Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval Amendment

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W5977/2016/1
Works Approval Holder	Tianqi Lithium Kwinana Pty Ltd
ACN	612 085 364
File Number	DER2016/001280
Premises	Lithium Hydroxide Processing Plant 61 Donaldson Road Kwinana Beach WA 6167 Legal description - Lot 201 on Deposited Plan 407762 Certificate of Title Volume 2914 Folio 662
Date of Report	21/12/2018
Status of Report	Final

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1. Definitions of terms and acronyms

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

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the *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 As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Minister	the Minister responsible for the EP Act and associated regulations
mtpa	million tonnes per annum
NEPM	National Environmental Protection Measure
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Occupier	has the same meaning given to that term under the EP Act.
PM	Particulate Matter
PM_{10}	used to describe particulate matter that is smaller than 10 microns (µm) in diameter
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Primary Activities	as defined in Schedule 2 of the Revised Licence
Risk Event	As described in *Guidance Statement: Risk Assessment*

2. Purpose and scope of assessment

Tianqi Lithium Australia Pty Ltd (Tianqi) hold Works Approval W5977/2016/1 granted on 21 September 2016 and amended on 25 October 2018 (Works Approval) to establish a Lithium Hydroxide Processing Plant (LHPP) on Donaldson Rd, Kwinana Beach. The LHPP will have a lithium hydroxide monohydrate (LHM) production capacity of 48,000 tonnes per annum (tpa).

Tianqi lodged an application to amend the works approval on 2 October 2018 (the Application) to request the following:

1. Allow the submission of compliance documentation at the completion of works in a staged manner;
2. At the completion of works, allow emissions and discharges from the LHPP through commissioning and initial operations;
3. Extend the works approval expiry date to account for commissioning and initial operation phases;
4. Remove all requirements and references to the disposal of wastewater to the Sepia Depression Ocean Outlet Landline (SDOOL) due to a change to treatment of wastewater via reverse osmosis (RO) and removal of RO brine offsite;
5. Correct erroneous baghouse dust concentration specifications from 30 mg/m^3 to 50 mg/m^3;
6. Amend the Prescribed Premises Category from 44 (Metal smelting or refining) to 31 (Chemical manufacturing).

Theses six items requested in the Application form the scope of assessment. This Decision Report documents the Delegated Officer's assessment and determination of the Application consistent with the Department's Regulatory Framework. This Decision Report refers to and should be read in combination with the Department's assessment for the Works Approval (Previous Assessment).

3. Background

The Works Approval permits the establishment of the LHPP inclusive of two processing trains constructed in two stages for a total LHM production capacity of 48,000 tpa. The first stage of works includes the first processing train and ancillary infrastructure such as the stormwater system, materials storage and handling areas, reagent storage areas and infrastructure not related to the Prescribed Premises Category (e.g. administration offices, workshops, laboratory, carparks and control rooms.) The second stage of works involves construction of a second duplicate processing train.

The Previous Assessment considered the operational phase risk of impacts from emissions and discharges from the LHPP at full capacity with two processing trains operating, and determined the types of controls for a future licence. The Works Approval does not authorise emissions and discharges from commissioning or operating the LHPP. The Works Approval therefore also does not allow for the submission of partial compliance documentation.

4. Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received	DWER records ref.
Application to amend works approval W5977/2016/1 including application form and supporting information document (doc. TLK-0000-J-APR-0059	02/10/2018	A1726043
Replacement application form	04/10/2018	A1726042

4.1 Prescribed Premises Category

The Application requests an amendment from Prescribed Premises Category 44 to Category 31 as shown in Table 3.

Table 3: Works Approval and requested change to the Prescribed Premises Category

Works Approval classification	Description	Production capacity
Category 44	Metal smelting or refining: premises on which metal ore, metal ore concentrate or metal waste is smelted, fused, roasted, refined or processed.	48,000 tpa (LHM)
Application requested change to classification	**Description**	**Production capacity**
Category 31	Chemical manufacturing: premises (other than premises within category 32) on which chemical products are manufactured by a chemical process.	48,000 tpa (LHM)

The Delegated Officer notes that Tianqi original applied for Category 31 in its 2014 application for a works approval. However, the Previous Assessment determined Category 44 applies to the Primary Activities at the Premises. In the Application, Tianqi states that Category 31 more accurately reflects the nature of the industrial activities to be undertaken at the LHPP where spodumene will be chemically converted by a number of chemical steps to produce LHM. The LHM is a precursor chemical that is subsequently made into a cathode and then into a battery. Tianqi does not believe the processing activities involve metal smelting or refining and advised that lithium metal is refined and smelted using a different process which does not use or involve the production of LHM.

