



Licence Number L4328/1989/10

Licensee Wodgina Lithium Pty Ltd

ACN 611 488 932

File Number: DER2013/001044

Premises Wodgina Operations
Mining Tenements M45/50, M45/353, M45/381,
M45/382, M45/383, M45/886, M45/887, M45/923
M45/925 MARBLE BAR WA 6760

Date of Amendment 12 March 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* 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: 12 March 2018

Alana Kidd

MANAGER LICENSING – 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
ACN	Australian Company Number
ARI	Average Recurrence Interval
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
Bq/L	Becquerel per litre
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 <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
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
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Licensee	Wodgina Lithium Pty Ltd
mbgl	metres below ground level
NATA	National Association of Testing Authorities, Australia
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 <i>Guidance Statement: Risk Assessments</i>
t/hr	Tonnes per hour
TSF	Tailings Storage Facility
USEPA	United States Environmental Protection Agency

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 5 – processing or beneficiation of metallic or non-metallic ore. The amendment is to include a new crushing and screening circuit adjacent to the current fixed plant located on M45/381, in addition to 3 mobile crushing and screening plants to be installed on M45/923.

Amendment description

An application for an amendment to Licence L4328/1989/10 was received by the Department of Water and Environment Regulation (DWER) on 3 October 2017.

Wodgina Lithium Pty Ltd (Licensee) is currently approved to process 6,800,000 tonnes of target material (pegmatite) per annum under the assessed design capacity of the current fixed plant located on M45/381. The current plant consists of multiple screens and crushing units to achieve a dry ore product of sub-80mm.

The Licensee proposes to install a new crushing and screening circuit (secondary fixed plant) adjacent to the current fixed plant on M45/381. The Licensee is also to install 3 mobile crushing and screening plants on M45/923 to process raw-feed product and low-grade product for use as saleable ore and onsite stemming uses for project blasts

Table 2 below outlines the proposed changes to the production or design capacity for category 5.

Table 2: Proposed production or design capacity changes

Category	Current production or design capacity	Proposed production or design capacity	Description of proposed amendment
5	6,800,000 tonnes per annual period	8,750,000 tonnes per annual period	<p>The current fixed plant has a design capacity of 6.8 million tonnes per annum (mtpa) and the additional secondary fixed plant has a design capacity of 5 mtpa.</p> <p>The 3 mobile crushing and screening plants each have a design capacity of 3.5 mtpa.</p> <p>The combined production capacity for all plant is 8.75 mtpa.</p>

Secondary fixed plant

Secondary fixed plant location

The location of the secondary fixed plant will be on previously disturbed areas and will be located adjacent to the current fixed plant.

Secondary fixed plant components

The purpose of the secondary fixed plant is to feed the future beneficiation plant operations (to be constructed under a works approval application). The plant consists of:

- Primary jaw crusher
- Secondary crusher
- High pressure grinding rolls
- Stacker
- Conveyors
- Control room
- Dust suppression system

Process description and layout

Description of the secondary fixed plant process:

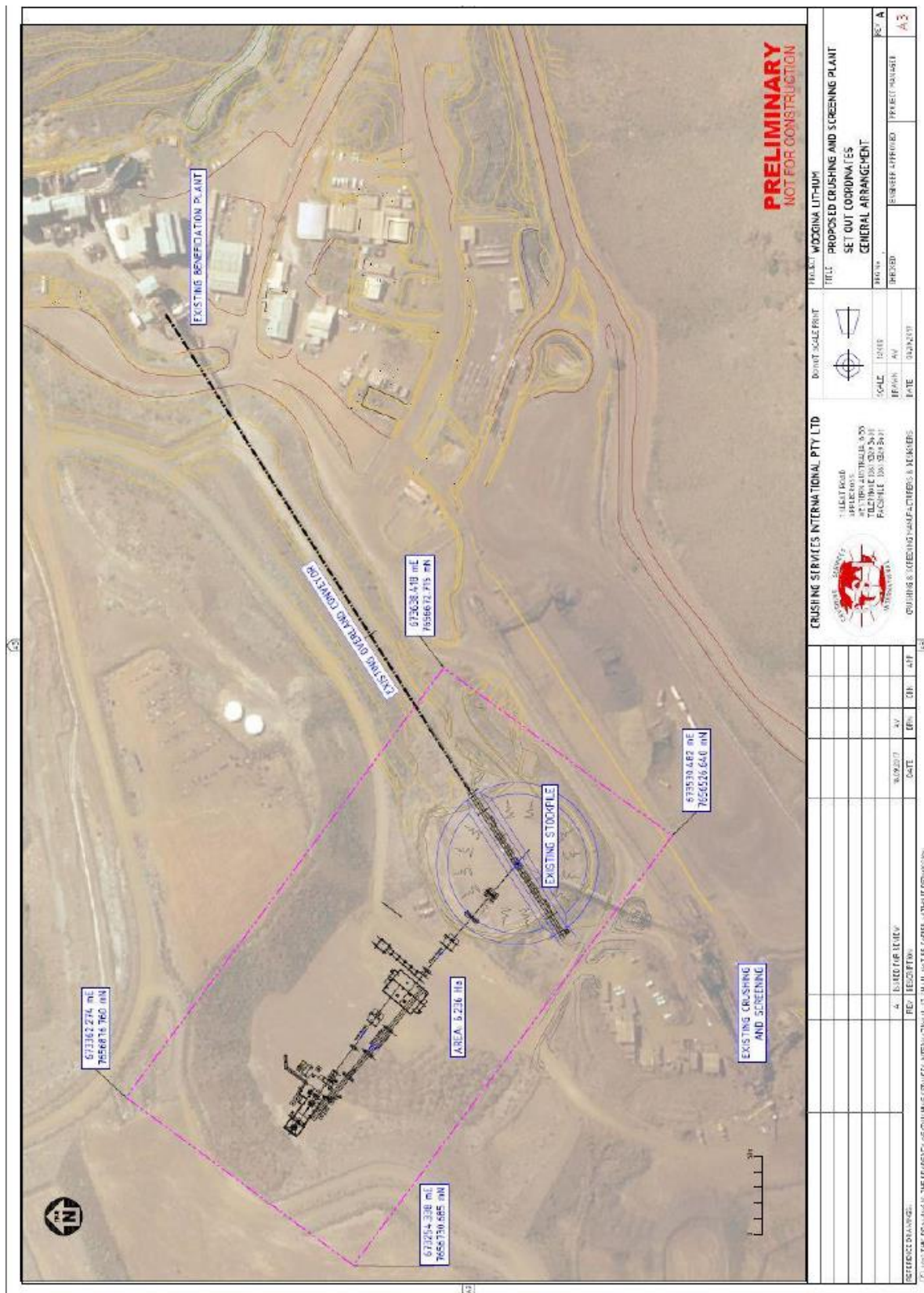
- Crushing
 - Ore is fed from a loader into the ROM bin where the ore passes a main grizzly feeder into the primary jaw crusher
 - The ore is then passed through a series of screens directing oversize through the secondary crushing unit (cone crusher)
- Screening
 - Screens and conveyors ensure that appropriate particle sizes are obtained prior to being fed into the secondary and tertiary crushers
 - Static magnets are also installed following all passing streams behind crushing stages
- Grinding Circuit (Tertiary crushing)
 - Crushed product will be fed to two parallel ball mills, each with a nominal feed rate of 231 dry t/h. Each ball mill will operate in closed circuit with a set of hydrocyclones, to produce a ground product. (Wodgina, November 2017)

