



Application for Works Approval Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number	W6618/2021/1
Works Approval Holder	Talison Lithium Australia Pty Ltd
ACN	139 401 308
File Number	DER2021/000628~2
Premises	Talison Lithium Mine Maranup Ford Road Part of mine tenements M01/6 and M01/7 As defined by the premises maps in Schedule 1 As defined by the Premises map attached to the Revised Works Approval
Date of Report	27 March 2024
Decision	Revised works approval granted

**/SENIOR MANAGER, RESOURCE INDUSTRIES
REGULATORY SERVICES**

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

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1. Decision summary

Works approval W6618/2021/1 is held by Talison Lithium Australia (Talison; the works approval holder) for the Talison Lithium Mine (the premises¹), located at Maranup Ford Road, Greenbushes and parts of mining tenements M01/6 and M01/7.

This amendment report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the construction and operation of the premises. As a result of this assessment, revised works approval W6618/2021/1 has been granted.

The revised works approval issued as a result of this amendment supersedes the existing works approval previously granted in relation to the premises.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary

On 26 October 2023, the works approval holder submitted an application to the department to amend works approval W6618/2021/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The proposed amendment is to change the proposed liner for tailings storage facility 4 (TSF4) cell 2 from engineered clay to bituminous geomembrane (BGM). BGM is now the works approval holder's preferred option due to time limitations and weather-related constraints in using engineered clay, as well as challenges sourcing and engineering sufficient suitable clay.

2.2.1 Bituminous geomembrane liner

Changes to proposed Cell 2 operational area

The department noted, per design drawings provided in the application, that the proposed BGM liner will only cover the eastern portion of TSF4 Cell 2 from the northern and dividing embankments to the 265 m AHD (RL 1265m) contour that runs north to south through the center of the cell (see Figure 14 in the amended works approval). Following clarification from the works approval holder that Cell 2 will be built in two-stages, it is understood the eastern side of this contour (elevation less than 265 m AHD) will be lined with BGM and receive tailings during the initial operation of the cell (stage 1) up to 264.7 m AHD. This is the section of Cell 2 under assessment in this report.

The works approval holder has proposed no modifications to the authorised location of tailings pipelines, decant structure and decant pipelines servicing TSF4 Cell 2 to enable the management of tailings discharge into the eastern portion of Cell 2. The western portion in Cell 2 with elevation above 265 m AHD will be levelled and lined with BGM under a separate works approval to raise Cell 2 to 270 m AHD (stage 2). Figure 1 shows the extent of the initial starter embankments to be built to 265 m AHD under this works approval.

¹ For noting, the premises also operates under EP Act Part V licence L4247/1991/13.

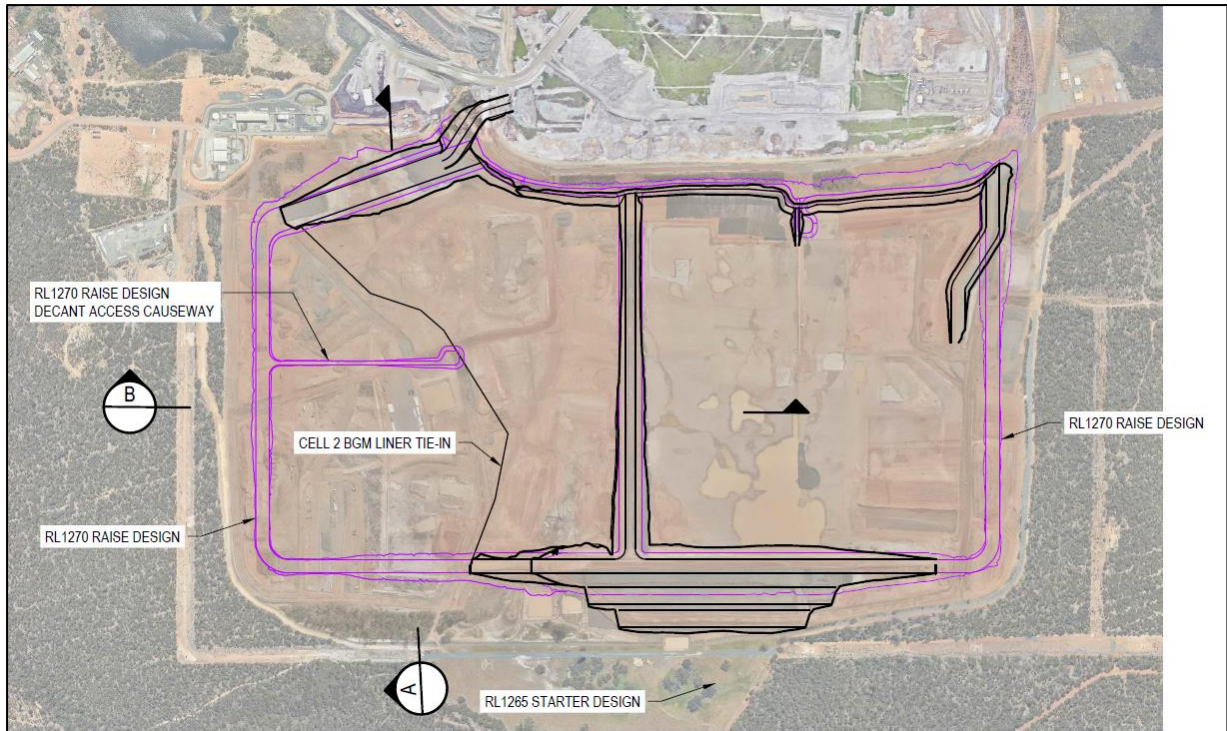


Figure 1 Starter embankment plan at 265 m AHD (black) and future lift to 270 m AHD (pink)

Permeability and seepage

The primary design change relevant to this application is to change the TSF4 cell 2 liner from a clay liner to a 3.5 mm thick Coletanche ES1 BGM or equivalent. The floor will be shaped so that liquor collected by the tailings underdrainage will flow to collection sumps for recovery and discharge to the mine water circuit (MWC). The floor subgrade on which the BGM will be placed will comprise natural saprolitic clay overlain by 300mm thick compacted subgrade constructed from suitable onsite material.