The Delegated Officer reviewed the Previous Assessment and the points raised in the Application and formed the view that both Category 44 and 31 can be applied to the LHPP. An error was noted whereby the assessed production capacity was based on the tonnage of LHM produced. However, the capacity for Category 44 should relate to the tonnage of spodumene ore concentrate roasted and processed (200,000 tpa).

The Delegated Officer considered Category 44 applies as a metal ore concentrate (chemical grade lithium ore concentration from the Greenbushes Lithium Operations) will undergo two roasting phases and more generally will be processed through a pyrometallurgical and hydrometallurgical processing train.

The Delegated Officer also considered Category 31 may apply as chemical products (LHM and sodium sulfate) are being manufactured through a chemical process, particularly with respect to the hydrometallurgical chemical processing steps.

4.2 Baghouse filter performance requirement

The Application requested a change in the baghouse performance specification in the Works

Approval from 30 mg/m^3 to 50 mg/m^3. Tianqi believes this to be an error noting that its air quality assessment and air dispersion modelling for the works approval application in 2014 was based on a particulate (PM_{10}) concentration of 50 mg/m^3. Tianqi advised that it identified the error in commencing internal works approval compliance assessment work.

The Delegated Officer noted that information from Tianqi in 2016 (ref. email from MSP Engineering on 5 September 2016) provides a nominated PM_{10} emission component for the respective calciner and ball mill baghouses of <50 µg/m^3. This is also likely to be a typographical error. The performance specification for particulates on the Works Approval can therefore be corrected to 50 mg/m^3. It is considered an administrative change as there is no change to the nature or characteristics of particulate emissions from the baghouses or the overall risk profile of point source emissions to air.

Key Finding: The Delegated Officer has reviewed information regarding the Primary Activities at the LHPP and considers:

1. The Works Approval can be amended to include Category 31 while retaining Category 44; and
2. The Works Approval requires amendment to correct the reference to the assessed Category 44 production capacity from 48,000 tpa (LHM) to 200,000 tpa (spodumene ore concentrate).

5. Overview of Premises

5.1 Operational aspects

The operational aspects were established in the Previous Assessment with key aspects including the following:

- Continuous operation (i.e. 24 hrs per day, 365 days per year);
- 200,000 tpa spodumene ore concentrate processed;
- 48,000 tpa LHM product;
- 88,500 tpa sodium sulfate by-product;
- 345,250 tpa Tianqi Alumina silicates (TAS) by-product; and
- 47,400 tpa gypsum / limestones residues by-product.

Specific details of the process are commercial in confidence, however Tianqi supplied process related information that was considered in the Previous Assessment. More generally, the process involves the input of spodumene ore concentrate as a feed material. The spodumene undergoes pyrometallurgical processing including acid roasting to produce an intermediate acid roasted solid material, then hydrometallurgical processing for the manufacture of the LHM product for export.

5.2 Infrastructure

The infrastructure for the LHPP is outlined in the Previous Assessment and the Works Approval specifies the works to be carried out on the Premises and any design and construction requirements.

The Previous Assessment considered Tianqi's proposal to discharge cooling tower blowdown water, boiler blowdown water and demineralisation plant reject water (wastewater) to the SDOOL. Taking into consideration conditions on Ministerial Statement (MS) 665 (refer to Section 6.2), requirements were included on the Works Approval relating to the design and construction of wastewater infrastructure for the storage, monitoring and connection to the SDOOL

The Application includes a request to remove references and requirements relating to the

discharge of wastewater to the SDOOL. Instead of a discharge to the SDOOL, wastewater will stored within existing storage tanks and piped to the feed of an RO process. The RO will produce permeate (treated wastewater) stream and a brine (concentrated wastewater) stream. Permeate will be stored with existing process water tanks for reuse into the LHPP, while brine will be stored in brine storage tanks pending collection and disposal offsite.

5.3 Commissioning

Tianqi provided information in the Application relating to commissioning and the sequencing of operational aspects. The Delegated Officer reviewed this information, however has not included specific detail due to an accepted commercial in confidence claim.

Commissioning information in the Application outlined the:

- sequencing and timing of commissioning Primary Activity infrastructure aspects;
- emissions and discharges;
- emission controls; and
- proposed emissions monitoring.