The dust suppression system consists of:

- Water sprays fitted to conveyors, transfer chutes and stackers;
- Visual monitoring; and
- Water carts and foggers used in the surrounding areas (Wodgina, October 2017).

The secondary fixed plant layout is depicted in Figure 1.

Figure 1: Secondary fixed plant layout.



Stormwater management

The current fixed plant stormwater management infrastructure will be utilised to manage stormwater in the location of the secondary fixed plant. The current stormwater management infrastructure consists of a series of concrete sumps with oil/water separators. The overflow valves direct the water component to an unlined retention pond. This stormwater management infrastructure will be utilised by “sloping the ground to direct all surface water into the series of sumps” (Wodgina, November 2017).

The plant area will be bunded and sloped to ensure all stormwater is diverted away from infrastructure towards the unlined retention sump. In the event of high rainfall events and prior to discharge from the unlined retention pond, the effluent will be tested for Total Recoverable Hydrocarbons to ensure that the emissions to land limit of 15 milligrams per litre is met prior to discharge into the TSF area, or re-use on site in accordance with Condition 2.2.2 of the current licence (Wodgina, November 2017).

Mobile crushing and screening plants

Plant location

The mobile crushing and screening plants are to be located on raised pad(s) atop tailings storage facility (TSF 3). TSF 3 has not been in use for several years (since 2012/2013). The tailings are capped with an oxide material and are completely dry. This facility will not be used in the short-term. The Licensee plans to reprocess the material in TSF 3 once a wet beneficiation plant has been constructed. The wet beneficiation plant is subject to a current works approval application.

Plant components (Wodgina, February 2018)

The 3 mobile crushing and screening plants consist of the following:

- Primary Crusher (Jaw),
- Secondary Crusher (Cone)
- Primary and Secondary Screens
- Conveyors
- Stacker
- Control Room
- Dust Suppression System

Process description and layout

The plant will process raw-feed product and low-grade product for use as saleable ore and onsite stemming uses for project blasts.

Stormwater management

The mobile plants will be positioned on raised pads situated on the tailings storage facility. Surface water flows generated on the tailings facility will be contained within the TSF and will not encroach on the plant’s operational footprint (Wodgina, November 2017).

The mobile plants are to be located atop TSF 3. TSF 3 contains tailings that have consolidated over time. A coffee report indicates that the depth to groundwater at the location of TSF 3 is 17 mbgl. A tailings assessment undertaken by MBS Environmental (MBS, June 2017) indicates that the permeability of the tailings from two samples is 9.2×10^{-7} m/s and 2.0×10^{-6} m/s respectively, which indicate moderate permeability.

Other ancillary infrastructure

Existing ancillary infrastructure will be utilised for the secondary fixed plant due to its location adjacent to the current fixed plant.

The only supporting infrastructure required for the mobile crushing and screening plants is an office and portable diesel generator.

No additional bulk fuel or chemical storage is required for the secondary fixed or mobile plants. If a workshop is required in the future for the mobile plants, bunding and storage infrastructure will be installed to ensure surface water flows are directed around the facility to minimise the generation of contaminated water streams (Wodgina, November 2017).

Amendment history

Table 3 provides the amendment history for L4328/1989/10.

