Holder would like to add the Suzie Open Pit as a discharge point to the current licence to allow for storage of some of the excess water from dewatering activities if required.

Category 6 – increase in TDS limit

The Licence Holder is also seeking to increase the surface discharge TDS exceedance notification limit from 3,000 mg/L to 3,500mg/L.

A groundwater monitoring program is undertaken on a quarterly basis for the bores surrounding the onsite TSF. Monitoring of the underground dewatering sources and the wider regional pastoral bore monitoring network also occurs. Historical groundwater monitoring data from onsite bores have indicated a general upward trend in TDS levels. The Licence Holder has stated that the cause of the upward trend is likely from the Project's dewatering and mining activities condensing ions in solution as the wider regional pastoral bore TDS field readings have remained relatively stable.

The recent 2017 monthly spigot surface discharge TDS readings have indicated TDS levels slightly over or on the limit of 3,000 mg/L. The Licence Holder is seeking to have this limit increase to 3,500 mg/L to account for the increase in TDS concentration. The Licence Holder anticipates that during the care and maintenance phase water quality will improve due to reduced mining activities and due to the recent construction of the final settling pond.

Other approvals

The Licence Holder has provided the following information relating to other approvals as outlined in Table 2.

Table 2: Relevant approvals

Legislation	Number	Approval
Rights in Water and Irrigation Act 1914	GWL175556(4)	DWER Groundwater Licence for the abstraction of 2,000,000 kL/yr (64.5 L/sec)
Mining Act 1978	Registration ID: 36216	Mining Proposal for Andy Well Gold Project
Mining Act 1978	Registration ID: 69427	Mining Proposal Addendum – Dewatering discharge into the suzie Open Pit
Environmental Protection Act 1986	5035/1	(DIMIRS) Clearing Permit. Permit covers entire Premises. No conditions.

Amendment history

Table 3 provides the amendment history for L8698/2012/1.

Table 3: Licence amendments

Instrument	Issued	Amendment
L8698/2012/1	07/06/2013	Licence amendment to add category 5.
L8698/2012/1	31/10/2013	Licence amendment to correct an administrative error.
L8698/2012/1	21/11/2013	Licence amendment to increase throughput.
L8698/2012/1	17/07/2014	Licence amendment to increase throughput and to convert to new licence template.
L8698/2012/1	25/09/2014	Licence amendment to change groundwater monitoring requirements.
L8698/2012/1	21/01/2016	Licence amendment to increase the total dissolved solids limit for mine dewatering discharge to land and the removal and replacement of monitoring bore references.
L8698/2012/1	27/01/2017	Licence amendment to allow for a lift at the TSF.
L8698/2012/1	13/07/2018	Licence amendment to allow an increase in dewatering water discharge to land (up to 1000 000 kL/yr) during C&M period and into the Suzie pit.

Location and receptors

Table 4 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 2: Receptors and distance from activity boundary

Residential and sensitive Premises	Distance from Prescribed Premises
Karalundi Aboriginal Education Community	Approximately 10 km to the north of the Project.
Killara Homestead	25 km to the south east of the Project.

Table 5 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Surface water – Yalgar River non-perennial tributary / drainage lines	The Yalgar River is a 120 km long tributary of the Murchison River. It arises near the Great Northern Highway approximately 50km north of Meekatharra. Minor non-perennial tributaries of this river are located near to the project area. The closest of these being approximately 2 km east and south of the ridgeline surface discharge site.
Groundwater	A staged hydrological investigation and dewatering assessment of the Project area was undertaken by RPS Aquaterra during 2011. It was found that depth to groundwater in the Project area is relatively uniform and has been measured at approximately 5 - 12 meters below ground level (mbgl). Regional groundwater flow is expected to be to the west into the Yalgar River and Murchison River drainage systems.
Vegetation	The vegetation type found in the area of the dewatering discharge is described as Mulga (*Acacia aneura*) or *Acacia* semi-desert scrub, consisting of Acacia groves within a flat hardpan wash plain with low open scrub of *Eremophila* species (Mattiske Consulting, 2011). A flora and vegetation survey conducted in 2011 found; ten plant communities within the survey area which also occurs throughout the region, no threatened flora species, no plant species listed under the *Environmental Protection Biodiversity Conservation Act 1999* and no priority species (Mattiske Consulting, 2011).

Risk assessment

Tables 8 and 9 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls. The risk rating is determined for risk events in accordance with the matrix set out in Table 3 below.

Table 3: 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 assesses the consequence and likelihood of the Risk Event in accordance with Table 4 below.

