Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 5

Works Approval Number	W6132/2018/1
Works Approval Holder	Wodgina Lithium Pty Ltd
ACN	611 488 932
File Number:	DER2017/001949
Premises	Wodgina Operations Mining tenements M45/50, M45/381, M45/382, M45/383, M45/886, M45/887, M45/923, M45/925 and M45/1252 MARBLE BAR WA 6760
Date of Amendment	**23 September 2019**

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Works Approval 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.

Alana Kidd

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Date: 2019.09.23 14:23:15 +08'00'

Alana Kidd

MANAGER, RESOURCE INDUSTRIES

INDUSTRY REGULATION

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
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Water Quality http://www.waterquality.gov.au/anz-guidelines
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 10,Joondalup DC JOONDALUP WA 6919 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 *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
Existing Works Approval	The Works Approval issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
km	kilometres
m	metres
m^3	cubic metres
m^3/d	cubic metres per day
mg/L	milligrams per litre
mS/cm	millisiemens per centimeter
mtpa	million tonnes per annum
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*
TSF	Tailings storage facility
Works Approval Holder	Wodgina Lithium Pty Ltd

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Works Approval 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. No changes to the aspects of the original Works Approval relating to Categories 52, 54 and 89 have been requested by the Works Approval Holder.

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

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*

Amendment description

On the 7June 2019, Wodgina Lithium Pty Ltd (WLPL) submitted a works approval amendment application to extend the commissioning period for Beneficiation Plant Train 1 and TSF3 Extension (TSF3E) beyond 90 days. WLPL also requested approval to commission Beneficiation Plant Train 2 with ore. The Amendment was granted on 12 July 2019, but commissioning of Train 2 with ore was not approved at this time due to issues identified with the site water balance.

Subsequently, WLPL has reviewed the water balance for TSF3 Expansion (TSF3E) and developed an operating strategy to minimize seepage and increase use of process water.

Following review of the first 21 day draft, WLPL requested for an additional spodumene (concentrate) storage area to be included in this amendment, aside from the existing storage shed. It should be noted that dry tailings storage is not part of this amendment.

Spodumene Storage Area

The previous Direct Shipping Ore (DSO) location onsite is being requested to be used as a spodumene storage area. Further operational flexibility requirements, means this area is needed to stockpile a maximum volume of 200,000 m^3 of spodumene product, during the commissioning of the beneficiation plant.

The DSO Stockyard Area was previously used to store crushed ore and has drainage controls and a dedicated sump with a pump. The 3.5 ha area slopes towards primary and secondary drainage areas.

No dry tails (or other tails products) are intended for this area. It is anticipated that this area will also be required for spodumene storage post commissioning, though at a lower volume.

This DWER initiated amendment has taken into consideration the environmental risks of commissioning Train 2 and also Train 3 based on the new information provided by WLPL and an additional spodumene storage area (outside of the designated purpose built shed).

Amendment history

Table 2 provides the amendment history for W6132/2018/1.

Table 2: Works approval amendments

Instrument	Issued	Amendment
W6132/2018/1	*19/09/2018*	*Amendment Notice 1 - amendment to extend the submission date for Specified Conditions 7 and 9*
W6132/2018/1	*13/02/2019*	*Amendment Notice 2 - amendment to extend the submission date for Specified Condition 9, include commissioning definition*
W6132/2018/1	*08/04/2019*	*Amendment Notice 3 - amendment to allow the TSF 3 Expansion with total tailings for 90 days and commissioning with ore of the Beneficiation Plant Train 1*
W6132/2018/1	*12/07/2019*	*Amendment Notice 4 - amendment to allow additional 90 days commissioning for TSF 3 Expansion (TSF3E) with total tailings and Beneficiation Plant Train 1 with ore.*
W6132/2018/1	*23/09/2019*	*Amendment Notice 5 - amendment to allow commissioning of Beneficiation Plant Train 2 and Train 3 with ore.* *Additional spodumene storage area for 200,000m^3 of product whilst commisisoning.*

Location and receptors

Table 3 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment as shown in Figure 1.

Table 3: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Turner River	Approximately 7.3km (Figure 1)
Wodgina Rock Holes	1.8km (Figure 1)
Groundwater	Depth to groundwater level is between 10 and 26 metres (WLPL groundwater monitoring data, June 2019).

Risk assessment

Table 4 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.