Table 3: Licence amendments

Instrument	Issued	Amendment
L4328/1989/10	12/12/2013	Licence amendment to amend submission date for Annual Environmental Report
L4328/1989/10	02/06/2016	Licence amendment for tyre disposal area
L4328/1989/10	07/02/2017	Licence transferred from Global Advanced Metals Wodgina Pty Ltd to Wodgina Lithium Pty Ltd. Administrative amendment undertaken in accordance with Departmental reform
L4328/1989/10	18/08/2017	Amendment Notice 1: Amendment to construct a new tyre disposal area and to increase the Category 89 capacity from 1,850 tonnes per annum to 3,350 tonnes per annum
L4328/1989/10	12/03/2018	Amendment Notice 2: Construction and operation of secondary fixed processing plant and 3 mobile crushing and screening plants

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 4: Receptors and distance from Prescribed Premises boundary

Residential and sensitive premises	Distance from Prescribed Premises
Kangan Homestead	19 km west north-west from the Premises boundary
Yandeyarra Aboriginal Community	32 km west south-west from the Premises boundary

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 Prescribed Premises boundary

Environmental receptors	Distance from Prescribed Premises
Priority Fauna	<p>There are no priority fauna species located within the footprint of the proposed secondary fixed plant or proposed mobile crushing and screening plants.</p> <p>According to publicly available data, Schedule 2 threatened fauna species are located within nearby operational areas, approximately 50 m from the secondary fixed plant. The existence of the fauna in this location is not certain and only one individual was recorded.</p> <p>No other priority fauna is located within 500 metres of the fixed and mobile plants.</p>
Priority Flora	<p>No threatened or priority flora species are located within 2 km of the fixed or mobile plants according to publicly available data.</p>

Table 6 below lists the relevant groundwater and water sources in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 6: Groundwater and water sources and distance from Prescribed Premises boundary

Environmental receptors	Distance from Prescribed Premises
Minor non-perennial watercourses	<p>No watercourses are located within the secondary fixed plant footprint. The mobile crushing and screening plants are located atop TSF3.</p>
Groundwater	<p>The depth to groundwater in the area surrounding the current fixed plant is 6.9 mbgl (Wodgina, November 2017).</p> <p>The mobile crushing and screening plants are to be located atop TSF 3 and the Licensee expects the groundwater to be at a greater depth at this location (Wodgina, November 2017). In addition, a 2008 geotechnical investigation states that most bores surrounding TSF 3 are dry, with one bore indicating groundwater is 17 mbgl (Coffey, 2008). The TSF is currently not in use.</p> <p>Bores located within the vicinity of the operations are mostly for production and exploration purposes.</p>

Other approvals

Table 7 below lists the other approval relevant to the proposed amendment

Table 7: Other relevant approvals

Legislation	Tenements	Approval details
<i>Mining Act 1978</i>	M45/381	<p>The Department of Mines, Industry Regulation and Safety (DMIRS) has confirmed that existing approval for M45/381 (site of secondary fixed plant) allows the processing of ore, however, not within the proposed footprint of the secondary fixed plant.</p> <p>The Licensee has submitted a mining proposal for the secondary fixed plant to DMIRS.</p>
	M45/923	<p>Screening of ore using the mobile crushing and screening plants on M45/923 is not currently approved under the <i>Mining Act 1978</i> and the tenement is held by Global Advanced Metals Wodgina Pty Ltd (GAM). There was an asset sale agreement between GAM and Mineral Resources Limited. Wodgina Lithium Pty Ltd is a subsidiary of Mineral Resources. A letter was submitted to DMIRS on 22 September 2016 authorising Mineral Resources Limited to act as an agent on behalf of GAM in respect to all matters concerning and connected to the tenements.</p> <p>The Licensee has submitted a mining proposal for the mobile crushing and screening plants to DMIRS.</p>

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.

Table 8: Risk assessment for proposed amendment during construction

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Cat 5 Processing plants	Installation and mobilisation of secondary fixed plant and 3 mobile crushing and screening plants	Dust: Associated with construction activities	No residential receptors in close proximity	Air: Transport through air then deposition	Health and amenity impacts	Slight	Rare	Low	The closest residential receptor is the Kangan homestead located 19 km from the Premises. The distance is considered too great for dust impacts to occur; therefore the risk has been determined as low .
		Noise: Associated with construction activities	No residential receptors in close proximity	Air or other physical medium	Health and amenity impacts	Slight	Rare	Low	The closest residential receptor is the Kangan homestead located 19 km from the Premises. The distance is considered too great for noise impact to occur; therefore the risk has been determined as low .

Table 9: Risk assessment for proposed amendment during operation

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Cat 5 Processing plants	Operation of secondary fixed plant and 3 mobile crushing and screening plants	<p>Dust: Associated with vehicle movements on unsealed access roads</p> <p>Dust from loading and unloading of material stockpiles</p> <p>Dust from the processing of target material</p>	No residential receptors in close proximity	Air: Transport through air then deposition	Health and amenity impacts	Slight	Rare	Low	The closest residential receptor is the Kangan homestead located 19 km from the Premises. The distance is considered too great for dust impacts to occur; therefore the risk has been determined as low .
		<p>Noise: Noise from operation of the mobile and fixed crushing and screening plants and vehicle movement</p>	No residential receptors in close proximity	Air or other physical medium	Health and amenity impacts	Slight	Rare	Low	The closest residential receptor is the Kangan homestead located 19 km from the Premises. The distance is considered too great for noise impacts to occur; therefore

									the risk has been determined as low .
	Waste: Spills and leaks of hydrocarbons	Groundwater with beneficial use Surface water systems	Seepage of hydrocarbons Contamination of sheet flow	Groundwater quality Surface water quality	Slight	Unlikely	Low	No additional fuel or chemical storage is required for the fixed or mobile plants. Any spills or leaks will be from the fuel tanks of the plant only. Noting the low volumes, the risk has been determined as low .	
	Waste: Contaminated stormwater associated with contact with processed fines at the 3 mobile crushing and screening plants	Groundwater with beneficial use.	Seepage of leached contaminants	Groundwater quality	Slight	Unlikely	Low	Noting that the mobile plants will be located atop TSF3 where the tailings have moderate permeability, and the inferred depth to groundwater at this location (17 mbgl), the risk has been determined as low .	