Tianqi's proposed emission controls for the commissioning phase are generally consistent with those considered in the Previous Assessment. It is noted that limestone deliveries will be pneumatically unloaded to a silo rather than inside a building due to a change from proposed bulk delivery from trucks to a new system utilising tankers with full encapsulated off-loading by pneumatic transfer.

The Application included a proposed point source emissions to air monitoring program where Tianqi intend to complete a minimum of one stack test per point source within 10 weeks of commencing each stage and annual thereafter. Tianqi also propose to develop a noise monitoring and validation plan for submission with a future licence application.

6. Legislative context

6.1 Part V of the EP Act

6.1.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

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

Noise emissions from the operating LHPP are subject to the *Environmental Protection (Noise) Regulations 1998* (Noise Regulations).

The Premises are located within Area A of *the Environmental Protection (Kwinana)(Atmospheric Wastes) Policy 1999* area and ambient standards and limits for particulates and sulfur dioxide specified in the *Environmental Protection (Kwinana)(Atmospheric Wastes) Regulations 1992* apply.

6.1.2 Works approval history

Table 4 summarises the works approval history for the premises.

Table 4: Works approval history

Instrument	Granted	Nature and extent of works approval, licence or amendment
W5977/2016/1	21/09/2016	New works approval for works associated with the first process train and ancillary infrastructure (stage 1)
	25/10/2018	Amendment Notice 1 for works associated with a duplicate second processing train (stage 2) along with minor changes to the scope of works and administrative changes.

6.2 Part IV of the EP Act – Ministerial Statement 665

In the Previous Assessment, the Delegated Officer identified that proposed discharges of wastewater via the SDOOL are subject to Part IV of the EP Act conditions in Ministerial Statement (MS) 665 held by Water Corporation. Therefore, there was no detailed risk assessment of discharges to Sepia Depression via the SDOOL in the Previous Assessment. Tianqi also needed to obtain an Effluent Services Agreement with Water Corporation.

The conditions of MS665 specify that Water Corporation cannot accept discharges into the SDOOL which are not licensed under Part V of the EP Act. Therefore, the Works Approval includes requirements for the design and construction of infrastructure for the storage, transfer and monitoring of wastewater within the LHPP, including infrastructure for wastewaters discharged to the SDOOL. Tianqi has outlined in the Application that it no longer intends to discharge any wastewaters to the SDOOL.

The Application states that wastewater will be treated via RO with treated water reused in the process and the concentrated wastewater (slurry) stored in tanks pending removal for offsite treatment and disposal. Requirements of MS665 are therefore no longer relevant to this assessment.

6.3 Contaminated Sites

Refer to the Previous Assessment which identified the Premises was classified as *contaminated – restricted use* under the *Contaminated Sites Act 2003* as a consequence of historical land uses and activities on the Premises.

6.4 Land use planning

Refer to the Previous Assessment. Tianqi has development approval in accordance with the City of Kwinana Town Planning Scheme No. 2 and Metropolitan Region Scheme.

7. Modelling

7.1 Updated air impact assessment

The Previous Assessment took into consideration air dispersion modelling for Stage 1 (one processing train) and subsequent updated modelling for Stage 2 (two processing trains).

The Application states there have been progressive refinements during construction of the LHPP and some minor alterations to the air emission point source characteristics. Therefore, a summary of updated air dispersion modelling outcomes was included to demonstrate the impact of changes to the emissions inventory inputs (stack characteristics – height, diameter, gas exit velocity and emission concentrations) to the model. A summary of updated air dispersion model

outcomes from the Application is provided in Table 5.

Table 5: Predicted cumulative ground level impacts at the nearest receptor in Medina (source: Application)

Parameter	Standard (µg/m^3)	Background value (µg/m^3)	Modelled value (µg/m^3)		Referenced Guideline
			Previous Assessment[1] (µg/m^3)	This Application[2] (µg/m^3)	
NO_2	247 (1-hr max)	41	47.7	74.1	Air NEPM
SO_2	572 (1-hr max)	39	39.1	39.1	Air NEPM
	229 (24-hr max)	39	39	39.0	
CO	11,254 (8-hr max)	458	460	459	Air NEPM
PM (as PM_{10})	50 (24-hr max)	20.7	21.1	21.3	Air NEPM

Note 1: As modelled by Tianqi in August 2017 for a production capacity of 48,000 tpa with both processing trains operating.