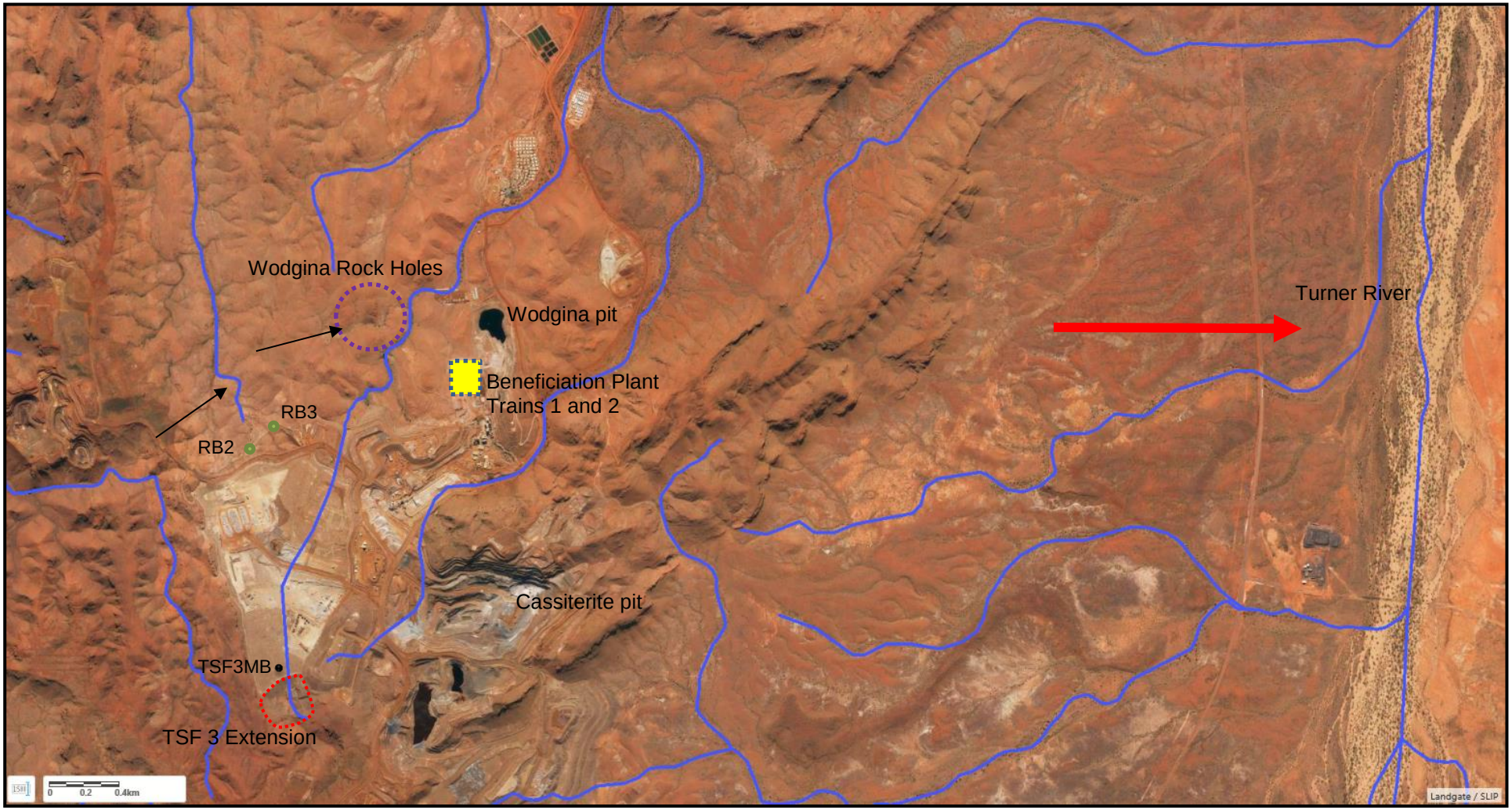


Figure 1: Wodgina Lithium Mine – Environmental receptors. The red dotted line depicts TSF3E, the blue lines represent pre mining surface water drainage lines.

Table 4: Risk assessment for proposed amendments during commissioning

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 5	TSF3E commissioning with Train 1, Train 2 and Train 3 tailings	Tailings seepage	Underlying groundwater	Infiltration through underlying soils to groundwater	Contamination of groundwater capable of beneficial use (noting issues with adequate decant removal)	Moderate	Possible	Medium	Subject to conditions Refer to discussion WLPL also utilise recovery bores
			Ephemeral surface water systems and pools (including those north of TSF3)	Hydraulic interactions between groundwater and surface water systems.	Impacts to surface water quality and aquatic fauna	Moderate	Possible	Medium	
		Tailings spillage from pipeline leaks/ruptures/ decant return	Vegetation/ ephemeral creeks	Direct discharge/ infiltration	Soil and or groundwater contamination/ impacts on vegetation.	N/A	N/A	N/A	Train 2 and Train 3 will use the same pipeline to TSF3E as Train 1, existing control measures in place.
Category 5	Additional spodumene concentrate storage area (uncovered) 200,000m^3	Dust from additional product handling Dust lift off from exposed stockpiles	Vegetation	Direct discharge	Smothering vegetation affecting photosynthesis Contamination	Slight	Possible	Low	The dust extinction moisture content is expected to be 10-12% during deposition which should reduce dust generation. To comply with Occupational exposure standard of 0.1mg/m^3, WLPL is required to maintain stockpile moisture (which in turn should ensure dust generation with potential for environmental impacts is minimised). This is regulated by DMIRS.

									WLPL has committed to: • minimise deposition/loading during high winds; • have and use dust suppression controls (water carts, spinklers) Vegetation adjacent to this area onsite is limited. WLPL has committed to ensure watercarts and sprinklers will be implemented as required to manage dust lift off.
		Stormwater with increased sediment (spodumene concentrate discharged	Vegetation/ ephemeral creeks onsite Stock	Direct discharge Direction ingestion	Sedimentation Discharge downstream and potential for semi-permanent pools to be elevated in contaminants.	Slight	Possible	Low	The storage location has drainage control areas (primary and secondary) designed to minimise suspended solids discharged in stormwater and a designated sump with a pump. The spodumene product is enriched in numerous elements which will be monitored as part of the monitoring regime. A surface water monitoring point located downstream will be monitored following heavy rain and flow to assess the potential for downstream impacts. DWER will require data post events to monitor the stormwater management during commissioning and pre licence. There are no perennial surface water systems in close proximity and a potential for some semi-permanent pools following heavy rainfall.

									It should also be noted that following commissioning the storage area will be reduced in size.
		Seepage to groundwater	Vegetation/ ephemeral creeks	Direct discharge/ infiltration	Groundwater contamination	Slight	Possible	Low	WLPL has a monitoring bore (DGMB1) which will be monitored to check the drainage system efficiency. DWER will require this data to be submitted for review of management measures. There is a lack of beneficial groundwater users in the immediate vicinity. Depth to groundwater near the DSO stockpile area at bore DGMB1 was 5.45m on 9 September 2019.

Discussion

TSF3E design criteria

As part of the commissioning process, WLPL has provided TSF 3 Extension Compliance Report (CMW, February 2019). In the seepage analysis model, the calculated seepage rate for TSF3E is 100m^3/d. The flow rates were assessed as very conservative, as the upstream batters were lined with bituminous membrane – water permeability of 6x10^{-14}m/s.

Water balance calculations were presented in Appendix E (Figure 2). In the outflow losses from the tailings dam, the return water balance to the plant has been designed to use on average, 50% of tailings water recovered.

TSF3E seepage

On 2 August 2019, WLPL provided an updated water balance for the site to the Department. The main differences from the previous water balance used for W6132/2018/1 Amendment 4 were:

- Volume of water accumulated in TSF3E from cyclone Veronica;
- Pond evaporation;
- Tailings storage volume; and
- Calculated seepage.

The difference between the old (1) and the new water balance (2) are presented in Table 5. Figure 3 then shows how TSF3E capacity was recalculated using image drone data which is deemed to be more accurate.

Table 5: WLPL Water Balance data comparison.

(1) Water balance (28/06/2019)	**Drone Survey (RLm)**	**Cyclone water (m^3)**	**Stored TSF3E (m^3) cumulative**
March	Not stated	39,117	
April	Not stated	-	Not stated
May	245.24	-	60,000
June	247.18	-	60,000
(2) Revised water balance (02/08/2019)	**Drone Survey (RLm)**	**Cyclone water (m^3)**	**Stored TSF3E (m^3) cumulative**
March	Approx. 241	15,059	15,059
April	242.6	-	28,435
May	244.4	-	53,940
June	247.6	-	133,981
July	248.8	-	174,517

Based on the updated information, the total volume of seepage during the first 90 days of commissioning was calculated to have then reduced from 2,083m^3/d to 931m^3/d. The TSF water balance during the commissioning period contains assumptions and potential errors as the processing plant and deposition of tailings is not a 'steady' operational state.

Groundwater monitoring

In accordance with W6132/2018/1 Condition 16, WLPL is required to provide monthly readings of monitoring bore data for the TSF3 Expansion. Figure 4 shows an update to the water level response at TSF3 monitoring bore (TSF3 MB) and piezometer PZ19TSF304. The water level rise since tailings deposition started has been:

- TSF3E – 13m
- PZ19TSF304 – 7.79m
- TSF3MB – 6.39m

The rise in water level at the monitoring bores can be related to the volume of tailings deposited at TSF3E, rain from cyclone Vernica and also reduced water recovery from TSF3E.