		Waste: Contaminated stormwater associated with contact with processed fines at the fixed screening plant	Groundwater with beneficial use Surface water ecosystems	Contamination of sheet flow	Surface water quality	Minor	Unlikely	Medium	See detailed risk assessment below.
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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 10 below.

Table 10: 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 11 below.

Table 11: 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

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)	
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.

Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 12 below:

Table 12: 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.

Detailed risk assessment – Stormwater

Risk Assessment – Stormwater contaminated with fines from secondary fixed plant

Description of Risk Event 1

Stormwater containing processed fines could result in the emission of trace metals and metalloids to groundwater and surface water systems. Stormwater is to be directed to an unlined retention pond. This unlined stormwater retention pond (already constructed) is able to manage water from a 1 in 10 year Average Recurrence Interval (ARI), 72-hour duration rainfall event, after which the retention pond may overflow to a designated overflow area (Wodgina, December 2017).

Weathering of crushed rock fines accumulating in the retention pond could result in the emission of trace metals and metalloids to groundwater. Stormwater run-off from the overflow area could result in crushed rock fines entering surface water systems where subsequent weathering could release contaminants.

Identification and general characterisation of emission

Pegmatite host rocks contain negligible amounts of sulphide minerals. As a consequence, these materials would normally be considered to have a low potential for producing metalliferous drainage other than low concentrations that are produced by rainfall-induced weathering of minerals in crushed rock. However, pegmatite host rocks at the Wodgina mine site contain substantial amounts of phosphate minerals (particularly lithiophilite and apatite), which make them vulnerable to bioweathering by symbiotic fungal communities (lichens and mycorrhizas) which often colonise rock surfaces (Gadd, 2007) and extract nutrients from minerals in the rocks. These communities can produce substantial amounts of organic acids (particularly citric and oxalic acids) which can both leach metals from minerals surfaces, and form complexes with metals and increase their mobility.

As a result of these factors, the extent to which metals and metalloids could be leached from these rocks should be considered to lie somewhere on a continuum between purely abiotic weathering, which can be assessed through leaching tests with deionised water, and biologically-enhanced weathering which can be assessed by conducting leaching tests on waste rock materials with dilute acid.

Leaching tests have been undertaken for tailings materials from the Wodgina mine site by MBS Environmental (MBS June 2017). The leaching tests indicate that acidic leachate (the “worst case” biologically-enhanced weathering scenario) contains elevated concentrations of thallium, caesium, lithium, rubidium and zinc. Of these elements, thallium is of greatest environmental concern.

Description of potential adverse impact from the emission

It is unlikely that concentrations of thallium and other contaminants would exceed levels of environmental concern by a sufficient margin to threaten offsite receptors; however this would need to be verified by groundwater monitoring at the site. Leaching of contaminants could cause exceedances of applicable groundwater criteria within the underlying groundwater.

There are no watercourses within 100 m of the secondary fixed plant. The depth to groundwater at the location of the secondary fixed plant is inferred at 6.9 mbgl.

Criteria for assessment

Applicable freshwater guideline values in ANZECC/ARMCANZ 2000 and applicable land

health investigation levels in ASC NEPM. USEPA National Primary Drinking Water Regulations for levels of thallium in drinking water.

Licensee's controls

This assessment has reviewed the controls set out in Table 13 below.

Table 13: Licensee's proposed controls

Site infrastructure	Description	Reference to issued licence plan
Secondary Fixed Plant	Clean stormwater from surrounding areas to be directed around the fixed plant.	Map of processing plant in Schedule 1.
	Site to be graded to direct stormwater within the footprint of the secondary fixed plant towards sumps/oil separators in the existing fixed plant location. This water is then directed to an unlined retention pond which has the capacity to contain a 1 in 10 year ARI, 72-hour duration storm event.	

Consequence

If contaminated stormwater infiltrates to groundwater, this could result in mid-level on-site impacts. Therefore, the consequence has been determined as **moderate**.

Likelihood of Risk Event

It is expected that concentrations of thallium and other contaminants of concern will not exceed levels of environmental concern by a sufficient margin to threaten offsite receptors however; it is possible that specific consequence criteria could be exceeded in the underlying onsite groundwater. Therefore the likelihood of the consequence has been determined as **unlikely**.

Overall rating of contaminated stormwater

A comparison of the consequence and likelihood rating described above with the Risk Rating Matrix (Table 10) has determined the overall risk rating for stormwater run-off as **medium**.

Decision

The approved premises production capacity for Category 5 – processing or beneficiation of metallic or non-metallic ore has been increased from 6.8 mtpa to 8.75 mtpa to allow for the operation of the secondary fixed plant and 3 mobile crushing and screening plants, once installed.