BGM will cover cell 2 embankments and be secured in anchor trenches on the crest of the northern and divider embankments and all seams will be heat bonded and tested. Where natural ground forms the southwestern containment along the 265m AHD contour, BGM will be anchored into the natural ground in a 600 mm x 600 mm anchor trench. When Cell 2 is raised from 265m AHD to 270m AHD (the subject of a future application and assessment), the BGM will be tied into the installed BGM at 265 m AHD.

GHD (2023) report that the permeability of the BGM liner is 6×10^{-14} m/s, four orders of magnitude lower than the 1×10^{-9} estimated permeability of the clay liner. GHD calculated that, assuming five defects per hectare (with a defect area of 1 cm^2), the vertical seepage would be reduced by 97% for TS4 cell 2 (Table 1).

The department received internal technical advice (DWER reference A2195884) for how partial use of a BGM liner would modify the rate of seepage from TSF4 (for cell 1). Advice indicated that, while the seepage may not be reduced as much as calculated by GHD (GHD 2023), it would still be much lower than from a compacted clay liner and should result in a reduction to the overall seepage rate from TSF4. In practice, the as-installed hydraulic conductivity of a BGM liner could be higher than the theoretical value due to:

- the level of preparation of the subgrade materials on which the liner is being installed; and
- the level of care taken to install the liner.

Table 1 Seepage rate through BGM due to installation defects

Item	Description	Value
Giroud and Bonaparte equation	$Q = C_{qo} [1+0.1(h/t_s)^{0.95}] a^{0.1} h^{0.9} k_s^{0.74}$	
C_{qo}	Contact quality factor for good contact	0.21
h	Liquid head	39.7 m
t_s	Thickness of saprolitic clay	10 m
a	Circular defect area	1 cm ²
k_s	Permeability of saprolitic clay	4.75 x 10 ⁻⁰³ m/d
Q	Rate of liquid migration per defect	2.86 x 10 ⁻⁰¹ m ³ /m ² /d
n	Number of defects per Hecate	5
Q	Rate of liquid migration per hectare	1.43 m ³ /d/h
A	Hectare	10,000 m ²
Q	Rate of liquid migration	1.43 x 10 ⁻⁰⁴ m/d

Tailings discharge and decant pipelines

The pipeline layout shown in the amended works approval W6618/2021/1 (Figure 2) will be constructed. The works approval holder is proposing to only use the spigots that will deposit tailings on to the area of BGM liner approved at 265m AHD until all Cell 2 embankments have been raised to 270m AHD, lined with BGM, and approved for time-limited operations (TLO).

The works approval holder expects decanting of supernatant from TSF4 to be increased by using a low permeability BGM as an alternative to a clay liner, due to a reduction in seepage losses. The use of BGM will result in the average discharge of decanted supernatant to the mine circuit increasing by up to 31 m³/hour to a maximum rate of 1,068 m³/hour during the wet season. This is less than the designed decant pumping capacity of 1,800 m³/h, which was based on the maximum wet decant rate with an allowance for a 1:1,000-year flood event.

BGM panels will be joined by overlapping the edges by 200 mm and torch welding, welded seams will be tested to ensure a watertight seam is established. The BGM will be secured in anchor trenches on the crest of the embankments. The anchor trench will be backfilled with the excavated spoil and compacted once the BGM has been placed. High friction angle BGM will be used on the embankments to further prevent the BGM from slipping down the embankment during deposition.

Underdrainage

No changes in the design of the internal drainage, underdrainage and the external seepage interception and collection network are proposed. Modelling for the underdrainage system indicates that there is adequate capacity of the design to manage the increased flows (GHD 2023). Therefore, the works approval holder has not proposed changes to the design of the internal drainage, underdrainage and the external seepage interception and collection network.

Replacing the clay liner with BGM reduces the lower underdrainage (below the liner) collected and discharged to the recovery sumps from 56,092 m³/year to 1,683 m³/year (GHD 2023). The lower underdrainage consists of two MEG450G Megaflo drains with a capacity of 71,000 m³/year, which is significantly greater than the calculated seepage for a BGM liner (1,683 m³/year).

Conversely, flow to the tailings upper underdrainage (above the liner) would increase by 161,151 m³/year, for a total flow of 268,417 m³/year for TSF4 at full height 295 m AHD. The upper underdrainage system consists of two Draincoil DN160 pipes located within a gravel

trench along the upstream toe of TSF4 Cell 2. The underdrainage system has been sized to accommodate a flow of 497,568 m³/year, which is greater than the anticipated estimated maximum drainage volume.

Overall, seepage modelling indicates that replacing the clay liner with BGM will increase the total seepage (lower and upper) collected by 65% from 163,358 m³/year to 270,100 m³/year. This is less than the total underdrainage capacity and the design capacity of the outlet system and recovery sumps.