PROJECT	: EXPANSION TO TSF3											Date	20-Nov-17	
CLIENT	: MINERAL RESOURCES LIMITED											Job No		
LOCATION	: WODGINA MINE, WA											File		
												Subject	Water Balance	
SUBJECT	: PROJECTED WATER BALANCE - AVERAGE RAINFALL ABYDOS, AVERAGE EVAPORATION PORT HEDLAND											Revision	A	

	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
INFLOWS	Days per month	31	28.25	31	30	31	30	31	31	30	31	30	31	
RAINFALL														
Rainfall (mm)		79.7	104.6	42.4	5.4	15.5	15.8	4.7	0.0	0.0	0.0	0.4	43.5	312.00
Average Daily Rainfall (mm)		2.57	3.70	1.37	0.18	0.50	0.53	0.15	0.00	0.00	0.00	0.01	1.40	
Tailings Dam Storage Area (m2)	change	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	128,000.00	
Runoff Coefficient Tailings		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Catchment Area above Storage (m2)	change	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	42,000.00	
Runoff Coefficient Catchment		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Pool Area (m2)	change	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	
Running Beaches (m2)	change	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	
Rainfall Inflow Total Volume (m3/day)		234.93	338.57	125.09	16.55	45.77	48.08	13.73	0.00	0.00	0.00	1.18	128.14	
SLURRY WATER														
Tonnes per hour														
Operating hours per year														
Total tonnes per month		333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	333,333.00	3,999,996.00
% Solids = 60		60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	
Tailings Output Solids (tpd)		10,752.68	11,799.40	10,752.68	11,111.10	10,752.68	11,111.10	10,752.68	10,752.68	11,111.10	10,752.68	11,111.10	10,752.68	
Volume of Water (m3/day)		7168.45	7866.27	7168.45	7407.40	7168.45	7407.40	7168.45	7168.45	7407.40	7168.45	7407.40	7168.45	2,666,664.00
OTHER WATER INFLOWS														
Pit Dewatering (m3/day)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (PARP) (m3/day)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other Water Inflow Total (m3/day)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL INFLOW (m3/day) 7168.4516		**7403.38**	**8204.84**	**7293.55**	**7423.95**	**7214.22**	**7455.48**	**7182.18**	**7168.45**	**7407.40**	**7168.45**	**7408.58**	**7296.60**	

OUTFLOW-LOSSES FROM TAILINGS DAM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
EVAPORATION (from pond and beaches)													
Evaporation Rate (mm) OCT	364.00	320.00	317.00	271.00	246.00	197.00	219.00	246.00	329.00	321.00	374.00	386.00	3,590.00
Pan Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
Monthly Dam Evaporation Rate (mm)	273.00	240.00	237.75	203.25	184.50	147.75	164.25	184.50	246.75	240.75	280.50	289.50	
Average Daily Evaporation Rate (mm)	8.81	8.50	7.67	6.78	5.95	4.93	5.30	5.95	8.23	7.77	9.35	9.34	
Pool Area & Running Beaches (m2)	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
Daily Evaporation Loss/Outflow (m3/day)	220.16	212.39	191.73	169.38	148.79	123.13	132.46	148.79	205.63	194.15	233.75	233.47	
EVAPO-TRANSPIRATION (from drying tailings)													
Evaporation Rate (mm)	364.00	320.00	317.00	271.00	246.00	197.00	219.00	246.00	329.00	321.00	374.00	386.00	
Evapo-transpiration Rate (Pan/3)	121.33	106.67	105.67	90.33	82.00	65.67	73.00	82.00	109.67	107.00	124.67	128.67	
Average Daily Evapo-transpiration Rate (mm)	3.91	3.78	3.41	3.01	2.65	2.19	2.35	2.65	3.66	3.45	4.16	4.15	
Area Transpiring (m2)	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	34,333.33	
Daily transpiration Loss (m3/day)	134.38	129.64	117.03	103.38	90.82	75.15	80.85	90.82	125.51	118.51	142.67	142.50	
SEEPAGE													
Downstream Embankment (m3/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Upstream Embankment (m3/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Seepage Rate m/sec 1.00E-07													
Dam Floor (m3/day)	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	
Total Seepage Outflow (m3/day)	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	
RETENTION													
Tailings Output (tpd)	10,752.68	11,799.40	10,752.68	11,111.10	10,752.68	11,111.10	10,752.68	10,752.68	11,111.10	10,752.68	11,111.10	10,752.68	
Assumed Moisture Content of Tailings (average) 30%													
Volume Retained in Tailings (m3/day)	3,225.80	3,539.82	3,225.80	3,333.33	3,225.80	3,333.33	3,225.80	3,225.80	3,333.33	3,225.80	3,333.33	3,225.80	
TOTAL OUTFLOW-LOSSES FROM TAILINGS DAM	3,710.34	4,011.85	3,664.57	3,736.09	3,595.41	3,661.61	3,569.11	3,595.41	3,794.46	3,668.46	3,839.75	3,731.77	
BALANCE INFLOW-OUTFLOW/LOSSES (m3/day)	3,693.04	4,192.99	3,628.98	3,687.87	3,618.81	3,793.87	3,613.07	3,573.04	3,612.94	3,499.99	3,568.83	3,564.82	
BALANCE INFLOW-OUTFLOW/LOSSES (m3/month)	114,484.22	118,452.09	112,498.37	110,635.97	112,183.01	113,816.19	112,005.14	110,764.27	108,388.13	108,499.68	107,064.85	110,509.53	
RETURN WATER TO THE PLANT (if available)													
Total Water Return per month (assume 30%)	114,484	118,452	112,498	110,636	112,183	113,816	112,005	110,764	108,388	108,500	107,065	110,510	1339301
Volume of Water (m3/day),estimated at	3,693	4,193	3,629	3,688	3,619	3,794	3,613	3,573	3,613	3,500	3,569	3,565	
Average water return	52%	53%	51%	50%	50%	51%	50%	50%	49%	49%	48%	50%	

Summary of Water Balance	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Water shortfall ( ) or excess of requirements (m3/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total water in excess of requirements (m3/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total water in excess of requirements (m3/year) =	0.00												50.2%