Conditions 1.3.12 to 1.3.15 specify the construction requirements for the secondary fixed plant and 3 mobile crushing and screening plants. The Licensee's controls have been conditioned in respect to the location of plant and stormwater management. These conditions also set the reporting requirements upon completion of the works.

An additional monitoring bore is required to be monitored downgradient of the stormwater retention pond to determine if groundwater contamination is occurring due to the discharge of stormwater. The monitoring of bore DG MB1 is now required under condition 3.4.1.

As part of this amendment, the groundwater monitoring parameters required to be analysed under condition 3.4.1 have been expanded to include lithium, caesium, rubidium, uranium, fluoride, thallium, gross-alpha and gross-beta as these substances are contained within pegmatites. The major ions have been expanded to include chloride, bromide and sulphate. Changes in the chemical composition of major ions are an early indicator for changes in groundwater chemistry prior to metal and metalloid increases being detected. Total phosphorus has been added as the pegmatite contains substantial amounts of phosphate minerals at Wodgina Operations.

Licensee's comments

The Licensee was provided with the draft Amendment Notice on 25 January 2018. The Licensee responded on 9 February 2018 with the following comments:

Condition	Summary of Licence Holder comment	DWER response
Condition 1.3.12 and table 1.3.6	<p>The Licensee has requested approval to mobilise and operate 3 mobile crushing and screening plants each with a design capacity of 3.5 mtpa. The 3 mobile plants are to be located atop TSF 3 with identical controls to that applied for in the original amendment application.</p> <p>The Licensee is not seeking a revised throughput but rather a throughput of 8.75 mtpa ad hoc across mobile and fixed processing plants.</p> <p>The Licensee has committed to the same controls to those proposed for the mobile screening plant in the original amendment application.</p> <p>The 3 mobile plants are to be used to process raw-feed product and low-grade product for use as saleable ore and onsite stemming uses.</p> <p>The Licensee has provided a map depicting the mobile plant footprint within TSF 3.</p>	<p>DWER notes this response and considers this acceptable subject to the Licensee's proposed controls. The overall throughput is to remain at 8.75 mtpa.</p> <p>The purpose of the mobile plant has been updated.</p> <p>Table 1.3.6 has been amended to now refer to 3 mobile crushing and screening plants.</p> <p>The map depicting the mobile plant footprint within TSF 3 has been included in the licence.</p>

Condition	Summary of Licence Holder comment	DWER response
<p>Table 1.3.6 and condition 3.4.1</p>	<p>The Licensee has provided a map depicting the location of the downstream bore (existing) and also an upstream bore to be located within TSF 3 (once installed). The Licensee has provided desk top hydrogeological information that indicates that the regional groundwater flow is to the north east.</p> <p>The Licensee has labelled all TSF 3 groundwater bores. This map also includes a proposed bore (TSF EXT MB1) which is to be constructed under the works approval currently being assessed.</p>	<p>DWER has included the map of groundwater monitoring points.</p> <p>DWER notes that the regional groundwater flow is to the north east towards the Turner River and has therefore removed the requirement to install a downstream groundwater monitoring bore from table 1.3.6</p> <p>The downstream groundwater bore reference (DG MB1) has been included in table 3.4.1.</p>

Amendment

- The Prescribed premises category is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

Prescribed premises category

Schedule 1 of the Environmental Protection Regulations 1987

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes per year	6,800,000 <u>8,750,000</u> tonnes per annual period
54	Sewage facility	100 cubic metres or more per day	210 cubic metres per day
89	Putrescible landfill site	More than 20 but less than 5,000 tonnes per year	3,350 tonnes per annual period

- The Licence is amended by the insertion of Conditions 1.3.12 to 1.3.15 below.

1.3.12 *The Licensee must install and undertake the Works for the infrastructure and equipment:*

specified in Column 1;

to the requirements specified in Column 2;

at the location specified in Column 3

of Table 1.3.6 below.

1.3.13 *The Licensee must not depart from the requirements specified in Column 2 of Table 1.3.6 except:*

(a) *where such departure does not increase risks to public health, public amenity or the environment; and*

(b) *all other Conditions in this Works Approval are still satisfied.*

1.3.14 *Subject to Condition 1.3.13, within 60 days of the completion of the Works specified in Column 1 of Table 1.3.6, the Works Approval Holder must provide to the CEO certification confirming each item of infrastructure or component of infrastructure specified in Column 1 of Table 1.3.6 below has been constructed with no material defects and to the requirements specified in Column 2.*

1.3.15 *Where a departure from the requirements specified in Column 2 of Table 1.3.6 occurs and is of a type allowed by Condition 1.3.13, the Licensee must provide to the CEO a description of, and explanation for, the departure along with the certification required by Condition 1.3.6 (b).*

Table 1.3.6: Infrastructure and equipment requirements table

Column 1 Infrastructure/Equipment	Column 2 Requirements (design and construction)	Column 3 Site plan reference
<i>Secondary fixed plant</i>	<p><i>Concrete catchment bunds under all lubricating vessels and hydrocarbon storage units.</i></p> <p><i>Sited on a flat stable pad.</i></p> <p><i>Graded site to direct stormwater towards the sumps/oil separators in the existing fixed plant location where water is then directed to the unlined retention pond.</i></p> <p><i>Plant area to be bunded to divert clean stormwater around operational areas.</i></p>	<i>Map of fixed processing plant layout and downstream monitoring bore location in Schedule 1 maps</i>
<i>3 mobile crushing and screening plants</i>	<p><i>Located atop tailings storage facility 3.</i></p> <p><i>All sited on a flat stable raised pad.</i></p> <p><i>All plant area(s) to be bunded and graded to ensure all stormwater is directed towards retention sump(s) within the footprint of all plants.</i></p>	<i>Map of mobile crushing and screening plant layout in Schedule 1 maps.</i>

3. Condition 3.4.1 of the Licence is amended by the deletion of the text shown in strikethrough and the insertion of the bold text shown in underline below:

3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table and record the results.