Tailings underdrainage is intended for return to the sites "mine water circuit" (see section 2.2.2 below). GHD (2021) reported that with a fully clay-lined TSF about 8,000m³/yr seepage would bypass the TSF Cell 2 toe drainage. This will be reduced with BGM lining as more seepage will be collected by the TSF drainage. The reduction in seepage bypassing drainage due to BGM was not calculated by GHD (2023). The works approval holder has therefore considered an overly conservative scenario for capture of all seepage and return to the mine water circuit (i.e. 8,000 m³/yr). This is about 0.11% of the total mine water circuit capacity (~7 gigalitres) and about 1.1% of the approved (under construction) capacity that will be created by the authorised lift to Cowan Brook Dam (under works approval W6795/2023/1 issued 28 June 2023). The department notes that further lifts to Austin's and Southampton dam are also planned to create additional capacity for the mine water circuit.

The additional decant water is intended to be returned to the Clear Water Dam, one of the dams for the sites mine water circuit. Seepage flows bypassing the drainage systems that migrate to the northwest will be collected in the existing Sump 3 collection system, which is sunk below the water table and thus able to collect seepage which is returned to the MWC. Seepage to the west is into TSF3/Tin Shed catchment which is also part of the MWC.

Potential for hydraulic uplift

The department received internal technical advice (DWER reference A2195884) regarding the potential for hydraulic uplift of an underlying perched aquifer with use of a partial BGM liner in TSF4 (for cell 1). Advice indicated that any structure that is installed below the water table can be subjected to hydrostatic uplift if the uplift pressure that is exerted by groundwater over the area of the structure exceeds its weight. The uplift force exerted by groundwater would depend on the local hydrogeological conditions, area of the structure and depth of the structure below the water table. However, this risk could be managed by covering the BGM liner with sufficient fill or tailings to counteract the potential groundwater uplift force. Given TSF4 is intended for tailings deposition, this should assist in counteracting potential hydraulic uplift.

2.2.2 The mine water circuit

The mine water circuit is made up of several hydraulically connected unlined earthen dams containing process water; namely Clear Water Dam (primary dirty water dam), Austin Dam, Southampton Dam and Cowan Brook Dam. Process water generated at the premises is known to be contaminated with metals and metalloids including lithium, arsenic, manganese and nickel. Some of this water is reused in the process, however water from the circuit also discharges to the surrounding environment via seepage and overtopping.

A detailed risk assessment for the mine water circuit and contaminant removal was undertaken for the licence amendment (L4247/1991/13) granted in December 2022. Specified actions to reduce seepage risk from the mine water circuit were placed on the licence at this time. Several of those actions have been completed, including the development of a *Clear Water Dam Emissions Management Plan* and revised Water Balance for Clear Water Dam.

2.2.3 Proposed amendment to time-limited operations

The works approval holder has also requested a change to the authorised TLO period in condition 8 of works approval W6618/2021/1. The amendment relates to applying a specified end date (30 June 2025) to the TLO period, rather than the authorised period of 180 days.

Expected TLO commencement dates for each cell are listed in Table 2. The works approval holder states that the amended condition would consolidate TLO so that the department only needs to assess one licence amendment application (rather than one for each cell). The revised timeframe would also ensure that TSF4 cells 1B and 2 have sufficient TLO for the department to assess the subject licence amendment application. Cell 1b TLO is not planned to commence until Cell 2 is full (to 265mAHD). This is expected to occur around November 2024.

Table 2 TSF4 cell construction schedule

<i>TSF4 Milestone</i>	<i>Construction end date</i>	<i>TLO start date</i>
<i>Cell 1a</i>	<i>November 2023</i>	<i>January 2024</i>
<i>Cell 1b</i>	<i>February 2024</i>	<i>November 2024</i>
<i>Cell 2</i>	<i>June 2024</i>	<i>July/August 2024</i>
<i>Licence amendment application</i>	<i>Submit November 2024</i>	-

3. Other approvals

3.1.1 Mining Act 1978

On 8 December 2023, the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) advised the department that the proposed works to install a BGM liner over the base and embankment of TSF4 cell 2 have been incorporated into an amended Mining Proposal – REG ID 121397 (currently under assessment by DEMIRS). DEMIRS considers that the proposed changes within the application for the works approval amendment appear to be generally acceptable under the *Mining Act 1978* and *Work Health and Safety (Mines) Regulations 2022*.

DEMIRS further noted that the revised rate of tailings rise will be up to 8 m/year for each TSF4 cell given the number of changes with the BGM liner and revised tailings deposition schedule. An initial review by DEMIRS identified the high rate of rise could potentially impact the southern embankment. It is understood design adjustments were made to increase factor of safety (FOS) to ensure the FOS will not reduce over the life of the facility.

DEMIRS recommended that once TSF4 Cell 1 and 2 starter embankments are constructed and deposition has commenced, and prior to the Stage 1 centreline lift construction commencing, a review of the design, underdrainage and instrument monitoring, focused on the behaviour of the facility (design versus actuals) for life of mine (LOM) is completed to ensure the LOM design remains effective.

The works approval holder must submit to DEMIRS a report that confirms design assumptions

for TSF4 before construction of the first centreline raise that includes:

- Confirmation of consolidation behaviour for the foundation layer of the TSF;
- The tailings material parameters where the embankment sits on a tailings foundation; and
- That the underdrainage system is effective.

DEMIRS also re-iterated that should any works approval amendments under Part V result in mining activities changing to be outside the scope of the existing Mining Act approvals, it is the tenement holder’s responsibility to seek approval or amendments under the Mining Act.

4. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020a).

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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the works approval holder has proposed to assist in controlling these emissions, where necessary.