Figure 2: CMW TSF3E Report – Technical Specification

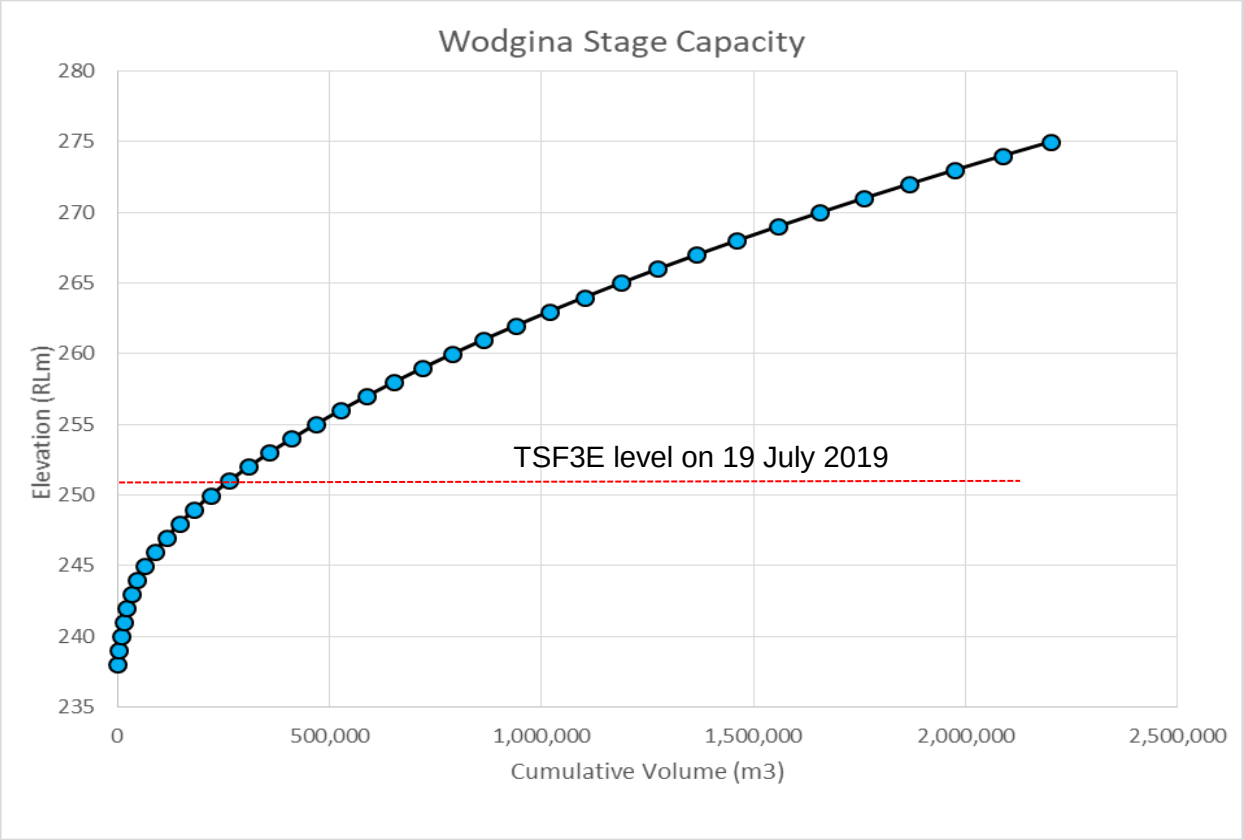


Figure 3: TSF3E storage capacity calculated using drone data.

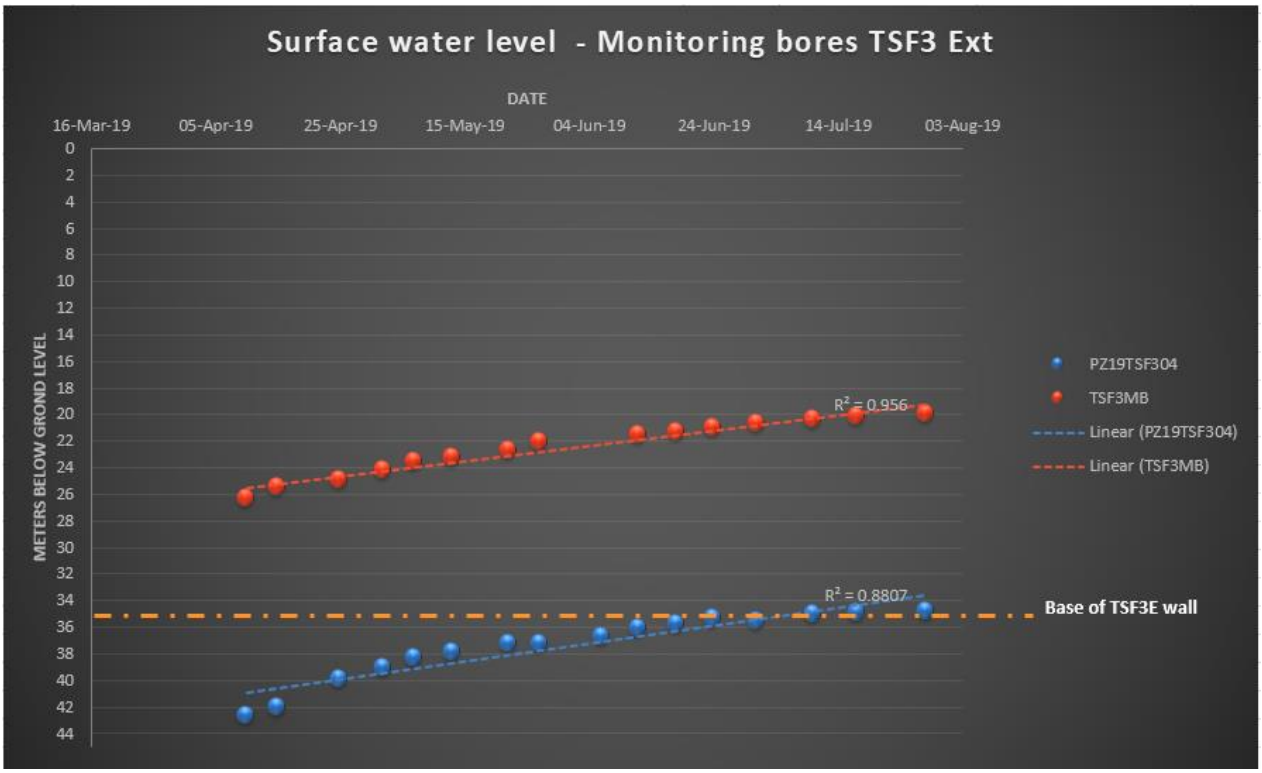


Figure 4: Groundwater monitoring data for TSF3MB and PZ19TSF304.

Seepage flow and receptors

The Interim Groundwater Quality Guideline report (MBS, February 2019) states that ephemeral surface drainage influenced by TSF3 passes to the south of the proposed Beneficiation Plant and to the north of Top Dump North East, and represents a tributary to the west Turner River branch. A second possible flow path from TSF3 to the north from RB2 is also indicated via RB1, RB4, MB3 and TSF1 (Figure 5).

In June, WLPL started pumping from recovery bores RB2 and RB3 (shown in Figure 1) to minimize seepage north of TSF 3. The volume recovered between July and August was 17,720m^3. The other two recovery bores (RB1 and RB4) were not operational.

In the ecotoxicity test report WLPL were required to provide (Condition 8 of W6132/2018/1), it was identified that the closest receptor point would be at Turner River, approximately 4.5 km to the nearest point downstream of TDNE6. TDNE6 lies on the north eastern groundwater flow path from the toe of TSF3 to Turner River and is still within the active mining lease (MBS, February 2019). As such this bore location (or other suitably chosen location in the area along the groundwater flow path prior to leaving the lease), is the logical and risk-based location for application of 95% of the site specific water quality criteria (Table 6).

Groundwater level response at TSF3MB and PZ19TSF304, and water recovery from RB2 and RB3 confirms that seepage from TSF3E is flowing under and through TSF3 north.

Table 6: Proposed interim trigger values for Wodgina (MBS, February 2019)

Parameter	95% Species Protection Level - Freshwater Ecosystems (mg/L)	Proposed Interim Trigger Value (mg/L)	Comments
Fluoride	No applicable guideline	2	Livestock Drinking Water (ANZECC 2000)
Aluminium	0.055	0.055	ANZECC (2000) value
Chromium	0.001 (Cr VI)	0.001	ANZECC (2000) value
Copper	0.0014 (0.013)	0.0013	Hardness Modified Trigger Value - ANZECC (2000)
Lithium	No applicable guideline	1.5	Site-specific ecotoxicity - indicated 95% species protection level
Nickel	0.011	0.099	Hardness Modified Trigger Value - ANZECC (2000)
Thallium	0.00003 (low reliability)	0.002	USEPA maximum contaminant level goal for drinking water
Zinc	0.008	0.072	Hardness Modified Trigger Value - ANZECC (2000)

WLPL raw water usage improvement plan

On 9 August 2019, WLPL provided a raw water usage management plan to the Department. Since commissioning commenced, a range of initiatives have been implemented to reduce raw water use (input), and increase use of return decant water from the TSF3E facility.