Table 3.4.1: Monitoring of ambient groundwater quality²

Monitoring point reference and location	Parameter	Units	Averaging period	Frequency
Wastewater Treatment Plant Bores (WWTF1-WWTF5)	Standing water level ¹	m(AHD)	Spot sample	Monthly
	pH ¹	pH units	Spot sample	Quarterly
	Biochemical Oxygen Demand	mg/L		
	Chemical Oxygen Demand	mg/L		
	Total Dissolved Solids	mg/L		
	Total Suspended Solids	mg/L		
	E.coli	cfu/100mL		
	Total nitrogen	mg/L		
	Ammonia			
	Nitrate/Nitrite			
Total Phosphorus				
Tailings storage facility 3 (TSF1-TSF6, RB1, RB4, MB1, MB3, RB3M, RB3, RB2M, RB2, MB2A and MB2B) Retention pond downgradient bore (DG MB1)	Standing water level ¹	m(AHD)	Spot sample	Monthly
	pH ¹	pH units	Spot sample	Quarterly
	Electrical Conductivity	mS/cm		
	Total Recoverable Hydrocarbons	mg/L		
	Total Dissolved Solids	mg/L		
	Aluminium	mg/L		
	Arsenic			
	Cadmium			
	Chromium			
	Copper			
	Iron			
	Lead			
	Selenium			
	Mercury			
	Nickel			
	Zinc			
	Manganese			
	Silicon			
	Cobalt			
	Potassium			
	Magnesium			
	Sodium			
	Total Nitrogen			
	Calcium carbonate			
	Calcium			
	Lithium			
	Caesium			
	Rubidium			
	Uranium			
	Fluoride			
	Thallium			
	Chloride			
	Bromide			
Sulphate				
Total phosphorus				
Gross-alpha	Bq/L			
Gross-beta				

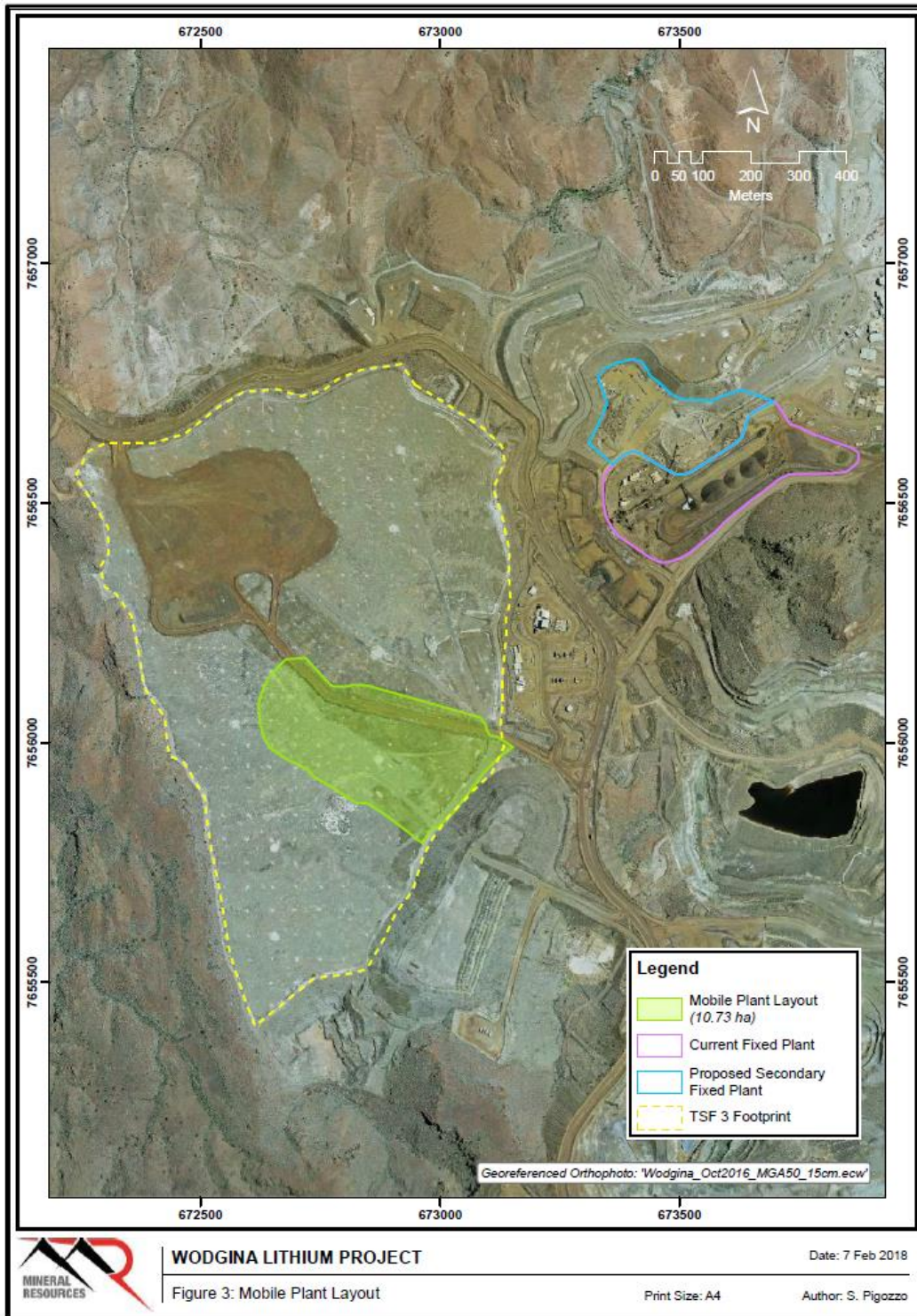
Note 1: In-field Non-NATA accredited analysis permitted.