Table 3: Works Approval Holder controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Placement of BGM liner within TSF4 cell 2 base	Air/windborne pathway causing impacts to health and amenity	<p><u>Existing works approval controls:</u></p> <p>Condition 1 - Construction phase of TSF4 requires dust management by water carts during dry and windy conditions targeting high risk areas.</p> <p>Condition 13 - dust monitoring</p> <p><u>Existing licence conditions (L4247/1991/13):</u></p> <p>Condition 14 – required to develop a dust trigger/action/response plan</p> <p>Conditions 32, 34, 37, 44, 45 – dust monitoring and management</p>
Noise	Mobile equipment movement over unconsolidated soil	Air/windborne pathway causing impacts to health and amenity	<p><i>Noise emissions and impacts on human receptors are regulated under a Regulation 17 exemption under the Environmental Protection (Noise) Regulations 1997 and are not assessed further in this report.</i></p>

Emission	Sources	Potential pathways	Proposed controls
Operation			
<p>Seepage water contaminated with metals/metalloids (modification to seepage rate)</p>	<p>Operation of TSF4 cell 2 with a liner comprising BGM:</p> <ul style="list-style-type: none"> Potential loss of integrity of BGM liner resulting in additional seepage 	<p>Direct infiltration to groundwater through liner or breaks in liner causing contamination and mounding.</p> <p>Migration of contaminated groundwater off-site causing adverse impacts to surface waters, ecosystem health and human health</p>	<p>GHD (2023) estimate the BGM will result in reduced seepage.</p> <p>Controls to ensure the integrity of the BGM liner include:</p> <ul style="list-style-type: none"> Pebbles on the surface will not be angular and will not have a diameter great than 20 mm; Installed by a competent and appropriately qualified installer from the top of the embankment floor; Panels will be joined by overlapping the edges by 200 mm and torch welding the overlapped BGM together to form a watertight seam; The leading edges of the BGM to be tied into the northern, southern and divider embankments of Cell 2 in a 1.0 m wide and 0.6 m deep anchor trench. Once the BGM has been placed in the anchor trench it will be backfilled with the excavated soil and compacted; The BGM liner to be anchored in a 600 x 600 mm anchor trench located along the crest of the perimeter and divider embankments and 265 m AHD contour through Cell 2; and High friction angle BGM will be used on the embankments to further prevent the BGM from slipping down the embankment during deposition. <p><u>Existing works approval controls:</u></p> <p>Condition 1 – installation of underdrainage, toe drains and seepage collection sumps A and C</p>
<p>Additional TSF4 Cell 2 tailings underdrainage (increase of up to 106,742 m³) containing metalloids deposited back to mine water circuit dams (as a result of less seepage through</p>	<p>Operation of TSF4 cell 2 with a BGM liner</p>	<p>Increased seepage rates from dams to groundwater causing contamination and mounding.</p> <p>Migration of contaminated groundwater off-site causing adverse impacts</p>	<p>No controls proposed in application.</p> <p><u>Existing licence controls:</u></p> <p>Specified actions to reduce seepage risk from the mine water circuit were placed on the licence as part of an amendment in December 2022. This included the requirement for Talison to:</p> <ul style="list-style-type: none"> Develop an emissions management plan for Clear Water Dam; Provide a detailed water balance for

Emission	Sources	Potential pathways	Proposed controls
the base of TSF4)		to ecosystem health and human health	all inputs and outputs; and <ul style="list-style-type: none"> Submit a proposal for a revised annual ecological assessment for impacts to downstream sensitive surface water receptors.
		Potential overtopping of TSF4 mine water circuit dams	<p><u>Proposed controls:</u></p> <ul style="list-style-type: none"> Maintain 0.3 m freeboard in Cell 2 <p><u>Existing licence controls:</u></p> <ul style="list-style-type: none"> Maintain 0.9 m freeboard in Cell 2 <p>Talison have historically had issues with capacity of the mine water circuit. The whole mine water circuit contains ~7 GL water. To help increase the capacity of the circuit, Talison applied to lift the embankment height of Cowan Brook Dam to 1,229 metres relative level (m RL) and was granted works approval W6795/2023/1 on 28 June 2023. The Cowan Brook Dam raise will provide between 0.7 – 0.8 GL additional capacity.</p> <p>The additional input associated with BGM liner (8,000 kl/year) will represent ~1.1% of the additional capacity being created by the Cowan Brook Dam lift.</p> <p>Talison have also notified the department that they intend to submit applications to lift the embankment heights for Southampton Dam and Austin Dam in September/October 2023.</p>

Note 1: The existing proposed underdrainage system capacity (authorised under W6618/2021/1) is considered sufficient to accommodate the additional water collection associated with reduced permeability of the BGM liner in TSF4 Cell 2.

4.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020a), the Delegated Officer has excluded employees, visitors and contractors of the Works Approval Holder’s from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 4 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020b)).