The current raw water consumption for one train is 2,160m^3/d – at normal operation (steady state). WLPL is still evaluating other areas in the process to further reduce raw water usage on site. Alternate options may require assessment under the works approval or licence.

Since mid-July 2019, as Train 1 has come to a steady state, tailings with an average solid content of 60% is consistently being produced.

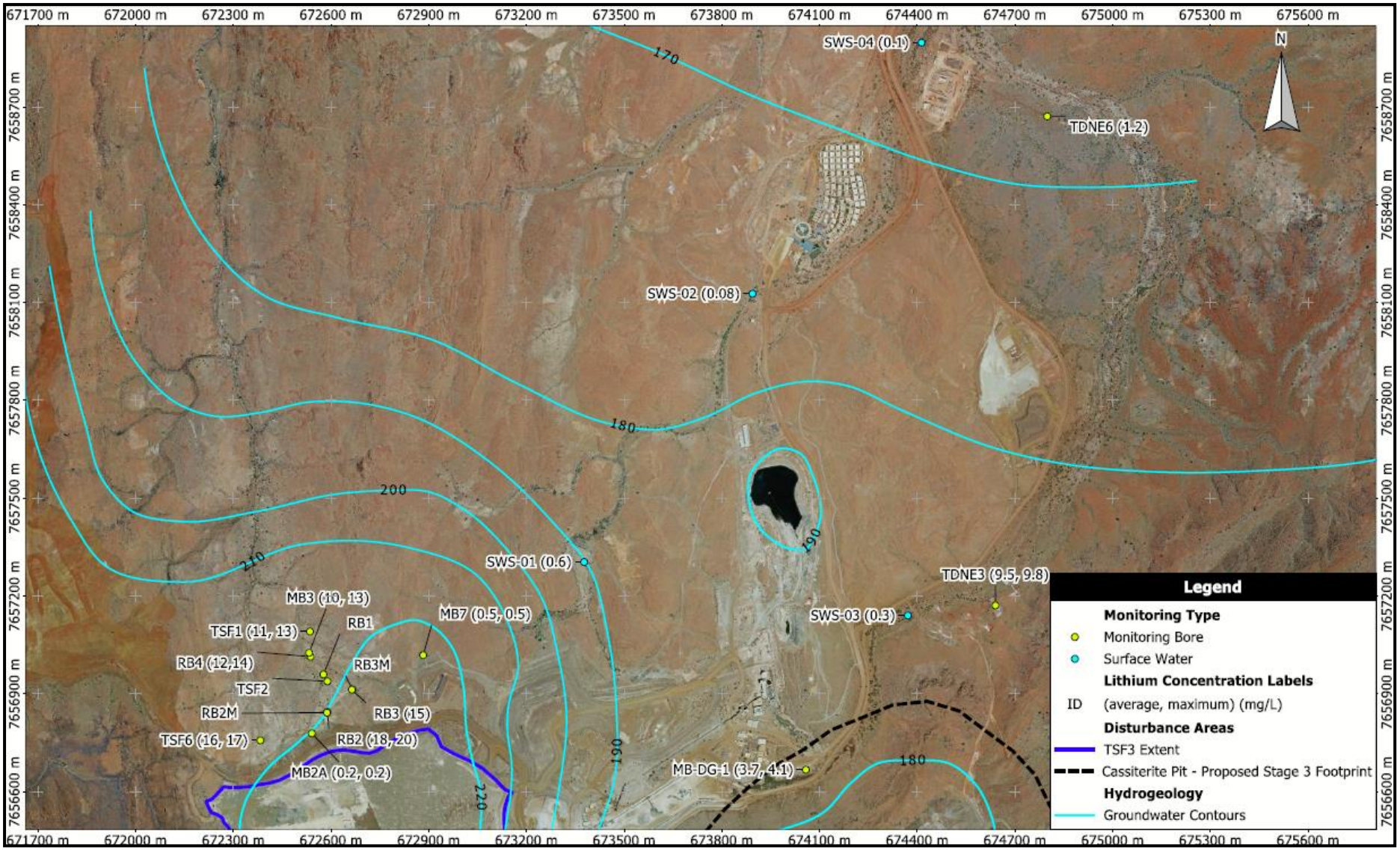


Figure 5: Wodgina TSF3 bore locations and Lithium concentrations.

Decision

The risks associated with the commissioning of Beneficiation Plant Train 2 and Train 3 combined with the continued commissioning of Train 1 is considered ***Medium*** with further conditions/controls added to Works Approval W6132/2018/1.

The Department has assessed the reviewed water balance, latest groundwater monitoring results and the Wodgina Interim groundwater quality report (MBS, February 2019) for Wodgina Lithium Project. The conclusions were:

- Revised water balance show that the estimated seepage loss was 2.2 times lower when compared to the original water balance WLPL provided, for the first 90 days of commissioning;
- Train 1 tailings solid content has increased towards design capacity;
- Groundwater level at PZ19TSF304 and TSF3E MB are rising with an increase in tailings deposition at TSF3E (and as a result of Cyclone Veronica); and
- The closest receptor point would be at Turner River, approximately 4.5 km to the nearest point downstream of TDNE6.

With the addition of Train 2 and Train 3 tailings, DWER has determined that the associated risks can be managed by WLPL if TSF3E, during commissioning becomes consistently operated in accordance with the design specifications. Conditions have been added to the works approval outlining that WLPL has to demonstrate that TSF3E is achieving the design specifications during the commissioning period and before operation, including:

- a target of at least 50% tailings water recovery; and
- a seepage target of 100m^3/day.

WLPL will be required to collect and provide data demonstrating the design criteria have been met and maintained. After 15 December 2019, any exceedance of the design criteria must be reported to DWER including corrective measures, implementation and timeframes for meeting the design criteria.

The amendment will also include a new monitoring bore located north of TSF 3 at the identified second seepage pathway with a nominal location provided in Schedule 1.

Spodumene storage area

Additional spodumene storage capacity to facilitate commissioning of the beneficiation train is proposed for the DSO Stockyard Area, as shown in Schedule 1. The Concentrate Storage Area (noting no Dry Tailings Area authorised) will include:

- Storage of spodumene product (up to 200,000 m^3) on a pre-existing operational hardstand with a sump and pump.
- Sprinklers and water carts readily available to minimise dust emissions.
- Primary and secondary drainage control areas. In the event of a rainfall event, run off will report to the primary drainage control area, which flows via a culvert to the secondary drainage control area.

Design of the drainage control areas is to minimise suspended solids being mobilised and discharged from the DSP Stockyard Area footprint during high rainfall events. Monitoring bore DGMB1 will be monitored to assess potential impacts to groundwater.

WLPL has a surface monitoring point located downstream of the DSO Stockyard drainage system to assess potential surface water impacts which will also be sampled during sufficient flow to monitor for sedimentation and vegetation impacts.

While the spodumene product is enriched in numerous elements, it is a saleable product, hence

containing this material is a priority for WLPL.