Note 2: Level of detection is required to be sufficient to enable a comparison with ANZECC/ARMCANZ Guidelines (2000).

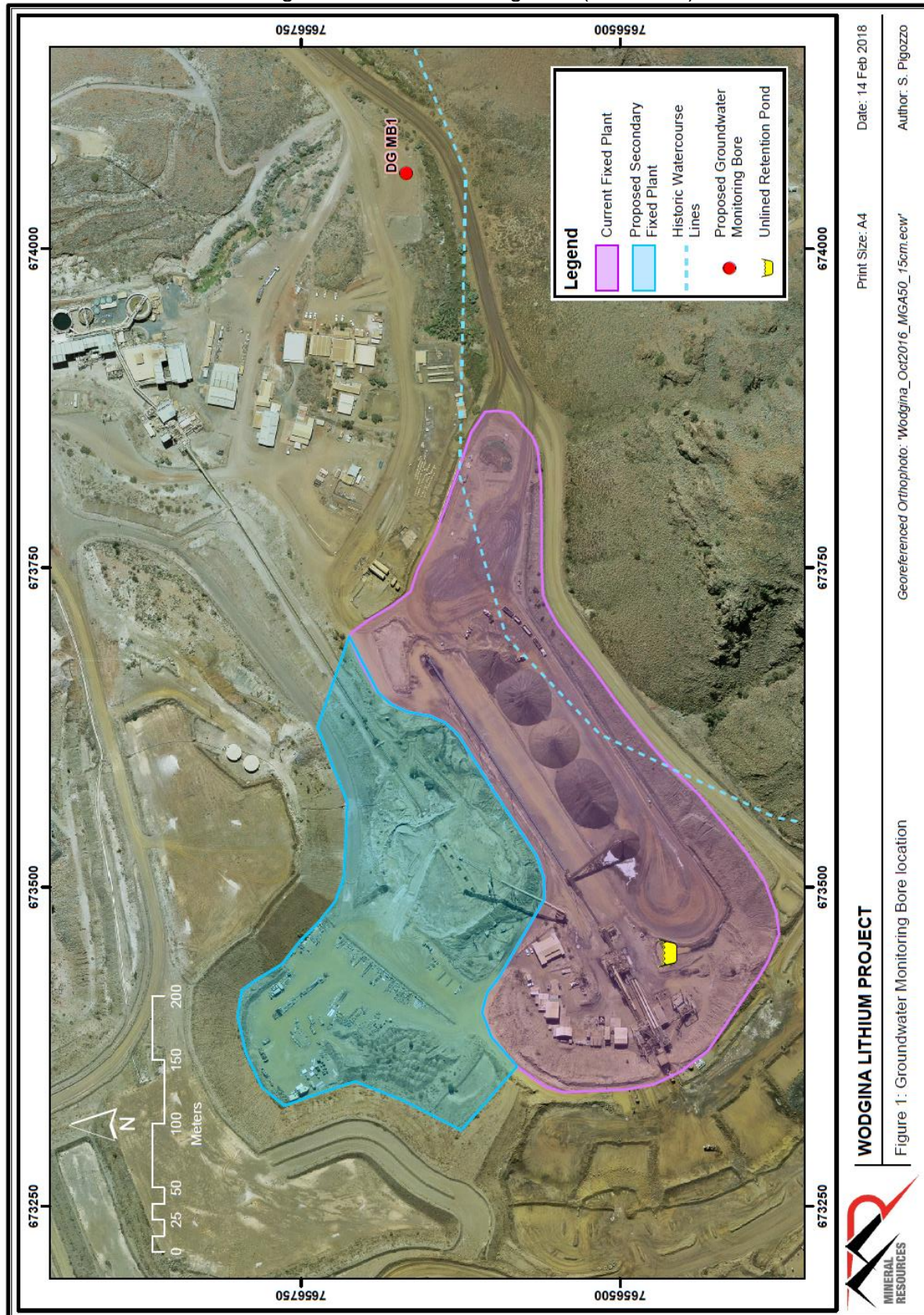
4. The Licence is amended by the insertion of the maps below into Schedule 1 Maps of the Licence.

Map of mobile crushing and screening plant footprint

Map depicting the footprint within TSF 3 where the 3 mobile crushing and screening plants will be located.