Table 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
<p><u>Residential dwellings south of TSF4</u></p> <p>Annual climate summary statistics² indicate:</p> <ul style="list-style-type: none"> • 9am prevailing wind direction is variable and can occur towards the north-west, west, south-east and south. • 3pm prevailing wind direction is to the north and the south-east. 	<p>The Greenbushes townsite is ~3.2 km north of TSF4.</p> <p>The closest residential dwellings to TSF4 are given below and shown in Figure 2.</p> <p>K: Lot 504 on Plan 73712 (Talison owned) ~1.3 km south-west of TSF4</p> <p>J: Lot 11888 on Plan 162545 (Talison owned) ~1.1 km south of TSF4</p> <p>I: Lot 5220 on Plan 136672 ~1.0 km south of TSF4</p>
<p><u>Downstream surface water and groundwater users</u></p>	<p>Whilst the groundwater underlying the site is not recognised as a strategic resource area (not listed as a proclaimed area) there are a number of residential surface and groundwater users surrounding the site.</p> <p>Figure 4 shows the location of the surface and groundwater users in relation to the premises and surface water bodies.</p> <p>The results of a water survey carried out by Talison in 2021 indicates that downstream users access surface water from Norilup Brook, Hester Brook and Woljenup Creek for purposes including drinking water, domestic uses such as showering, laundry, water for gardens, recreational activities (including swimming), aquaculture activities, irrigation for crops and stock water.</p>
Environmental receptors	Distance from prescribed activity
<p>Blackwood River and tributaries, including Woljenup creek</p>	<p>Woljenup creek is immediately south and down-gradient of TSF4 (Figure 3)</p>
<p>Cowan Brook, Norilup Dam and Norilup Brook (water quality and ecology)</p>	<p>At the western edge of the premises boundary (offsite).</p> <p>Seepage from Cowan Brook Dam flows into Cowan Brook and into Norilup dam.</p>
<p>Nearby native vegetation</p>	<p>Immediately adjacent to TSF4</p>
<p><u>DBCA Legislated Tenure</u> Greenbushes State Forest</p>	<p>A proposal for expansion activities (including TSF4) was approved under Part IV of the Act for which Ministerial Statement MS 1111 was granted on 19 August 2019.</p> <p>Receptors addressed under ministerial statement MS</p>

² Taken from the closest weather station at Bridgetown (12.9 km from Greenbushes), site ID 009617.

	1111 are not assessed in this decision report and are not duplicated as conditions in the works approval.
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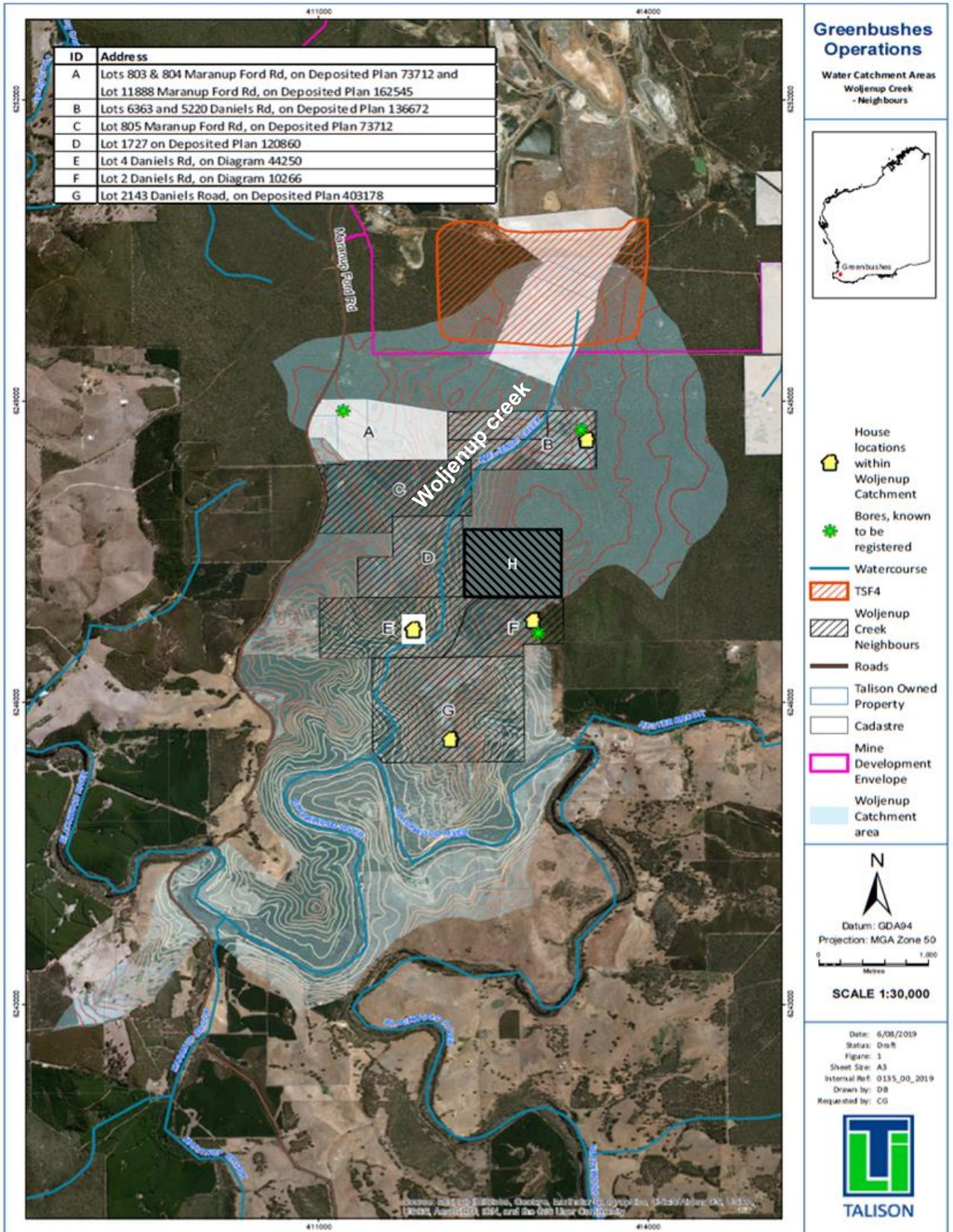