Table 4: 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	• **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	• 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	• **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	• **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	• **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	• **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

Likelihood	
The following criteria has been used to determine the likelihood of the Risk Event occurring.	
Almost Certain	The risk event is expected to occur in most circumstances
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Consequence		
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)**
Severe	• **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	• 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
Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **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.

Table 8: Risk assessment for proposed amendments during construction

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Cat 6 – Mine Dewatering	Construction of dewatering pipelines and associated infrastructure	Dust associated with construction of pipeline and vehicle movements	Karalundi Aboriginal Education Community is ~10 km north of the Premises	Air: Particulate matter (dust)	Health and amenity impacts	Slight	Unlikely	**Low**	A water cart will be utilized during construction activities to minimize dust emissions. Given the separation distance to the nearest sensitive receptor, the risk of impact by dust is considered to be **low**. No additional regulatory controls are required to mitigate this risk.
		Noise associated with construction of pipeline and vehicle movements	Karalundi Aboriginal Education Community is ~10 km north of the Premises	Air: Noise generated through the operation of equipment	Health and amenity impacts	Slight	Unlikely	**Low**	Given the separation distance to the nearest sensitive receptor, the risk of impact by noise is considered to be **low**. *Environmental Protection (Noise) Regulations 1997* also apply. No additional regulatory controls are required to mitigate this risk.

Table 9: Risk assessment for proposed amendments during operation

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Cat 6 – Mine Dewatering	Discharge of mine dewatering water to ridgeline.	Increased volume of excess dewatering water released to land during Care and Maintenance (600,000 kL/yr to 1,000,000 kL/yr).	Vegetation within the discharge zone	Direct discharge to land – surface runoff	Vegetation stress/ decline as a result of soil waterlogging.	Moderate	Unlikely	**Medium**	Waterlogging of soils (from an increase in discharge volume) can result in native vegetation health decline / death surrounding the spigot discharge areas. The Licence Holder has committed to alternating the active spigots from which water discharges from to minimize pooling and waterlogging of soil. However waterlogging impacts have occurred in the past during discharge at the current approved discharged volume (600,000 kL/yr) demonstrated by site inspection photographs and biannual vegetation monitoring photographs. The consequence of the impact of increasing the approved discharged volume (by 400,000 kL) is considered to be '*Moderate*' as it could result in mid-level onsite impacts (waterlogging of soils, stressed and dying vegetation). The likelihood of this impact happening is *unlikely based* on Information provided by the licence holder indicating that it is unlikely that the extra 400,000kL/yr discharge volume will be discharged to the ridgeline. The project anticipates that the current water disposal options, including the current 600 000 kL/yr discharged to the ridgeline, the new discharge into the Suzie open pit (550,000 kL) and the current dust control measures (sprinkler systems) will utilize the entire abstracted volume during care and maintenance 2018 (based on Q1

									average abstraction volume of 69000 kL/month). The requested 400 000 kL/yr has been requested to build redundancy into the system if required. The increase in discharge volume to occur only during C&M will be added (existing condition 1.3.14). The Licence already contains a condition (2.2.3) requiring the Licence Holder to manage the discharge from the ridgeline spigots in a manner which minimises the likelihood of surface ponding. Evidence to date (DWER compliance inspection June 2016) suggests this has not been effective in mitigating the impact to vegetation. An new improvement condition will be added to the Licence requiring the Licence Holder to submit a plan within 3 months of the amendment detailing how they plan to manage waterlogging impacts on the ridgeline. A new condition will be added to require the Licence Holder to monitor the vegetation condition at each discharge location on the ridgeline by providing biannual photographs in their annual environmental report.
					Vegetation stress/ decline as a result of sediment build-up smothering leaves and branches of low shrubs and grasses.	Minor	Unlikely	**Medium**	The discharge of mine dewatering effluent containing high TSS can result in a buildup of sediment on soils and the smothering of low vegetation. Effluent quality monitoring data sampled during C&M (2018) indicates a significant reduction in TSS within the effluent (<10mg/L) compared to the operations phase (10 - 380mg/L). This is believed to be due to the reduction in underground activities which mobilize