Note 2: Revised modelling in the Application with a updates to the input emissions inventory for a production capacity of 48,000 tpa with both processing trains operating.

The Delegated Officer's review of the air dispersion modelling results included 1-hour 99.9th percentile ground level concentration values for all four modelled parameters provided in the Application. However review of predicted values for criteria in Table 5, did not indicate a need for additional consideration of 1-hour 99.9th percentile concentration values.

The only change of significance was an increase in the cumulative 1-hr maximum predicted of NO_2 concentration from 47.7 µg/m^3 to 74.1 µg/m^3. This updated value is 30% of the Air NEPM standard and includes a 41 µg/m^3 background reference value and 33.1 µg/m^3 contribution from all LHPP point sources.

In the Application, the explanations provided for the predicted increase are:

- Stack height and exit velocity reductions of the sodium sulfate heater stack;
- Slight increase in the steam generation emission rate; and
- Slight increase in the sodium sulfate stack emission rate.

Changes to previously modelled predicted cumulative ground level concentrations were negligible, including for nitrogen dioxide which increased marginally and remain 30% of the relevant short-term Air NEPM standard. The Delegated Officer does not expect the updated air dispersion modelling outcomes to impact on the risk profile determined in the Previous Assessment.

8. Consultation

The Application was advertised for public comment on the Department's website for a 21 day period. The City of Kwinana, Water Corporation and the Environmental Protection Authority (EPA) are direct interest stakeholders previously notified of applications relating to the LHPP, the latter due to a proposed discharge of wastewater to the SDOOL. As Tianqi no longer propose a discharge of wastewater into the SDOOL, the Application was only referred to the City of Kwinana.

The Department received a submission from the City of Kwinana's statutory planning section on 9 November 2018 confirming Tianqi's requested amendments are consistent with the granted planning approvals for the LHPP and don't require additional planning related approval

or amendments. The Department did not receive any public submissions during the publically advertised 21 day comment period.

9. Location and siting

9.1 Siting context

The LHPP is located in the Kwinana Industrial Area and surrounded by other industrial land uses. The shoreline of Cockburn Sound is approximately 1.2 km west with the nearest non-industrial receptor being the Kwinana Motorplex approximately 700 m east of the LHPP.

9.2 Residential and sensitive Premises

The Previous Assessment identified residential and sensitive receptors as shown in Table 6. No new sensitive receptors have been identified.

Table 6: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Closest dwelling	2.35 km south-east in the residential suburb of Medina

9.3 Specified ecosystems

The Previous Assessment identified specified ecosystems as listed in the Department's *Guidance Statement: Environmental siting.* Specified ecosystems and relevant distances are shown in Table 7. No new specified ecosystems have been identified.

Table 7: Environmental values

Specified Ecosystem	Distance from LHPP
Wetlands of International Significance – Forrestdale and Thompsons Lakes	Approx. 7.3 km northeast
Wetlands of national and regional significance – Spectacles North	Approx. 4.8 km east
Geomorphic Wetlands	There are six Conservation category and nine Resource Enhancement or Multiple Use category wetlands located between 1 km and 4.7 km from the Premises. Table 10 in the Works Approval Assessment contains additional information.
Cockburn Sound	Approx. 1.2 km west

9.4 Groundwater and water sources

The Previous Assessment identified groundwater and water sources as shown in Table 8.

Table 8: Groundwater and water sources

Groundwater distance from LHPP	Environmental value
Groundwater encountered at 6 m relative to groundwater level or 1 m relative to AHD. Estimates may fluctuate between 0.5 m and 3 m due to seasonal variation and tidal variation / influence. Groundwater contours indicate flow direction conservatively east to west towards Cockburn Sound	Groundwater salinity (as TDS) is between 1500 and 3000 mg/L and considered brackish. The site is within the Kwinana Industrial Area which is described as unsuitable for domestic garden bores. There are no sensitive groundwater resources on or near the Premises. Water is not used for potable use.

10. Risk assessment

10.1 Determination of emission, pathway and receptor

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

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 9. The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 9.

The Delegated Officer has taken into consideration information in the Application to identify any changes to the risk profile of potential emissions determined in the Previous Assessment. Potential emissions will be subject to further detailed risk assessment where Table 9 indicates a potential change to the risk profile.