Figure 3 Sensitive receptors downstream of TSF4

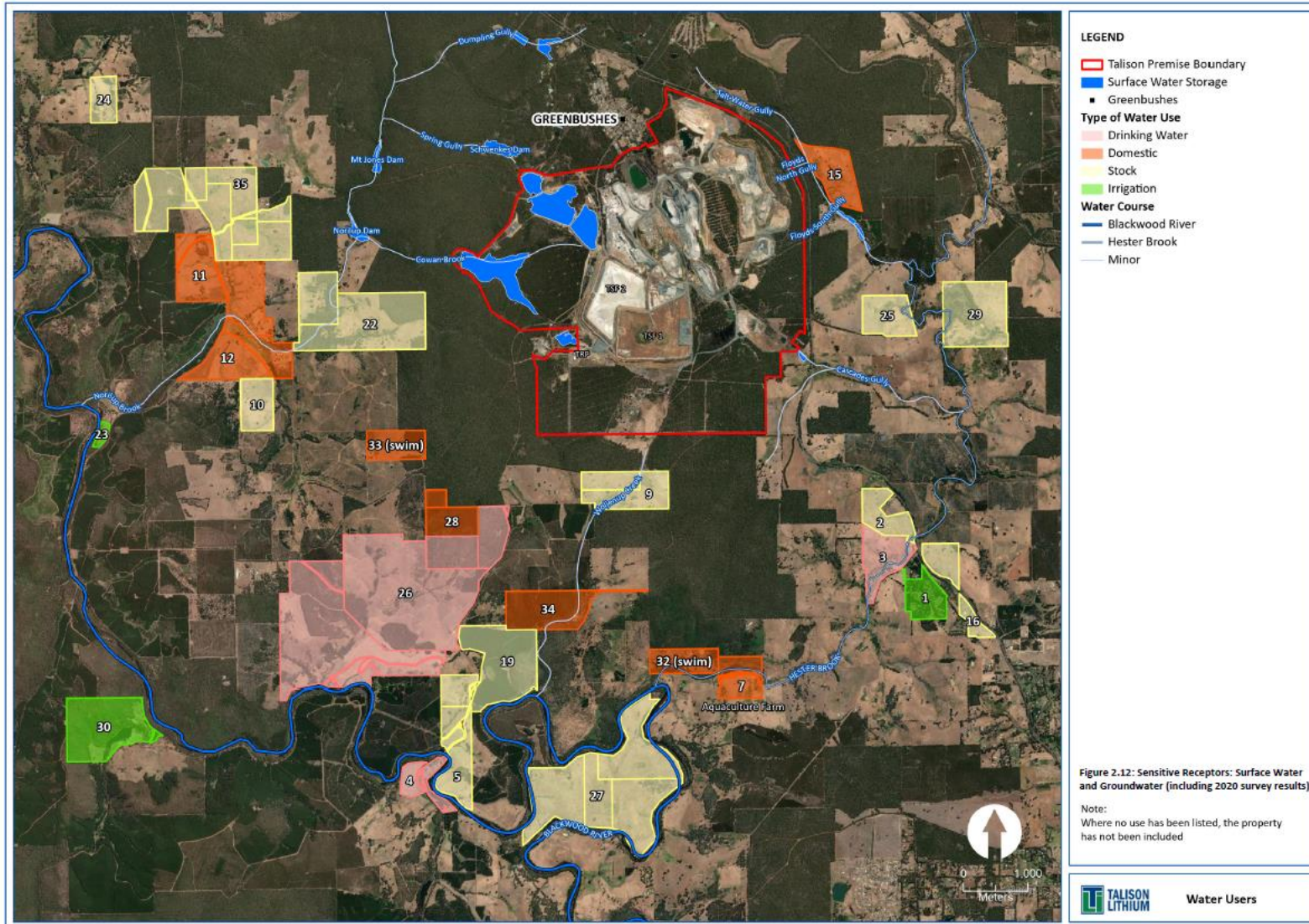


Figure 4 Nearby surface water and groundwater users (based on Talison 2021 survey)

4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020a) for those emission sources which are proposed to change and considers potential source-pathway and receptor linkages as identified in Section 4.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Works Approval Holder has proposed mitigation measures/controls (as detailed in Section 4.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Works Approval Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the Works Approval Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 5.

The Revised Works Approval W6618/2021/1 that accompanies this Amendment Report authorises construction and time-limited operations. The conditions in the Revised Works Approval have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the Premises i.e. operation of TSF4. A risk assessment for the operational phase has been included in this Amendment Report, however licence conditions will not be finalised until the department assesses the licence application.