									fines within the groundwater. The likelihood of this impact happening during C&M is considered to be *unlikely* as TSS levels within the effluent are expected to be low during C&M and dewatering effluent is directed to a 3 staged settlement process prior to discharge on the ridgeline to reduce sediment loads. The impact of this risk event has been determined to be **Medium**. The settlement ponds have not been captured on the licence. Therefore conditions will be added requiring the dewatering effluent to be passed through the settlement ponds prior to discharge onto the ridgeline. The Licence Holder has committed to constructing a fourth settlement pond (under a works approval) prior to operation commencing to further reduce the TSS volumes discharged to the ridgeline.
			Soil within the discharge zone	Direct discharge to land	Build-up of salt and heavy metals within soils inhibiting vegetation growth and survival	Minor	Possible	**Medium**	The buildup of salt and heavy metals within soils can inhibit vegetation growth and survival. Metal/metalloid concentrations within the dewatering effluent generally meet the ANZECC long term irrigation guidelines. TDS levels within the dewatering effluent are between 3,000-3,500 mg/L which is classed as brackish. It is expected that the discharge rate would be greater than the infiltration rate which would subject the effluent to evaporation and lead to the concentration of dissolved solids (i.e. salts) in the surface soils over time. The increase in discharge volume will also be restricted to only occur during

									C&M which is expected to end in November 2018 (approximately 8 months). The Licence Holder will monitor the ridgeline disposal area for impact to vegetation on a bi-monthly basis and will take vegetation health photographs which will be included in their Annual Environmental Report. A new condition will be added to the Licence to require a botanist or equivalent professional to conduct an annual assessment of vegetation health in the impacted zone. Based on this information and that fact that TDS levels are relatively low (<3500 mg/L) it expected that the consequence of this event will be '*minor*'and the likelihood '*possible*'. The impact of this risk event is **Medium**.
			Groundwater	Infiltration through soil profile	Decline in groundwater quality	Slight	Unlikely	**Low**	Prolonged irrigation of land with effluent can result in groundwater mounding and contamination of groundwater. There are no other licensed groundwater users nearby to the Premises. The nearest pastoral wells are Road Well, approximately 3.5km to the north-northeast, Breakaway Well, approximately 4km to the east, and Little Munarra Well, approximately 4.1km to the southwest. The discharge of dewatering effluent will occur over a wide area of ridgeline (1.5km) which will minimise the amount of water reaching the groundwater (5-10 mbgl). The Premises is located within an area with a high evaporation rate and low

									rainfall resulting in minimal infiltration of effluent to the groundwater table. Dissolved and suspended solids will also be removed from the effluent as it infiltrates through the soil profile. Heavy metal concentrations meet ANZECC long term irrigation guidelines. Given these factors the consequence of this risk event is '*slight*' and the likelihood of impact to the environment '*unlikely*'. As a result the impact of this risk event on the environment is **low.**
	Discharge of mine dewatering water to Suzie Open Pit	Overtopping of pit	Native vegetation adjacent to pit	Direct discharge to land	Decline/death of vegetation due to inundation	Minor	Unlikely	**Medium**	Overtopping of Suzie pit may occur if dewatering water discharged to Suzie pit is not closely monitored or managed in conjunction with major rainfall events. Overtopping of the pit can cause vegetation death or stress due to inundation of water and waterlogging of soils. No threatened flora species, no plant species listed under the *Environmental Protection Biodiversity Conservation Act 1999* and no priority species have been found within the Premises boundary (Mattiske Consulting, 2011). The Suzie Open Pit has an estimated volume of 550 ML. A hydrological study carried out by Pennington Scott in 2017 determined that if the underground mine dewatering continued at 32 L/s, with 19 L/s sent to the ridgeline and remaining 13 L/s sent to Suzie's Pit, it would reach capacity in five months. This is due to the fact the Suzie Open Pit acts as a groundwater sink and takes into account groundwater inflow (~ 3.6 L/s) through pit walls and base.

									The Licence Holder has committed to recording the volume discharged into the Suzie Open Pit daily via a calibrated flow-meter. A 500 mm freeboard is required to be maintained as per existing condition 1.3.12 and daily visual inspection of the pit's freeboard will be required by including the Suzie Open Pit in condition 1.3.13. Given that overtopping of the Suzie Open Pit is likely to have a low level onsite impact (water is fresh-brackish) the consequence rating is '*Minor'*. The likelihood of overtopping occurring is '*unlikely*' due to the freeboard control and inspections. As a result the risk rating for overtopping of the pit is '**Medium**'.
		Rupture of dewatering water pipelines causing discharge to land	Native vegetation adjacent to pipeline	Direct discharge to land	Soil contamination inhibiting vegetation growth and survival	Slight	Unlikely	**Low**	The quality of water that would be released in a once off event of pipeline rupture would have a minimal onsite impact (pipeline located on Premises only, no off-site impacts) due to the relatively low TDS level (fresh to brackish). Therefore the consequence of this risk event has been deemed to be *slight* (minimal onsite impact). The likelihood of a pipeline rupture is *unlikely* due to the short period that Susie Open Pit is planned to be used as a discharge site (12 months C&M period) and the Licence Holders has committed to daily inspections of pipeline during use. The risk rating for this event is therefore **low**.
		Mounding of groundwater table in vicinity of receiving pit.	Groundwater	Movement of pit water through pit walls and base to groundwater	Decline / death of adjacent vegetation via brackish water uptake from roots	Minor	Unlikely	**Medium**	Mounding of the groundwater in the vicinity of Suzie Open Pit may occur from discharging dewater into the pit. Mounding can increase groundwater levels from lateral seepage through pit walls which can impact deep rooted vegetation.