Table 9: Identification of emissions, pathway and receptors during *commencement of operations*

Risk Events					Change to Previous Assessment risk profile	Reasoning
Potential emissions	**Sources / Activities**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Fugitive dust	Storage and handling of spodumene and process input materials	Closest dwelling 2.35 km south-east in Medina	Air / wind dispersion	Health and/or amenity impacts	No	The Previous Assessment determined the operational phase risk (including Stage 2) of fugitive dust emissions as: Consequence: Moderate Likelihood: Unlikely **Risk: Medium** The Delegated Officer formed the view that there are no aspects of commencing operations under the works approval that would cause the risk profile of fugitive dust emissions to change from the Previous Assessment. The types of controls determined in the Previous Assessment are adequate and appropriate to control the risk of fugitive dust during the commencement of operations. Therefore, the Delegated Officer considers that further detailed risk assessment is not required and regulatory controls are determined in Section 11, taking into consideration the types of controls outlined in the Previous Assessment.
	Processing of materials including transfer through the process					
	Product and by-product storage and handling					
Noise	Storage and handling of spodumene and process input materials	Closest dwelling 2.35 km south-east in Medina	Air / wind dispersion	Amenity impacts	No	The Previous Assessment determined the operational phase risk (including Stage 2) of noise emissions as: Consequence: Moderate Likelihood: Unlikely **Risk: Medium** The Delegated Officer formed the view that there are no aspects of commencing operations under the works approval that would cause the risk profile of noise emissions to change from the Previous Assessment. The types of controls determined in the Previous Assessment are adequate and appropriate to control the risk of noise during the commencement of operations. Therefore, the Delegated Officer considers that further detailed risk assessment is not required and regulatory controls are determined in Section 11, taking into consideration the types of controls outlined in the Previous Assessment. .
	Processing of materials through the process trains					
	Product and by-product storage and handling					
Point source emissions to air	Spodumene ore concentrate processing and manufacture of LHM and sodium sulfate	Closest dwelling 2.35 km south-east in Medina	Air / wind dispersion	Health and/or amenity impacts	No	The Previous Assessment determined the operational phase risk (including Stage 2) of point source emissions to air as: Consequence: Minor Likelihood: Unlikely **Risk: Medium** The Delegated Officer formed the view that there are no aspects of commencing operations under the works approval that would cause the risk profile of point source emissions to air to change from the Previous Assessment. The Delegated Officer reviewed information in the Application and considers that point source emissions to air will be consistent with emissions during ongoing operations. Aspects of commissioning and consideration of updated air dispersion modelling are discussed in Section 5.3 and Section 7.1 respectively. The types of controls determined in the Previous Assessment are adequate and appropriate to control the risk of point source emissions to air during the commencement of operations. Therefore, the Delegated Officer considers that further detailed risk assessment is not required and regulatory controls are determined in Section 11, taking into considerations the types of controls outlined in the Previous Assessment.

Risk Events					Change to Previous Assessment risk profile	Reasoning
Potential emissions	**Sources / Activities**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Loss of containment or contaminated stormwater runoff involving chemicals, process water or wastewater	Processing of materials through the process trains	Groundwater, soil and Cockburn Sound	Direct discharge and infiltration through soils. Groundwater migration	Groundwater quality and beneficial use impacts Soil contamination Stormwater contamination	No	The Previous Assessment determined the operational phase risk (including Stage 2) of loss of containment or contaminated stormwater runoff as: Consequence: Insignificant Likelihood: Rare **Risk: Low** The Delegated Officer formed the view that there are no aspects of commencing operations under the works approval that would cause the risk profile of loss of containment and contaminated stormwater runoff risk profile to change from the Previous Assessment. The types of controls determined in the Previous Assessment are adequate and appropriate to control the risk loss of containment and contaminated stormwater runoff during the commencement of operations. Therefore, the Delegated Officer considers that further detailed risk assessment is not required and regulatory controls are determined in Section 11, taking into considerations the types of controls outlined in the Previous Assessment.
	Chemical storage					

10.2 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 10 below. Controls are described further in Section 11.