Table 5. Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk Event					Risk rating ¹	Works Approval Holder's controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Works Approval Holder's controls	C = consequence L = likelihood Medium Risk			
Construction								
Installation of BGM liner over TSF4 cell 1 base	Dust	Air/windborne pathway causing impacts to health and amenity	Residences (closest 1 km south)	Refer to Section 4.1.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1 – dust management with water cart	N/A The applicant's proposed controls are considered sufficient and are already specified on the works approval.
Operation (including time-limited-operations operations)								
Operation of TSF4 Cell 2 with a liner comprising BGM rather than clay: Potential loss of integrity of BGM liner resulting in additional seepage	TSF4 seepage water contaminated with metals/metalloids (modification to seepage rate)	Seepage through base and embankments to groundwater causing contamination and mounding Migration of contaminated groundwater off-site causing adverse impacts to ecosystem health and human health	Downstream surface water and groundwater users Blackwood River and tributaries, including Woljenu Creek Nearby native vegetation	Refer to Section 4.1.1	C = Moderate L = Unlikely Medium Risk	Y	Condition 1 – modified to include minimum BGM construction requirements Conditions 1 – BGM liner to be tied in via anchor trench along the 265 m AHD contour through the centre of Cell 2	The applicant's proposed controls have been specified on the works approval to mitigate the risk of seepage and leaks through the BGM liner. In addition, the Delegated Officer has specified that the proposed BGM tie in via anchor trench along with embankment crests will include tie in along the 265 m contour that cuts through the centre of Cell 2. The licence holder confirmed that this tie-in will occur via a 600 x 600 mm anchor trench to reduce the risk of the BGM liner slipping during the initial operation of Cell 2, prior to it being lifted to 1270 m AHD.
Operation of TSF4 Cell 2 with a liner comprising BGM rather than clay: Additional decant water and tailings underdrainage deposited back to mine water circuit	Water within mine water circuit contaminated with metals/metalloids	Additional seepage from the mine water circuit dams to groundwater causing contamination and mounding Migration of contaminated groundwater off-site causing adverse impacts to ecosystem health and human health	Downstream surface water and groundwater users	Refer to Section 4.1.1	C = Moderate L = Possible Medium Risk	Y	N/A	N/A Specified actions to reduce seepage risk from the mine water circuit were placed on licence L4247/1991/13 as part of an amendment in December 2022. This included the requirement for Talison to: <ul style="list-style-type: none"> Produce an emissions management plan for Clear Water Dam Provide a detailed water balance for all inputs and outputs for Clear Water Dam Submit a proposal for a revised annual ecological assessment for impacts to downstream sensitive surface water receptors. Compliance against these conditions has since been demonstrated.
		Potential for overtopping from mine water circuit dams	Cowan Brook, Norilup Dam and Norilup Brook (water quality and ecology) Nearby native vegetation		C = Moderate L = Possible Medium Risk	Y	Condition 9 – Maintain 0.9 m freeboard in Cell 2 (area below 265 m AHD)	N/A The Delegated Officer has restricted the deposition of tailings during TLO to the stage 1 eastern portion of Cell 2 (up to 265 m AHD). The Delegated Officer also notes that the works approval holder proposed a reduced freeboard of 0.3 m in Cell 2, instead of the existing 0.9 m freeboard specified in the works existing approval. No justification for the reduced freeboard was provided and the Delegated Officer has determined to maintain the existing freeboard. Talison have historically had issues with capacity of the mine water circuit, including overtopping events recorded at Cowan Brook Dam. Talison were granted works approval W6795/2023/1 on 28 June 2023 to lift the embankment height of Cowan Brook Dam to 1,229 metres relative level (m RL), which will provide between 0.7 – 0.8 GL additional capacity. The maximum additional input associated with BGM liner will represent ~1% of the additional capacity being created by the Cowan Brook Dam lift. Talison have also notified the department that they intend to submit applications to lift the embankment heights for Southampton Dam and Austin Dam in September/October 2023.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020a).

Note 2: Proposed Works Approval Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4.3 Proposed amendment to time-limited operations

The Delegated Officer has determined to accept the proposed changes to the TLO period detailed in Section 2.2.3 of this report. A revised TLO period end date of 30 June 2025 has been set for all items constructed in Table 1, Condition 1 of W6618/2021/1. As a result, the revised TLO periods will effectively be up to seven months for Cell 1b (a 4 m lift to RL 1265 m) and three to four months for Cell 2, if TLO commences as scheduled.

The Delegated Officer considers the change will streamline the licence amendment process while ensuring TSF4 Cell 1b and Cell 2 have sufficient respective TLO periods. The Delegated Officer notes that a licence amendment is currently under assessment for the operation of TSF4 Cell 1a.

5. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 27 November 2023	Comments received 8 December 2024. See section 3.1.1.	The department notes that preliminary assessment indicates DEMIRS consider the proposed change to a BGM liner in TSF4 is generally acceptable under the <i>Mining Act 1978</i> and Work Health and Safety (Mines) Regulations 2022. The department also note that a review of the design, underdrainage and instrument monitoring is required prior to construction of future TSF4 lifts.
Works Approval Holder was provided with draft amendment on 14 March 2024	Comments received on 26 March 2024. Refer to Appendix 1	Refer to Appendix 1

6. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Works Approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

6.1 Summary of amendments

Table 7 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Works Approval as part of the amendment process.

Table 7: Summary of works approval amendments

Condition no.	Proposed amendments
1	Construction condition modified to include requirements for the TSF4 Cell 2 BGM liner
1 and 9	Amended infrastructure description to include specific TSF4 cells.
8	Amended TLO period end date to 30 June 2025.
13	Condition 13 and Table 5 have been removed as the existing licence L4247/1991/13 has existing monitoring of ambient air quality conditions.
14 – 19	Condition numbering has been revised to 13 – 18.
Schedule 1	New figures 1, 2, 7, 14, 15 and 16, showing location of BGM liner within TSF4 cell 2 and BGM tie in detail

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020b, *Guideline: Environmental Siting*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
4. GHD 2021, *Talison TSF4 Detailed Design Report - Revision 2*. Unpublished Report for Talison Lithium Australia Pty Ltd.
5. GHD 2023, *Substituting the Clay Liner with Bituminous Geomembrane (BGM) in TSF4 Cell 2*. Report prepared for Talison Lithium. 20 September 2023.