									Vegetation surrounding the pit has been impacted by mining activities and hence is degraded. A hydrological assessment carried out in 2011 by RPS Aquaterra determined that the Suzie Open Pit acts as an evaporative sink with groundwater flowing in rather than flowing out. Based on this information the consequence of this risk event has been deemed to be *minor* (low on-site impact). The development of a groundwater mound will be influenced by adjacent drawdown from mine dewatering so it is considered unlikely to inundate adjacent vegetation. The risk rating for this event is therefore **medium**.

Decision

Category 6 – increase in volume of dewater discharge to the ridgeline

The key emission associated with the increase in dewatering water discharge to the ridgeline is direct discharge to land via ridgeline spigots. The Delegated Officer considers the impact associated with this emission presents a medium risk to the environment due to the risk of waterlogging of soils leading to vegetation stress or death. The Delegated Office notes that the increase in approved discharge volume to the ridgeline is *unlikely* to occur as it is anticipated that the surplus water will be disposed of at the current level to the ridgeline (600 000kL), within the Suzie open pit and for dust suppression purposes in the first instance. A condition has been added to the license restricting the increase in discharge volume to the C&M period only. Condition 1.3.14 has been updated to reflect this.

The discharge of a large volume of dewatering effluent to the ridgeline has resulted in some impact to the native vegetation. Evidence of stress and vegetation death has been recorded during a 2016 DWER site inspection, with further evidence provided by bi-monthly vegetation photographs submitted to DWER via the Licence Holder's Annual Environmental Report. As a result, the Delegated Officer has determined that a management plan is required to be submitted within 3 months of issue of this amendment outlining the Licence Holders management of waterlogging on the ridgeline; i.e. frequency of inspection, actions to minimize waterlogging (i.e. alternating spigots), and corrective actions in response to pooling or waterlogging. Improvement condition (4.1.1) has been added to the Licence.

The Licence Holder will be required to monitor vegetation health at each spigot location on a biannual basis by taking representative photographs and providing these within the annual environmental report. This requirement has been formalised through conditions 3.4.2 and 4.2.1.

The settlement ponds system designed to help remove TSS within the dewatering effluent has not been captured on the licence. Past water quality results from sampling of the effluent has indicated high levels of TSS during operation. To ensure TSS levels are reduced as much as possible prior to discharge to the ridgeline during operation, conditions will be added to the licence requiring the dewatering effluent to be passed through the settlement ponds prior to discharge onto the ridgeline (1.3.7).

Category 6 – Suzie Open Pit as a dewatering discharge point

The key emissions associated with construction and operation of the dewatering pipeline from the underground works to the Suzie Open Pit are: discharge of dewatering water to land (from overtopping and pipeline leaks) and groundwater (via seepage). The Delegated Officer has determined that the impacts from these emissions present a medium risk to the environment and the use of Suzie Open Pit is approved.

The construction of the pipeline and other infrastructure required for the disposal of dewatering water will be approved through condition 1.3.15 which will require the Licence Holder to construct the infrastructure according to the application documents and to provide a compliance certificate at completion of construction.

In accordance with DWER's *Guidance Statement: Risk Assessments* (DWER 2017) the Licence Holder's controls in relation to management of the dewatering water discharged into the Suzie Open Pit will be conditioned as they lower the assessed likelihood of the risk event. Changes to condition 1.3.13 will require the Licence Holder to carry out daily inspections of the dewatering pipeline leading to the Suzie Open pit and the pit freeboard. Changes to conditions 3.2.1 and 4.2.1 will require the Licence Holder to monitor the volume of dewatering effluent that is

discharged into the Suzie Open Pit to prevent overtopping.

Category 6 – increase in TDS limit

The key emission associated with the increase in TDS limit is an increase in salts concentration in the soil at the discharge location at the ridgeline. The impact associated with this emission presents a medium risk.