Table 10: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	Fugitive Dust	Storage and handling of process inputs and products / by-products. Processing.	Air / wind dispersion impacting on the health or amenity	As per Previous Assessment	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable, subject to the types of controls determined for the operational phase in the Previous Assessment
2.	Noise	Various equipment from sources as above.	Air / wind dispersion impacting on amenity	As per Previous Assessment	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable, subject to the types of controls determined for the operational phase in the Previous Assessment
3.	Point source emissions to air	Processing trains – stacks/ vents	Air / wind dispersion impacting on the health or amenity	As per Previous Assessment	Minor consequence Unlikely likelihood **Medium risk**	Acceptable, subject to the types of controls determined for the operational phase in the Previous Assessment
4.	Loss of containment or contaminated stormwater runoff	Processing. Chemical storage	Direct discharge and infiltration through soils to groundwater. Groundwater migration towards Cockburn Sound	As per Previous Assessment	Insignificant consequence Rare likelihood **Low risk**	Acceptable, subject to the types of controls determined for the operational phase in the Previous Assessment

11. Regulatory controls

Table 11 summarises the types of controls determined in the Previous Assessment for a future licence during the operational phase of the LHPP. The risks are set out in the assessment in Section 10 and the controls are detailed in this section. The conditions of the Works Approval will be amended to give effect to the determined regulatory controls.

Table 11: Summary of the types of controls for the operational phase as determined in the Previous Assessment

Risk	Controls	Description
Point source emissions to air	Infrastructure and equipment requirements (operation)	Consistent with the Works Approval design requirements
	Monitoring	Stack monitoring
	Reporting	Annual reporting of monitoring results
Fugitive dust	Infrastructure and equipment requirements (operation)	Consistent with the Works Approval design requirements
	Specified actions	Loading and unloading of materials within specified buildings with doors closed. Clean up of spilt materials. Truck loads to be covered.
Noise	Monitoring	One off investigation of noise emissions against assigned levels in the Noise Regulations.
	Reporting	One off reporting of noise investigation outcomes
Loss of containment and contaminated stormwater runoff	Infrastructure and equipment requirements (operation)	Consistent with the Works Approval design requirements

11.1 Amended Works Approval controls – fugitive dust

11.1.1 Infrastructure and equipment (operation)

The following requirements will be specified in the works approval:

- The use of dedicated enclosed buildings or containment vessels (e.g. silos) for the stockpiling or storage of loose dust forming materials.
- Rapid opening and closing automatic doors remain closed except for the entry and exit of vehicles and machinery.
- Truckloads of loose dust forming materials must be covered when transported within the Premises.

Grounds: The use of dedicated infrastructure to contain the specified dust forming materials controls the risk of generating airborne dust from the storage and handling of these materials. Requirements to close automatic doors and cover transported loads reflect controls proposed by Tianqi as outlined in the Previous Assessment. No requirement for cleanup of spilt material specified on the basis that minor spillages from time to time are unlikely to contribute to the risk of fugitive dust impacts offsite.

11.2 Amended Works Approval controls - noise

11.2.1 Specified action

The following requirements will be included in the works approval:

- Retain the services of person qualified and experienced in the area of environmental noise assessment to compile and provide Tianqi with a report detailing a proposed noise monitoring program.
- Provide the CEO with a report on a noise monitoring program that:
    - investigates the nature and extent of noise emissions from the premises for a two processing train operational scenario to assess:
        (i) noise emissions from the Premises in accordance with the methodology required in the *Environmental Protection (Noise) Regulations 1997*, against the relevant assigned levels in those Regulations; and
        (ii) against design criteria and predicted noise emissions from the Premises in the '*Tianqi Lithium Australia Pty Ltd, WA and DA Approvals – Stage 2, Noise and Vibration Assessment*, GHD, August 2017' noise assessment.

Grounds: Predictive noise modelling for the full capacity LHPP (i.e. two processing trains operating) was considered in the Previous Assessment. Noise emissions are predicted to comply with the assigned noise levels in the Noise Regulations at the nearest sensitive noise receptor in Medina and will not significantly contribute to noise levels at the nearest sensitive receptor.

Validation noise monitoring will be required under a future licence once the LHPP is fully operational with two processing trains operating. However, the Delegated Officer has included a requirement in the works approval for Tianqi to submit to the CEO a report on a proposed noise monitoring program. This report will guide the imposition of noise validation requirements on a future licence.

11.3 Amended Works Approval controls – point source emissions to air (operation)

11.3.1 Infrastructure and equipment (operation)

The following requirements will be included in the works approval:

- Significant emission points will be specified as authorised emission points. These include the stacks included in air dispersion modelling for the LHPP.
- Tianqi will be required to ensure pollution control equipment on discharge points to air are active when the respective sources are in operation.

Grounds: Engineering design measures incorporated in LHPP design are intrinsic to emission control and emission outcomes. Accordingly, emission control technology specified in the infrastructure design and construction requirements of the Works Approval will be specified under operational requirements.