Appendix 1: Summary of Works Approval Holder's comments on risk assessment and draft conditions

Condition	Summary of Works Approval Holder's comment	Department's response
<p>Condition 8. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 9 (as applicable):</p> <p>(a) for a period commencing the day the works approval holder meets the requirements of condition 7 for that item of infrastructure and ending on 31 December 2024; or</p>	<p>Talison plans to cease deposition to Cell 1a and deposit to Cell 2 (to 265mAHD) once Cell 2 (265mAHD) Time Limited Operations (TLO) has been authorised. Cell 1b TLO is not planned to commence until Cell 2 is full (to 265mAHD). This is expected to occur around November 2024. The draft Amendment species TLO until 31 December 2024, allowing for only limited Cell 1b TLO. Talison therefore requested that TLO is extended to 30 June 2025.</p> <p>Proposal:</p> <p>Condition 9(a) for a period commencing the day the works approval holder meets the requirements of condition 7 for that item of infrastructure and ending on 30 June 2025.</p>	<p>The Delegated Officer has determined to amend the TLO date in condition 8 to 30 June 2025, given the proposed extension to TLO does not represent an increase in the existing risk profile. Further, the Delegated Officer considers existing controls on the works approval to be sufficient to manage operations risks during the extended TLO period.</p>
<p>Condition 13a-e Table 5</p> <p>The licence holder must monitor the air for concentrations of the parameter listed in Table 5:</p> <p>(a) at the corresponding monitoring location;</p> <p>(b) in the corresponding unit;</p> <p>(c) at no less that the corresponding frequency;</p> <p>(d) for the corresponding averaging period; and using the corresponding method,</p> <p>(e) as set out in Table 5.</p>	<p>The rationale for eliminating the dust conditions from the works approval lies in their redundancy, as they are now more comprehensively addressed through Table 13 of Licence L4247/1991/13.</p> <p>Proposal:</p> <p>Remove Condition 13 and Table 5 from the works approval.</p>	<p>The Delegated Officer agrees that condition 13 should be removed to reduce regulatory duplication, as it is adequately specified in licence L4247/1991/13 (as amended 12 July 2023).</p>

Condition	Summary of Works Approval Holder's comment	Department's response																														
Draft Decision Report	Summary of Works Approval Holder's comment	Department's response																														
<p>Section 2.2.3: Expected TLO commencement dates for each cell are listed in Table 2. The works approval holder states that the amended condition would consolidate TLO so that the department only needs to assess one licence amendment application (rather than one for each cell). The revised timeframe would also ensure that TSF4 cells 1B and 2 have sufficient TLO (approximately four months) for the department to assess the subject licence amendment application.</p> <p>Table 2: TSF4 cell construction schedule</p> <table border="1" data-bbox="210 724 819 1027"> <thead> <tr> <th><i>TSF4 Milestone</i></th> <th><i>Construction end date</i></th> <th><i>TLO start date</i></th> </tr> </thead> <tbody> <tr> <td><i>Cell 1a</i></td> <td><i>October 2023</i></td> <td><i>November 2023</i></td> </tr> <tr> <td><i>Cell 1b</i></td> <td><i>February 2024</i></td> <td><i>March 2024</i></td> </tr> <tr> <td><i>Cell 2</i></td> <td><i>May/June 2024</i></td> <td><i>June 2024</i></td> </tr> <tr> <td><i>Licence amendment application</i></td> <td><i>Submit June 2024</i></td> <td>-</td> </tr> </tbody> </table>	<i>TSF4 Milestone</i>	<i>Construction end date</i>	<i>TLO start date</i>	<i>Cell 1a</i>	<i>October 2023</i>	<i>November 2023</i>	<i>Cell 1b</i>	<i>February 2024</i>	<i>March 2024</i>	<i>Cell 2</i>	<i>May/June 2024</i>	<i>June 2024</i>	<i>Licence amendment application</i>	<i>Submit June 2024</i>	-	<p>The dates listed in the Amendment Table 2 are no longer correct. As per Table 1 above, Talison plans to commence Cell 1b TLO around November 2024.</p> <p>Proposal:</p> <p>Expected TLO commencement dates for each cell are listed in Table 2. The works approval holder states that the amended condition would consolidate TLO so that the department only needs to assess one licence amendment application (rather than one for each cell). The revised timeframe would also ensure that TSF4 cells 1B and 2 have sufficient TLO for the department to assess the subject licence amendment application.</p> <p>Table 2: TSF4 cell construction schedule</p> <table border="1" data-bbox="869 750 1456 1062"> <thead> <tr> <th><i>TSF4 Milestone</i></th> <th><i>Construction end date</i></th> <th><i>TLO start date</i></th> </tr> </thead> <tbody> <tr> <td><i>Cell 1a</i></td> <td><i>November 2023</i></td> <td><i>January 2024</i></td> </tr> <tr> <td><i>Cell 1b</i></td> <td><i>February 2024</i></td> <td><i>November 2024</i></td> </tr> <tr> <td><i>Cell 2</i></td> <td><i>June 2024</i></td> <td><i>July/August 2024</i></td> </tr> <tr> <td><i>Licence amendment application</i></td> <td><i>Submit November 2024</i></td> <td>-</td> </tr> </tbody> </table>	<i>TSF4 Milestone</i>	<i>Construction end date</i>	<i>TLO start date</i>	<i>Cell 1a</i>	<i>November 2023</i>	<i>January 2024</i>	<i>Cell 1b</i>	<i>February 2024</i>	<i>November 2024</i>	<i>Cell 2</i>	<i>June 2024</i>	<i>July/August 2024</i>	<i>Licence amendment application</i>	<i>Submit November 2024</i>	-	<p>Updated accordingly to support proposed change to TLO end date in condition 8.</p>
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