Condition 2.2.2 will be updated to increase the TDS limit from 3000mg/L to 3500mg/L. However a new condition will be added to the Licence to ensure that the Licence Holder monitors vegetation health on an annual basis by using biannual photographs and including the results of the survey within the Annual Environmental Report. This requirement has been formalized through conditions 3.4.2 and 4.2.1.

The Licence Holders plans to rehabilitate the ridgeline as part of their mine closure plan. Areas impacted by salinity will be revegetated with local salt tolerant species.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 20/4/2018. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

Amendment

1. The Licence is amended by the insertion of the bold text shown in underline below:

1.3.10 The Licensee shall ensure that any dewatering effluent shall only be managed in the following manner:
(a) used for dust suppression in a manner that minimises damage to surrounding vegetation; or
(b) discharged via discharge spigots in accordance with condition 2.2.1,
(c) used for process water and administration requirements, ***or***
(d) discharged to Suzie Open Pit.

2. The Licence is amended by the insertion of the bold text shown in underline and by the deletion of the text shown in strikethrough below;

1.3.11 The Licensee shall ensure that tailings ***and mine dewater*** *are only ~~discharged~~* ***stored and/or treated within compounds*** *~~into dams~~ with the relevant infrastructure requirements and at the location specified in Table 1.3.3 and identified in schedule 1.*

Table 1.3.3: Containment infrastructure			
Containment point reference	***~~Dam number(s)~~***	***Material***	***Infrastructure requirements***
TSF	***~~-~~***	*Tailings*	***2 celled storage dam***
Settlement ponds 1-3		***Mine Dewater***	***Unlined settlement ponds to treat dewater prior to discharge***
Suzie Open Pit			***-***

3. The Licence is amended by the insertion of the bold text shown in underline below:

1.3.15 The Licensee shall ensure that each item of infrastructure or equipment specified in column 1 of Table 1.3.6 is designed and constructed in accordance with the requirements specified in column 2 of Table 1.3.6.

Table 1.3.6: Infrastructure or equipment requirements (design and construction) of the TSF Cell A and Cell B embankment lift and dewatering pipeline	
Column 1	***Column 2***
Infrastructure	***Requirements (design and construction)***
TSF embankment raise to Cell A and Cell B	*Raised by 2 metres only from RL1489m to RL1491m*
	Minimum embankment freeboard designed to ensure a minimum total freeboard of 715 mm (300 mm operational freeboard + 200 mm beach freeboard + 215 mm ARI)
	Embankments lifted utilising either compacted tailings or compacted oxide mine waste sourced from pit development
	Corresponding central concrete decant tower and causeway are raised by 2 metres
	Clean rock fill placed around slotted precast concrete at the extended decant tower
	Perimeter embankment and decant accessway crests sheeted with a nominal 150 mm thickness of wearing course material
	Tailings spigots located at nominally 20 m centres on the upstream crest of the embankment
Dewatering water pipeline to Suzie Open Pit	***Flow meter installed to measure volume of effluent pumped from settling pond 3 to Suzie Open Pit.***
	Dewatering effluent pipeline constructed using poly pipe poly welded.
	Pontoon pump installed within settling pond 3.

4. The Licence is amended by the insertion of the bold text shown in underline below:

1.3.13 The Licensee shall:

(a) undertake inspections as detailed in Table 1.3.4;

(b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and

(c) maintain a record of all inspections undertaken.

Table 1.3.4: Inspection of infrastructure		
Scope of inspection	***Type of inspection***	***Frequency of inspection***
Tailings pipelines	*Visual integrity*	*Daily*
Return water lines	*Visual integrity*	*Daily*
Embankment freeboard	*Visual to confirm required freeboard capacity is available*	*Daily*
Mine dewater pipelines	*Visual integrity*	*Daily*
Suzie Open Pit freeboard	***Visual integrity***	***Daily when discharge is occurring***

The Licence is amended by the insertion of the bold text shown in underline below:

1.3.14 The Licensee shall ensure the limits specified in Table 1.3.5 are not exceeded.

Table 1.3.5: Production or design capacity limits		
Category1	***Category description[1]***	***Premises production or design capacity limit***
5	*Processing or beneficiation of metallic or non-metallic ore*	*365,000 tonnes of tailings per annual period*
6	*Mine dewatering*	*600,000 tonnes of discharge per annual period during **operations;*** ***1,000,000** tonnes of discharge per annual period during **care and maintenance period.***

Note 1: Environmental Protection Regulations 1987, Schedule 1.