Groundwater and surface water monitoring will be required to enable an assessment of the management of stormwater from the Spodumene Storage area. This will assist in the assessment of longer term storage at this location (operational licence).

Works Approval Holder's comments

The Works Approval Holder was provided with a draft Amendment Notice on 30 August 2019. Following a meeting with DWER on the 11 September 2019 to discuss the draft and initial comments provided, the Works Approval then submitted an additional request (spodumene storage in an uncovered area during commissioning) and revised comments on the draft on the 11 and 12th of September respectively. The additional storage area and comments have been considered by the Delegated Officer as shown in Appendix 2. A revised draft was subsequently sent to the Works Approval Holder on 19 September and minor comments and waiver received 20 September 2019.

Amendment

1. Condition 6 of the Works Approval is amended by the insertion of the text shown in bold and underline and deletion of text shown in strikethrough below for Specified Emissions in Table 3.

Emissions

6. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2, of Table 3.

Table 5: Authorised Emissions table

Column 1	**Column 2**
Emission type	**Exclusions/Limitations/Requirements**
Specified Emissions	
Commissioning of the Lithium Beneficiation Plant and TSF3 Expansion	Subject to Conditions 1, 2, 3 and 5 TSF 3 Expansion commissioning with total tailings[1] ~~from Train 1 only~~ until ~~the 11 October~~ **15 February 2020** ~~2019~~. Deposition of fine/wet tailings alone is not permitted.[1]

Note [1]Total tailings and Fine tailings are as defined by CMW Geosciences Tailings Storage Facility 3 Expansion – Wodgina Mine – Design Report Ref. PER2017-0428AE Rev5

2. Condition 18 and 19 of the Works Approval is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown underlined below:

18. The Works Approval Holder must by the 15 December 2019, provide a Commissioning Report to the CEO, for Trains 1, 2 and 3, and the TSF3 Expansion including:

18.1 All data recorded in accordance with conditions 14, 15, 16, 17 and 24;

18.2 An analysis of the data required by Condition 18.1 and assessment of how Train 1, Train 2, Train 3 and TSF3 Expansion have acquired and maintained the designed technical specifications outlined by the CMW TSF3E Report – Technical Specification;

18.3 Decant recovery shown to have met and been maintained for at least two weeks with, a target of at least 50% tailings water recovery; and

18.4 Tailings density to have met and maintained 60% solids for at least two weeks.

Following the Commissioning Report being submitted, the Works Approval Holder may operate the TSF3 Expansion in accordance with the designed technical specifications outlined by the CMW TSF3E Report – Technical Specification, until 15 February 2020.

19. The Works Approval Holder must provide to the CEO by the **31 January 2020** updated recorded data required by conditions 14 to 17, **and condition 24.**

3. Condition 22 of the Works Approval is amended by the insertion of the bold text shown in underline in Table 4 as shown below:

22. The Works Approval Holder shall undertake the monitoring in Table 4 according to the specifications in that table and record the results.

Table 4: Monitoring of ambient groundwater quality[2]				
Monitoring point reference and location	Parameter	Units	Averaging period	Frequency
Recovery Bores RB2, RB3	Volume of water recovered	m^3	cumulative	daily
TSF3MB, PZ19TSF304**,** Decant Water **Path 2MB vicinity (once established) Schedule 1** **Monitoring bore – DGMB1 (Schedule 1)** **Indicative Surface Water Monitoring site (ISWMS) (Schedule 1)**	pH[1]	pH units	Spot sample	Monthly **for ISWMS only - once flow reaches this site**
	Electrical Conductivity	mS/cm		
	Total Dissolved Solids	mg/L		
	Aluminium	mg/L		
	Arsenic			
	Boron			
	Bromide			
	Caesium			
	Cadmium			
	Calcium			
	Calcium carbonate			
	Chloride			
	Chromium			
	Cobalt			
	Copper			
	Fluoride			
	Iron			
	Lead			
	Lithium			
	Magnesium			
	Manganese			
	Mercury			
	Nickel			
	Total Nitrogen			
	Total Phosphorus			
	Potassium			
	Rubidium			
	Selenium			
	Silicon			
	Sodium			
	Sulphate			
	Thallium			
	Tin			
	Uranium			
	Zinc			
	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.

4. The Works Approval is amended by the insertion of the following Conditions 24 to 28:

24. The Works Approval Holder must record monthly the TSF 3 Extension operation data as listed below:

24.1 Flow meter values for tailings discharge (beginning and end of the month);

24.2 Flow meter values for decant water recovery (beginning and end of the month); and

24.3 Calculated seepage.

25. After 15 December 2019, for any monthly average seepage and/or decant water recovery in exceedance of the designed technical specifications outlined by the CMW TSF3E Report – Technical Specification, notification must be provided to the CEO within 48 hours of the information becoming available.

26. For any notification submitted in accordance with Condition 25, the Works Approval Holder must, within 14 days of that notification, provide a report to the CEO detailing the control measures implemented and date, and a timeframe for meeting design specifications.

27. The Works Approval Holder must only store spodumene concentrate outside of the Storage shed on the premises, at the location designated 'Concentrate Storage Area' in Schedule 1.

28. The Works Approval Holder must ensure that for the Concentrate Storage Area in Schedule 1:

28.1 Deposition and loading are minimised during high winds;

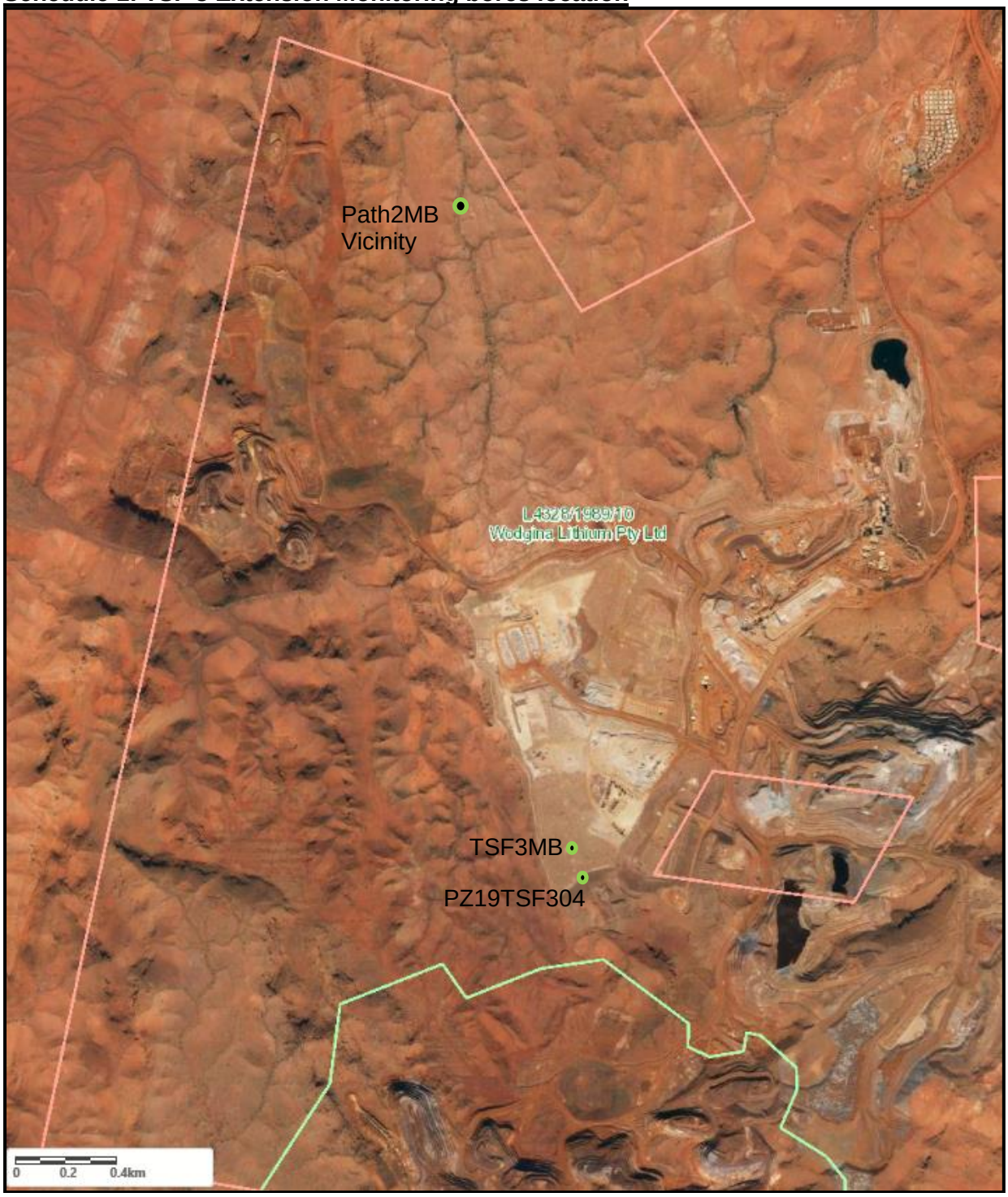
28.2 Dust suppression controls are available at all times;