11.3.2 Emission limits

Point source emission limits will be specified as per Table 12.

Table 12: Proposed emission limits

Parameter	Stack reference	Recommended Limit	Justification for the limit value proposed
NOx	Calciner fan stacks Sodium sulfate heater stacks	350 mg/m^3	Limits derived from Schedule 3 and 4 of the NSW *Protection of the Environment Operations (Clean Air) Regulations 2010*
SO_3	Acid roast scrubber stacks	100 mg/m^3	
TSP	Calciner fan stacks Acid roast scrubber stacks	50 mg/m^3	
	Calciner refeed end stacks		
	Calciner discharge end stacks		
	Sodium sulfate heater stacks		

Grounds: The calciner fan stacks (83 mg/m^3) and sodium sulfate stacks (106 mg/m^3) are predicted to be the largest concentration source of NOx based on modelled emission rates and flow rates. The limit applied to SO_3 from the acid vapour scrubbing system is precautionary and future licensing requirements for an SO3 limit will be informed by validation monitoring results. The total suspended particulate matter limit also reflects works approval design requirements for bag filters systems.

11.3.3 Monitoring (operation)

Monitoring of discharges to air will be included in the works approval:

- Two separate validation stack sampling events of all discharge points and corresponding parameters.

Grounds: The stack monitoring requirements demonstrate acceptability of the constructed works and accuracy of the estimated emissions in air dispersion modelling. The monitoring results will inform the determination of ongoing monitoring requirements once a licence application is received from Tianqi.

11.3.4 Monitoring Reports (operation)

- Requirement to submit a report on air emissions monitoring specified in the works approval including:
    - sample analysis reports;
    - analysis of sampling methods against standards;
    - comparison of results against any limits specified in the works approval;
    - commentary on how the emissions compare with works approval application modelling inputs and design criteria.

Grounds: Reporting requirements are necessary for the administration of the works approval, validating ongoing acceptability of the Premises operation and for post-construction validation against design criteria.

11.3.5 Notification

Tianqi will be required to notify DWER of any exceedances of limits specified in the works approval.

Grounds: Notification of limit exceedances is required for the effective administration of the works approval.

11.4 Amended Works Approval controls – loss of containment or contaminated stormwater runoff

11.4.1 Infrastructure and equipment (operation)

A requirement will be included in the Works Approval to ensure stormwater runoff from delivery areas (spodumene and lime sand), processing trains and the TAS loading area is directed to concrete lined wedge pits.

Grounds: Requirement is a Tianqi proposed control and consistent with design specifications and the Previous Assessment.

12. Determination of Amended Works Approval conditions

The conditions in the amended Works Approval in Appendix 2 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 13 provides a summary of the condition alterations to be to this amended works approval.

Table 13: Summary of changes to the Works Approval

Works Approval section	Condition number	Amendment type	Description and grounds
Amendments relating to staged works completion and the control of emissions during commissioning			
Infrastructure and equipment (design and construction)	6	Amended condition	Included the option for staged completion of works with associated compliance reporting.
Emissions	-	New condition	Included on the basis of authorising emissions during commissioning. Condition is valid, risk-based and consistent with the EP Act.
Noise emissions	-	New conditions	Submit a report detailing a noise monitoring program. Condition is valid, risk-based and consistent with the EP Act.
Infrastructure and equipment (operation)	-	New conditions	Infrastructure operation requirements during commissioning. Condition is valid, risk-based and consistent with the EP Act.
Discharges to air	-	New conditions	Emission limits and monitoring of point source emissions to air. Conditions are valid, risk-based and consistent with the EP Act.
Records and reporting	-	New conditions	Reporting of point source emissions to air monitoring data, emission limit exceedance notifications and complaints management.
Administrative amendments to the Works Approval conditions			
Environmental Compliance	1	Deleted conditions	Duplicates requirements under the EP Act inconsistent with the Department's *Guidance Statement: Condition setting.*
Premises	3	Deleted conditions	Duplicates the Premises definition on page 1 of the works approval.
Infrastructure and equipment (design and construction)	7, 8	Amended	Updated wording to reflect the current version of the condition specified in works approvals more generally. Requirements for disposal of wastewater to SDOOL removed as discussed in Section 5.2
Table 2: Infrastructure requirements	-	Amended condition	Corrected the calciner baghouse filter and spodumene mill baghouse filter particulate emission specifications from <30 mg/m^3 to <50 mg/m^3 as discussed in Section 4.2.
Record and reporting	11	Deleted condition	Amalgamated with condition 22.