5. The Licence is amended by the insertion of the bold text shown in underline below

2.2.1 The Licensee shall ensure that where waste is emitted to land from the emission point in Table 2.2.1, and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emission points to land		
Emission point reference and location on Map of emission points	***Description***	***Source including abatement***
Discharge Spigots and Discharge Spigots (Contingency)	*Dewatering discharge onto the ridgeline located approximately 1.2 km east of the mining area*	*Water from dewatering of the Mine pit and underground operations **via settlement ponds 1-3.***
Suzie Open Pit	***Dewatering discharge into Suzie Open Pit.***	***Water from dewatering of the mine via settlement ponds 1-3.***

6. The Licence is amended by the insertion of the bold text shown in underline and by the deletion of the text shown in strikethrough below

2.2.2 The Licensee shall not cause or allow emissions to land that do not meet the limits listed in Table 2.2.2.

Table 2.2.2: Emission limits to land			
Emission point reference	***Parameter***	***Limit (including units)***	***Averaging period***
*Dewatering discharge **spigots** sampling point*	*Total Dissolved Solids*	*< ~~3,000~~ **3500** mg/L*	*Spot sample*
	pH	*≥ 6 to ≤ 9 pH units*	
Suzie Open Pit	***Total Dissolved Solids***	***< 3,500 mg/L***	***Spot sample***
	pH	***≥ 6 to ≤ 9 pH units***	

7. The Licence is amended by the insertion of the bold text shown in underline and by the deletion of the text shown in strikethrough below.

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of emissions to land				
Monitoring point reference	***Parameter***	***Units***	***Frequency***	***Averaging period***
Dewatering discharge at location before the settling ponds	***Total Suspended Solids***	***mg/L***	***Quarterly (taken on the same day as sampling post settling ponds)***	***Spot sample***
Dewatering discharge sampling point ***(post settling ponds)***	*Arsenic (As); Cadmium (Cd); Chromium (Cr); Cobalt (Co); Copper (Cu); Iron (Fe); Lead (Pb); Nickel (Ni); Selenium (Se);and Zinc (Zn)*	*mg/L*	*Annual*	***Spot sample***
	Total Dissolved Solids	*mg/L*	*Quarterly[1]*	
	Total Suspended Solids			
	pH	*pH units*	*Quarterly[1]*	
	~~*Volumes of dewatering water discharged to the environment*~~ ***Volumetric flow rate***	*(m^3/day)*	*Continuous*	***Monthly***
Dewatering discharge point into Suzie Open Pit	***Volumetric flow rate***			
	Total Dissolved Solids	***mg/L***	***Quarterly[1]***	***Spot sample***
	pH	***pH units***	***Quarterly[1]***	

Note 1: Parameter can be analysed with field equipment.

8. The licence is amended by the insertion of the bold text shown in underline below;

3.4.2 The Licensee shall engage a botanist or an otherwise suitably qualified environmental professional to undertake an annual survey of vegetation health at each ridgeline discharge spigot location. The vegetation survey should utilise biannual photo points for assessment.

9. The licence is amended by the insertion of the bold text show in underline below

4.1.1 The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.

Table 4.1.1: Improvement Program		
Improvement Reference	***Improvement***	***Date of Completion***
IR1	***The Licensee shall submit a plan to the CEO detailing how the risk of soil waterlogging will be mitigated at the ridgeline discharge site. The plan shall include but not be limited to;*** ***a) Management measures taken to prevent waterlogging of soils;*** ***b) Corrective actions to be taken if waterlogging of soils is identified; and*** ***c) Inspection frequency of ridgeline during discharge.***	***3 months after issue date of this amendment***

10. The Licence is amended by the insertion of the bold text shown in underline below.

4.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 90 calendar days after the end of the annual period. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table.

Table 4.2.1: Annual Environmental Report		
Condition or table (if relevant)	***Parameter***	***Format or form[1]***
-	*Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken*	*None specified*
Table 3.2.1	*Monitoring of emissions to land*	*LR1*
3.4.2	***Vegetation survey comprising biannual photographs at each discharge spigot location***	***None specified***
Table 3.2.1	***Cumulative volume of mine dewater discharged to ridgeline spigots.***	*None specified*
Table 3.2.1	***Cumulative volume of mine dewater discharged to Suzie Open Pit.***	
Table 3.3.1	*Process monitoring*	
Table 3.4.1	*Monitoring of ambient groundwater quality*	*AGWQ1*
4.1.3	*Compliance*	*Annual Audit Compliance Report (AACR)*
4.1.4	*Complaints summary*	*None specified*