28.3 The drainage controls in place are maintained to minimise suspended solids discharged in stormwater; and

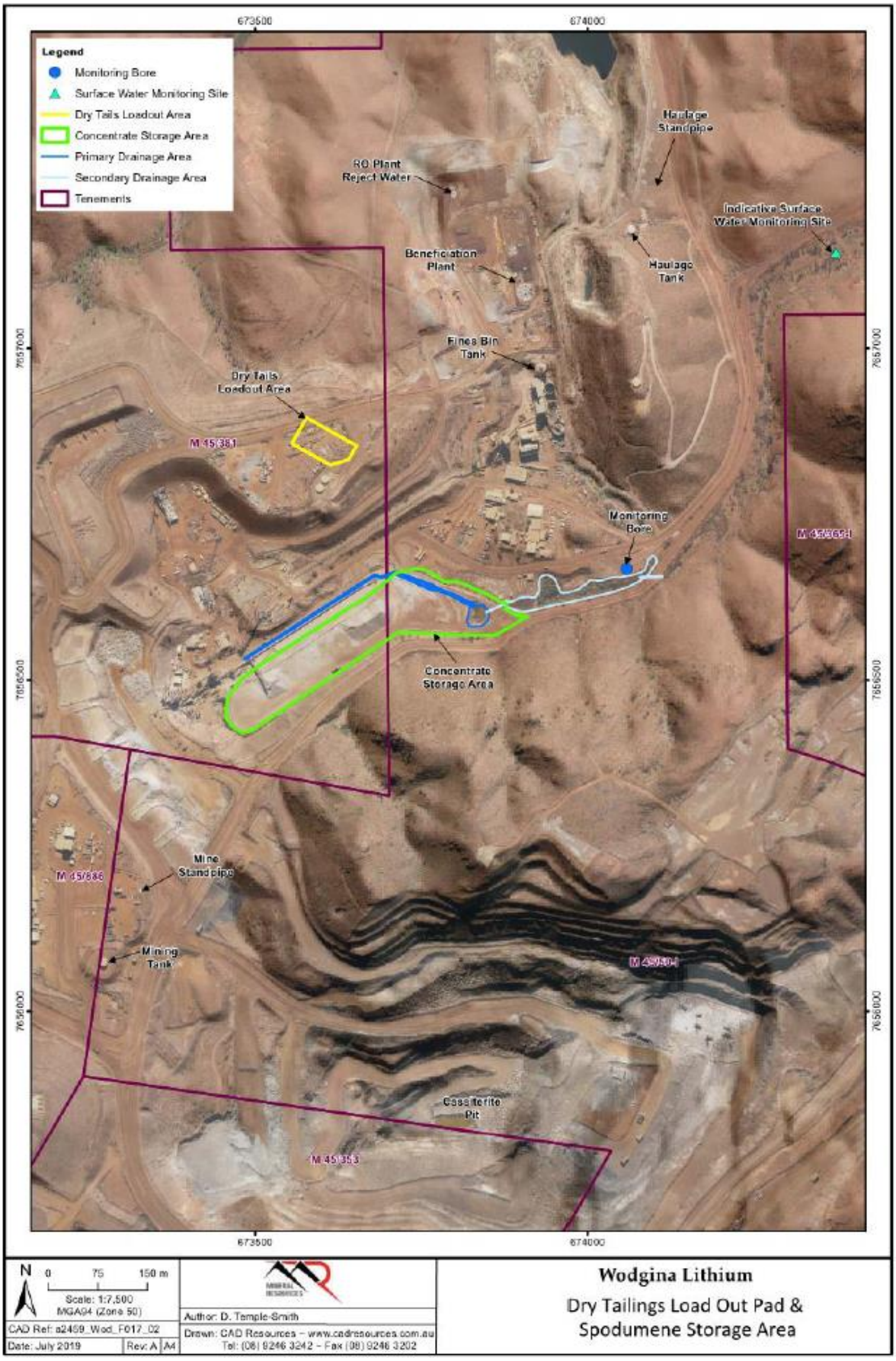
28.4 The designated sump is maintained to ensure efficient operation and emptied prior to rainfall events.

5. The Works Approval is amended by insertion of Schedule 1: Monitoring bores location and Concentrate Storage Area:

Schedule 1: TSF 3 Extension Monitoring bores location



Schedule 1: Concentrate Storage Area (including associated monitoring Bore and surface water monitoring site)



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Works Approval W6132/2018/1 – Wodgina Lithium Mine	W6132/2018/1	accessed at www.dwer.wa.gov.au
2	Works Approval W6132/2018/1 – Amendment 4		accessed at www.dwer.wa.gov.au
3	MBS Environmental, February 2019 Wodgina Lithium Project – Interim groundwater quality guideline value assessment.	MBS, February 2019	DWER records (DWERDT138712)
4	CMW Geosciences, February 2019 Tailings Storage Facility 3 Expansion, Wodgina Mine, Design Report Ref. PER2017-0428AE Rev 5		DWER records (A1769650)
5	Mineral Resources Wodgina TSF3-EXT Quantum, Impacts and Management of Seepage, July 2019 Power Point presentation		DWER records (A1815900)
6	Wodgina TSF3 Water balance - WWL Excel file		DWER records (A1814861)
7	Mineral Resources, 9 August 2019 Process water recovery strategy		DWER records (A1814865)
8	Strategen July 2019 Wodgina Dry Tailings Load Out and Spodumene Storage Areas FINAL. Section 3.2 Spodumene Product Storage.	Spodumene Storage Area	DWER records (DWERDT180199)
9	Mineral Resources Attachment 2 – Standing water levels – TSF Monitoring bores 28/07/2019		DWER records (A1814860)
10	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	accessed at www.dwer.wa.gov.au
11	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
12	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2016c	
13	WLPL responses to draft amendments		A1823650 and A1825614

Appendix 2: Summary of Works Approval Holder comments

The Works Approval Holder (WLPL) was provided with the draft Amendment Notice on 30 August 2019 for review and comment. The Works Approval Holder responded on 11 September 2019 with the below comments. The following comments were received on the draft Amendment Notice. A second draft was sent to WLPL on the 19 September 2019. WLPL responded with minor comments as below on the 20 September 2019.