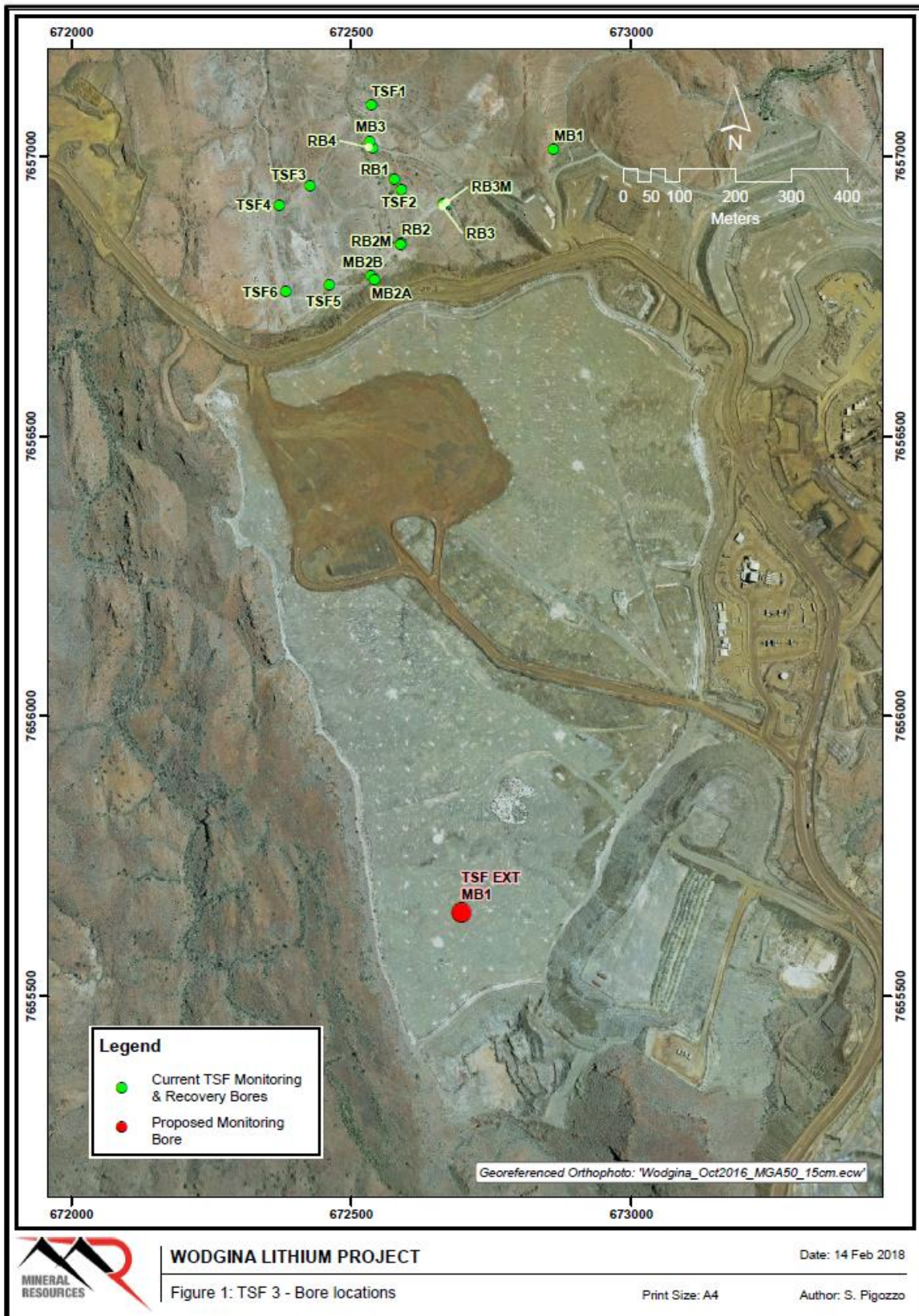


Map of fixed processing plant layout and downstream monitoring bore location
 Map depicting the footprint of the current fixed plant and proposed secondary fixed plant in addition to the downstream groundwater monitoring bore (DG MB1 I).



Map of TSF 3 groundwater monitoring bores and groundwater monitoring located downstream of fixed processing plant retention sump.

Map depicting the location of bores to monitor TSF 3 and bore TSF EXT MB1 which will be constructed as part of the works approval.



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L4328/1989/10	L4328/1989/10	Accessed at www.dwer.wa.gov.au
2	Wodgina Lithium Pty Ltd - Licence amendment application 3/10/2017	Wodgina, October 2017	DWER records (A1535282)
3	Wodgina Lithium Pty Ltd further information received via email on 2 November 2017 at 10:24 AM	Wodgina, November 2017	DWER records (A1559782)
4	Wodgina Lithium Pty Ltd further information on Wodgina amendment received via email on 4 December 2017 at 1:37 PM	Wodgina, December 2017	DWER records (A1559782)
5	Coffey Mining Pty Ltd. 2008. Tailings Storage Facility No.3 Geotechnical Investigation Wodgina Mine	Coffey, 2008	DWER records (A1563262)
6	Gadd, G.D., 2007. Geomycology: biogeochemical transformations of rock, minerals, metals and radionuclides by fungi, bioweathering and bioremediation. <i>Mycological Research</i> , 111, 3-49.	Gadd, 2007	Accessed at https://faculty.unlv.edu/buckb/scan ned%20pfd/Gadd%202007_lichen %20chelation.pdf .
7	MBS Environmental, June 2017. Wodgina Mine Assessment of Wodgina Tailings as a Cover Material for Waste Rock Landforms.	MBS, June 2017	DWER records (A1560243)
8	Wodgina Lithium Pty Ltd comments of proposed amendment received via email 9 February 2018 at 4:57 PM	-	DWER records (A1614417)
9	Wodgina Lithium Pty Ltd proposed changes to amendment received via email 15 February 2018 at 9:38 AM	Wodgina, February 2018	DWER records (A1618240)