Note 1: Forms are in Schedule 2

11. The Licence is amended by the insertion of the bold text shown in underline below

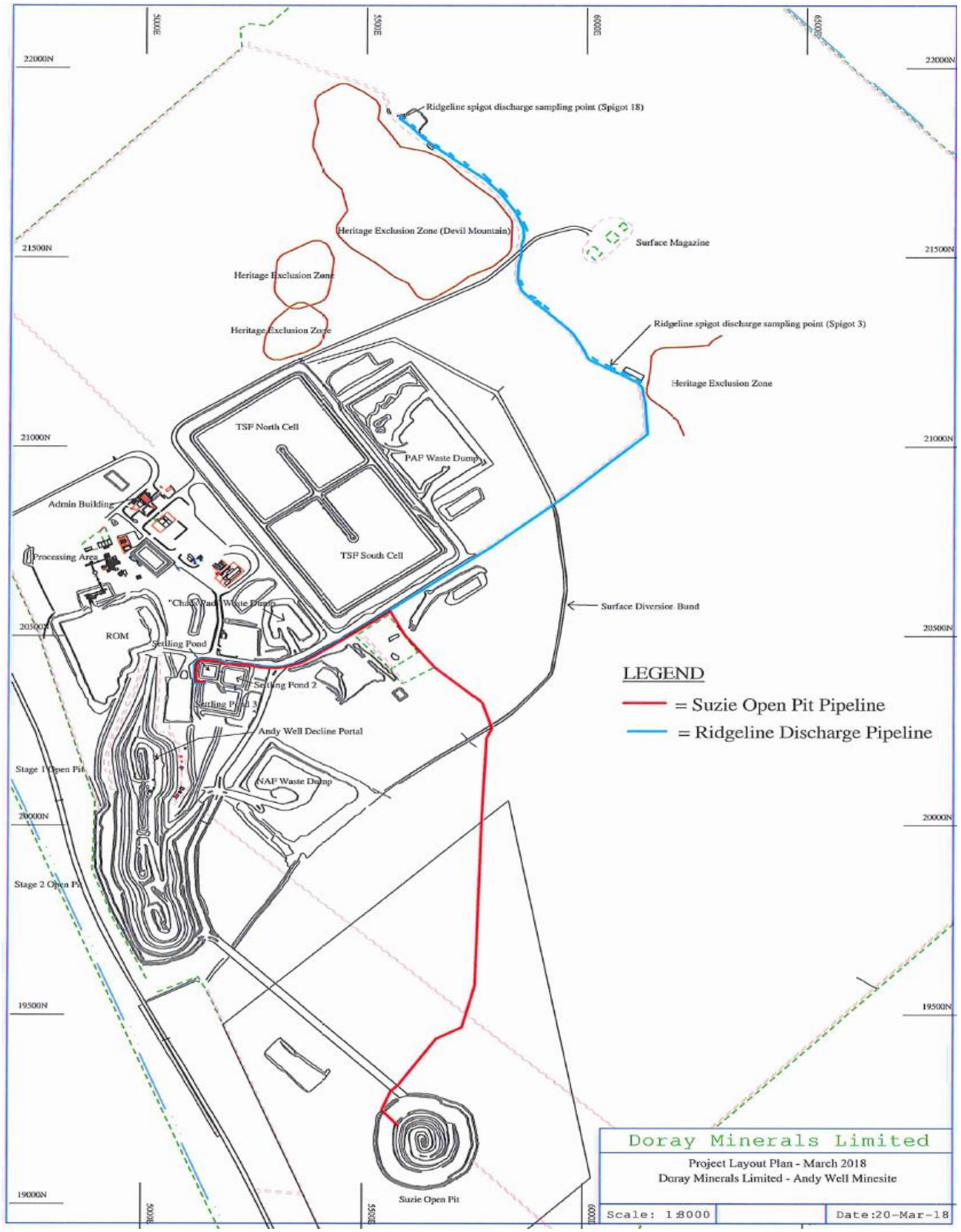
4.3.1 The Licensee shall ensure that the parameters listed in Table 4.3.1 are notified to the CEO in accordance with the notification requirements of the table.

Table 4.3.1: Notification requirements			
Condition or table (if relevant)	***Parameter***	***Notification requirement1***	***Format or form2***
1.3.1 and 2.1.1	*Breach of any limit specified in the Licence*	*Part A: As soon as practicable but no later than 5pm of the next usual working day.* *Part B: As soon as practicable*	*N1*
3.1.4	*Calibration report*	*As soon as practicable.*	*None specified*
-	***Commencement of Operations***	***Within 7 days of commencement***	

Note 1: Notification requirements in the Licence shall not negate the requirement to comply with s72 of the Act
Note 2: Forms are in Schedule 2

12. The Licence is amended by inserting the map below in Schedule 1 Map of Storage locations:

The location of the settlement ponds defined in Table 1.3.3 is shown below.