Condition/ page	Summary of Works Approval Holder comment	DWER response
Page 6: Change to label of Figure 1.	Requested removal of reference to surface water lines' and replacement with pre-mining surface water drainage lines.	Minor change – figure 1 label updated.
Page 8: Text states: Water balance calculations were presented in Appendix E (Figure 2). In the outflow losses from the tailings dam, the return water balance to the plant has been designed to use on average, 50% of tailings water recovered.	WLPL has requested this be removed, stating: *It is noted that the seepage analysis model used a simplistic 2D finite element analysis to conservatively estimate groundwater seepage for saturated, steady state operational flow conditions.*	DWER disagrees with this comment given. Figure 2 as part of the CMW TSF3 Expansion Report, was submitted as part of the works approval application (supporting documentation) and used in the assessment of seepage and water management. While it is noted that the site is currently commissioning, the design and technical specifications remain relevant for assessing against the intended steady state operation long-term, given these were endorsed compliance documents.
Page 9: Text states: Based on the updated information, the total volume of seepage during the first 90 days of commissioning was calculated to have then reduced from 2,083m^3/d to 931m^3/day.	If this statement is to be retained, WLPL requests that following additional statement to be included for context: *It is acknowledged that the TSF water balance during the commissioning period contains assumptions and potential errors as the processing plant and deposition of tailings is not a 'steady' operational state.*	DWER considers the statement to be factual. The text below has been added as DWER had reviewed the water balance and identified errors in calculations: *The TSF water balance during the commissioning period contains assumptions and potential errors as the processing plant and deposition of tailings is not a 'steady' operational state.*
Page 9 Figure 2: CMW TSF3 Report – Technical Specification.	WLPL requests deletion of Figure 2 - *as discussed WLPL acknowledges that whilst this information is already publicly available but for the purpose of this Amendment does not add value.*	DWER disagrees with this comment. This amendment is to allow commissioning of Trains 1, 2 and 3 together. At the end of the commissioning period, it is expected that a steady state of operation will be reached, at which time this Technical Specification (as has been provided as compliance documentation) is very relevant for operation (Licence).

Condition/ page	Summary of Works Approval Holder comment	DWER response
Page 11: Text states *to the north of TSF3*	WLPL requests revised text: *..... under TSF3 in a northerly direction.*	DWER has modified this to read through and under as seepage is not isolated to under TSF3 only.
Page 11: Comment states *has reached the process design criteria of***,** *normal*	WLPL requests removal of this text and 'normal' replaced with 'steady state'.	Text removed and steady state placed in text (in brackets). DWER considers normal operations to be post commissioning (and to mean the same as steady state).
Page 11: Text states *Figure 6 shows that since mid-July, Train 1 is producing tailings with an average solid content of 60% (MRL presentation, July 2019) and the adopted measures should result in TSF3E operating as per the intended design.*	As discussed, WLPL requests removal of this statement and Figure 6 In terms of tailings solids, the following context is provided: An average solids content of 60%+ is a target only, and has currently been achieved during the commissioning period d when running at a steady state of operations. The key operational objective at all times is to maximise the recovery of water from the thickener and decant pond, subject to operational constraints at a given time.	Figure 6 removed. DWER has updated the comment to support the development of Train 1 during commissioning as follows: Since mid-July 2019, as Train 1 has come to a steady state, tailings with an average solid content of 60% is consistently being produced.
Page 13: Figure 6: Wodgina Lithium Project – Train 1 solid content in tailings between June and July 2019.	Remove Figure 6 as Production profile is commercially sensitive and approval to include in a Public Document is not provided.	Removed.
Page 13: Train 1 tailings……text states *design capacity*	...estimated steady state operations	DWER disagrees, the tailings solid content is not an estimate and is positively trending towards the design specifications. Text unchanged.
Page 13: Text states: Groundwater level at PZ19TSF304 and TSF3E MB ……*with an increase in tailings deposition at TSF3E*	WLPL suggests removal, stating as a consequence to rainfall received from Cyclone Veronica and the commencement of tailings deposition into TSF3E during commissioning;	DWER has updated this paragraph to also reference cyclone Veronica.

Condition/ page	Summary of Works Approval Holder comment	DWER response
Page 13: Text states: Conditions have been added to the works approval outlining that WLPL have to demonstrate that TSF3E is achieving the design specifications during the commissioning period and *before operation*, including: *At least 50% tailings water recovery; and* *Seepage of less than or equal to 100m³/d.*	WLPL stated 'Before operation' not a phase Amend statement to read: *A commissioning target of 50% tailings water recovery to assist with the minimisation of the TSF3E decant pond size* Amend Condition: *A commissioning seepage target of 100m3/day*	DWER disagrees with the removal of 'before operation' as that is the intent of commissioning, being before operation via a licence. The 50% tailings water recover has been updated to a target, but not specifically for commissioning as we cannot approve this post the works approval. DWER acknowledges the difficulty in a daily flow limit and has updated the seepage to a target.
Page 14, addition of text referring to monitoring bore	WLPL suggests with a nominal location provided in Schedule 1.	Text added.
Condition 18: at least 50% tailings water recovery.	Amend statement to read: *….the target of 50% tailings water recovery*	Updated to target.
Table 4: Recovery Bores RB1 and RB 4	WLPL states RB1 and RB4 are not operational	DWER has removed these but notes these will need to be added to the works approval once operational.
Table 4: Path2MB	WLPL states, this new bore is unlikely to be established prior to the commissioning of all Trains. Currently determining an appropriate location, in consultation with AQ2.	DWER has left this in the table for monitoring and results once the bore is established.
Condition 25: After 15 December 2019….	Up to the Grant of the License amendment, ...	The intent of this condition is to allow commissioning, then once the time limited operation starts (after the commissioning report has been submitted) for DWER to be updated on exceedances while WLPL apply for a licence application. DWER will then be updated on any issues as the licence for operation is being drafted (up to 15 February 2020). Wording has also been updated to *exceedance* seeing targets are now referenced.

Condition/ page	Summary of Works Approval Holder comment	DWER response
Comments on second 21 day draft – received 20 September 2019		
DWER query: depth to groundwater at DSP stockyard.	DG MB1 – SWL as of 9 Sep was 5.45m	Report updated.
Page 4: clarification on spodumene storage volume, to be reported in m^3 not tonnes.	Please change the reference to “100,000 tonnes” to “200,000 m^3” for the storage of concentrate.	Report revised and risk assessment reviewed.