Works Approval section	Condition number	Amendment type	Description and grounds
	12	Amended condition	Amalgamated with condition 21 and updated wording to reflect the current version of the condition specified in works approvals more generally
	13, 14	Deleted conditions	Duplicates requirements under the EP Act inconsistent with the Department's *Guidance Statement: Condition setting.*

Table 14 is a summary of alterations to the Works Approval other than to the conditions.

Table 14: Summary of other administrative changes to the Works Approval

Works Approval section	Description
Prescribed premises	As per Section 4.1, Category 31 additionally specified on the works approval.
Works Approval Holder	No change to the ACN, however the legal entity has changed from Tianqi Lithium Australia Pty Ltd to Tianqi Lithium Kwinana Pty Ltd.
Explanatory notes	Standardised update.
Schedule 1: Maps	Additional map depicting the location of point source emissions to air monitoring locations.
Schedule 3: Primary Activities	Included to reflect inclusion of conditions for commissioning.
Schedule 4: Monitoring	Include for specification of tabulated monitoring requirements for point source emissions to air.

The Delegated Officer notes that the appropriateness and adequacy of controls may be reviewed at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

13. Works Approval Holder comments on draft amendments

A copy draft amendments to the works approval and the draft decision reports was provided to Tianqi on 3 December 2018 for a 21 day comment period. Comments on the draft amendments to the works approval were received on 21 December 2018. Tianqi identified a number of typographical errors and these were corrected in the final amended works approval. Furthermore, the following comments were considered

- Table 3 – Tianqi are not proposing to specifically use a bobcat to remove accumulated solids from wedge pits. Remove reference to the bobcat;
- Table 5 – A 12 month period for emissions to air does not allow sufficient time for staged commissioning of the processing trains to occur as per the schedule supplied in the application. Tianqi request 24 months as emissions will occur throughout this period from selected aspects of the processing train as they are commissioned through to performance testing; and
- Reference to lime sand is not correct;

In response to these specific matters, the Delegated Officer:

- removed reference to the bobcat as it does not alter the risk profile and the type of machinery is likely to be inconsequential to emissions and discharges;
- Retained a 12 month period for initial operations under the works approval. The Delegated Officer considers this period of time is reasonable for the purposes of completing the stack validation sampling requirements and to apply for a licence in respect of stage 1 in the first instance. Broader performance testing and process fine tuning beyond validation sampling is able to continue subject to the requirements of a licence. The requirement in Table 5 is such that Tianqi has up to 12 months of initial operations of each processing train and within

this period, Tianqi would be expected to apply for a licence (or licence amendment in the case of processing train 2) in advance and

- Changed references to lime sand to limestone.

14. Conclusion

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

Based on this assessment, it has been determined that the conditions of the Works Approval will be amended subject to the alterations outlined in Section 11 and summarised in Table 13.

Paul Byrnes
Manager, Process Industries
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

Table 15: Key documents

	Document title	In text ref	Availability
1.	Application to amend works approval W5977/2016/1 lodged on 2 October 2018	Application	DWER records (refer to Table 2)
2.	Licence L4247/1991/13 – Greenbushes Lithium Operations	L4247/1991/13	accessed at www.dwer.wa.gov.au
3.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	N/A	accessed at www.dwer.wa.gov.au
4.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.		
5.	DER, November 2016. Guidance Statement: Environmental Siting. Department of Environment Regulation, Perth.		
6.	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.		
7.	DER, February 2017. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.		
8.	GHD, August 2017. *Tianqi Lithium Australia Pty Ltd, WA and DA Approvals – Stage 2, Noise and Vibration Assessment*	N/A	DWER records (A1503864)
9.	Ministerial Statement 665	MS 665	accessed at www.epa.wa.gov.au
10.	*Protection of the Environment Operations (Clean Air) Regulation 2010* (NSW)	N/A	accessed at www.legislation.nsw.gov.au
11.	Works Approval 5977/2014/1 – LHPP Stage 1 construction project	Works Approval / Previous Assessment	accessed at www.dwer.wa.gov.au
12.	Works Approval W5977/2016/1 Amendment Notice 1, issued 25 October 2017 – LHPP Stage 2 construction project		

Appendix 2: Amended Works Approval W5977/2016/1