Ridgeline spigot discharge sampling point (Spigot 18)
Heritage Exclusion Zone (Devil Mountain)
Surface Magazine
Heritage Exclusion Zone
Heritage Exclusion Zone
Ridgeline spigot discharge sampling point (Spigot 3)
Heritage Exclusion Zone
TSF North Cell
PAF Waste Dump
Admin Building
Processing Area
TSF South Cell
Surface Diversion Bund
ROM
Settling Pond
Settling Pond 2
Andy Well Decline Portal
Stage 1 Open Pit
NAF Waste Dump
Stage 2 Open Pit
Suzie Open Pit
LEGEND
= Suzie Open Pit Pipeline
= Ridgeline Discharge Pipeline
Doray Minerals Limited
Project Layout Plan - March 2018
Doray Minerals Limited - Andy Well Minesite
Scale: 1:8000
Date:20-Mar-18

Appendix 1: Key documents

	Document title	In text ref	Availability
1	ANZECC (2000) Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality	ANZECC 2000	Accessed at www.agriculture.gov.au/water/quality/guidelines/volume-1
2	RPS Aquaterra. (2011) Preliminary Hydrological Assessment – Andy Well. PRS Aquaterra, 21 February 2011	RPS Aquaterra. 2011	Provided by Applicant
3	Mattiske Consulting (2011) Flora and Vegetation of the Andy Well Survey Area, Mattiske Consulting Pty Ltd, June 2011.	Mattiske Consulting, 2011	Provided by Applicant
4	DWER (2016) *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth, November 2016.	DWER 2016	Accessed at www.dwer.wa.gov.au
5	Licence L8698/2012/1	Licence	Accessed at www.dwer.wa.gov.au

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 20/4/2018 for review and comment. The Licence Holder responded on 30/5/2018. The following comments were received on the draft Amendment Notice.

Condition	Summary of Licence Holder comment	DWER response
1.3.10	The Licence Holder accepts the amendment to condition 1.3.10	N/A
1.3.11	The Licence Holder accepts the amendment to condition 1.3.11	N/A
1.3.15	The Licence Holder requests that the two engineering specifications be removed from Table 1.3.6	DWER accepts the Licence Holders justification for removal of the two engineering requirements from Table 1.3.6. Condition 1.3.15 has been updated.
1.3.13	The Licence Holder accepts the amendment to condition 1.3.13	N/A
1.3.14	The Licence Holder accepts the amendment to condition 1.3.14	N/A
2.2.1	The Licence Holder requests that a single TDS limit of 3500 mg/L be applied to Table 2.2.2	DWER accepts the Licence Holders justification. Condition 2.2.1 has been updated.
3.2.1	The Licence Holder accepts the amendment to condition 3.2.1	N/A
3.4.2	The Licence Holder appeals the requirement for an annual flora survey as listed in condition 3.4.2. Stipulates that photo monitoring is sufficient.	DWER has not accepted the Licence Holders justification. Condition 3.4.2 remains unchanged.
4.1.1	The Licence Holder queries the requirement for an alternative discharge method due to limited environmental benefits, potentially increase environmental disturbance, materials balance requirements for rehabilitation and financial implications.	Based on information provided to DWER (Record A1685805) on 30/5/2018 DWER accepts the Licence Holders justification and have removed this requirement. It has been replaced by an improvement condition requiring a management plan to be submitted to DWER outlining the Licence Holders plans for the management of waterlogging of soils on the ridgeline.
4.2.1	The Licence Holder accepts the amendment to condition 4.2.1	N/A
4.3.1	The Licence Holder accepts the amendment to condition 4.3.1	N/A
Table 1.3.3	The Licence Holder accepts the amendment to Table 1.3.3	N/A

The Licence Holder was provided with the draft Amendment Notice again on 14/06/2018 for review and comment. The Licence Holder responded on 21/06/2018. The following comments were received on the draft Amendment Notice.

Condition	Summary of Licence Holder comment	DWER response
N/A	*'Just one minor comment, in relation to Table 1.3.6, thank you for removing the engineering specifications (PN10 poly pipe and 11 kW pontoon pump); however, on page 7 under 'Category 6 – Suzie Open Pit as an additional dewatering discharge point' of the document, the third sentence refers to the piping specifications and notes that the pipe runs along the pit haulage road. Is it possible to remove this sentence from the final version of the licence?* *Otherwise, at your convenience, could we please request that L8698/2012 be issued as a final version.'*	Sentence has been deleted.