



Application for Works Approval

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

Works Approval Number	W6512/2021/1
Applicant	Kirkalocka Gold SPV Pty Ltd
ACN	626 160 816
File number	DER2020/000580~1
Premises	Kirkalocka Gold Mine Mining Lease M59/234 and M59/233 DAGGAR HILLS WA 6638 As defined by the coordinates in Schedule 2 of the works approval
Date of report	23 September 2021
Decision	Works approval granted

MELANIE BRUCKBERGER
A/ MANAGER RESOURCE INDUSTRIES

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

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W6512/2021/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) 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 and overview of premises

On 12 November 2020, the applicant submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to the construction of tailings storage facility 2 (TSF2) integrated into a waste rock landform at the premises. The premises is approximately 70 km south of Mount Magnet.

The premises relates to the category 5 and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6512/2021/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6512/2021/1.

On 27 July 2021, the department was notified that Kirkalocka Gold Mine was transferred from Adaman Resources Pty Ltd to Kirkalocka Gold SPV Pty Ltd (ACN 626 160 816).

2.2.1 Proposed Activities

TSF2

TSF 2 will be developed as an Integrated Waste Landform (IWL) facility. The TSF 2 development will comprise the downstream construction of the perimeter embankment in a single stage to a crest level of RL 355.7 m. The embankment height will be about 12 m. Perimeter embankments will be constructed using compacted clayey borrow/mine waste material for the upstream region (Zone A) and traffic compacted mine waste (from the open cut mine) for the downstream region (Zone B).

TSF2 will provide an additional 5.7 x 100 m³ of tailings storage volume or 8.6 Mt corresponding to approximately 3.9 years of production capacity based on the average design tonnage of 2.212 Mtpa and an adopted tailing dry density of 1.5 t/m³.

A water recovery system will be incorporated, consist of a decant tower located at the centre of the facility. A decant causeway will be constructed with traffic compacted mine waste to provide access to the central decant pump system.

Site clearing for the proposed IWL/TSF 2 footprint area will be carried out as part of the foundation and embankment construction works. The cleared areas of IWL/TSF 2 are estimated at approximately 89 ha and are covered under Clearing Permit CPS8367/1.

The tailings lines from the process plant to TSF2 and the return water lines from the decant facility to the process water dam are to be located inside bunded open trenches to contain any spillage of materials resulting from lines which develop leaks or burst during operation.

After construction of TSF2, commissioning and time limited operations will be required.

Table 1 summarises the proposed infrastructure associated with Kirkalocka TSF2 environmental commissioning requirements. The proposed location of the new infrastructure is shown in Figure 1.

Table 1: TSF2 infrastructure and equipment proposed.

TSF	Infrastructure and Equipment	Environmental Commissioning
TSF2	<ul style="list-style-type: none"> - Embankment foundation – compacted to achieve permeability (k) of 1.0×10^{-7} m/s - Central underdrainage piping network - Crest level of RL 355.7 m - Perimeter embankment: <ul style="list-style-type: none"> Slopes of 1:2 (V:H) upstream and an overall 1:3 (V:H) downstream Crest width of 20 m - Decant causeway - slope of 1:1.5 (V: H) for both sides and a minimum crest width of 8 m. - Data loggers and vibrating wire piezometers (VWPs) – three pairs - Tailings distribution and return water pipelines - External sumps - Cut-off trench - 4 m-wide base excavated to a nominal depth of 1.0 m beneath the perimeter embankment (Zone A) and backfilled with compacted clayey material. - Monitoring bores – eight in total - Recovery bores – five in total 	Required

Tailings

Tailings properties and characteristics were assessed under L9195/2019/1 Amendment, dated 22 December 2020.

2.2.2 Site characteristics

Most of the project is situated on almost flat sandy-surfaced hardpan wash plains supporting tall shrublands and woodlands of Mulga.

The area contains alluvial basins, being part of the ancient Mongers Lake drainage system. Major surface drainage in the project area generally trends northwest through dryland creeks.

An alluviated palaeodrainage system extends through the length of the mining leases M59/232, M59/233 and M59/234. The average depth to groundwater has been estimated as 7 m below ground level. The shallow aquifer comprises coarse to medium-grained, poorly sorted ferruginous sand that is about 20 m thick. Beneath the palaeodrainage sediments, there is a weathered and fractured basement aquifer that has groundwater stored in the saprolitic weathering profile, and in fractured greenstone and granitic rocks. This aquifer is present in the Curara Well Pit and contributes groundwater inflows that will require dewatering into the future.

Groundwater within the site is mainly brackish. Fresh groundwater is found in some upstream locations such as near Canning Hill. Groundwater levels vary around the site. Historical data for surface water level data around TSF1, since tailings deposition started, is shown in Table 2. The low SWL at TDP1, TDP2, TDP4 and TDP 5 are likely due to the open pit dewatering activities which occur in close proximity to the bores.

A summary of historical groundwater quality on site is shown in Appendix 3. Elevated levels of nitrate (above 10.6 mg/L – ANZG 2018) are found in most bores around TSF1.

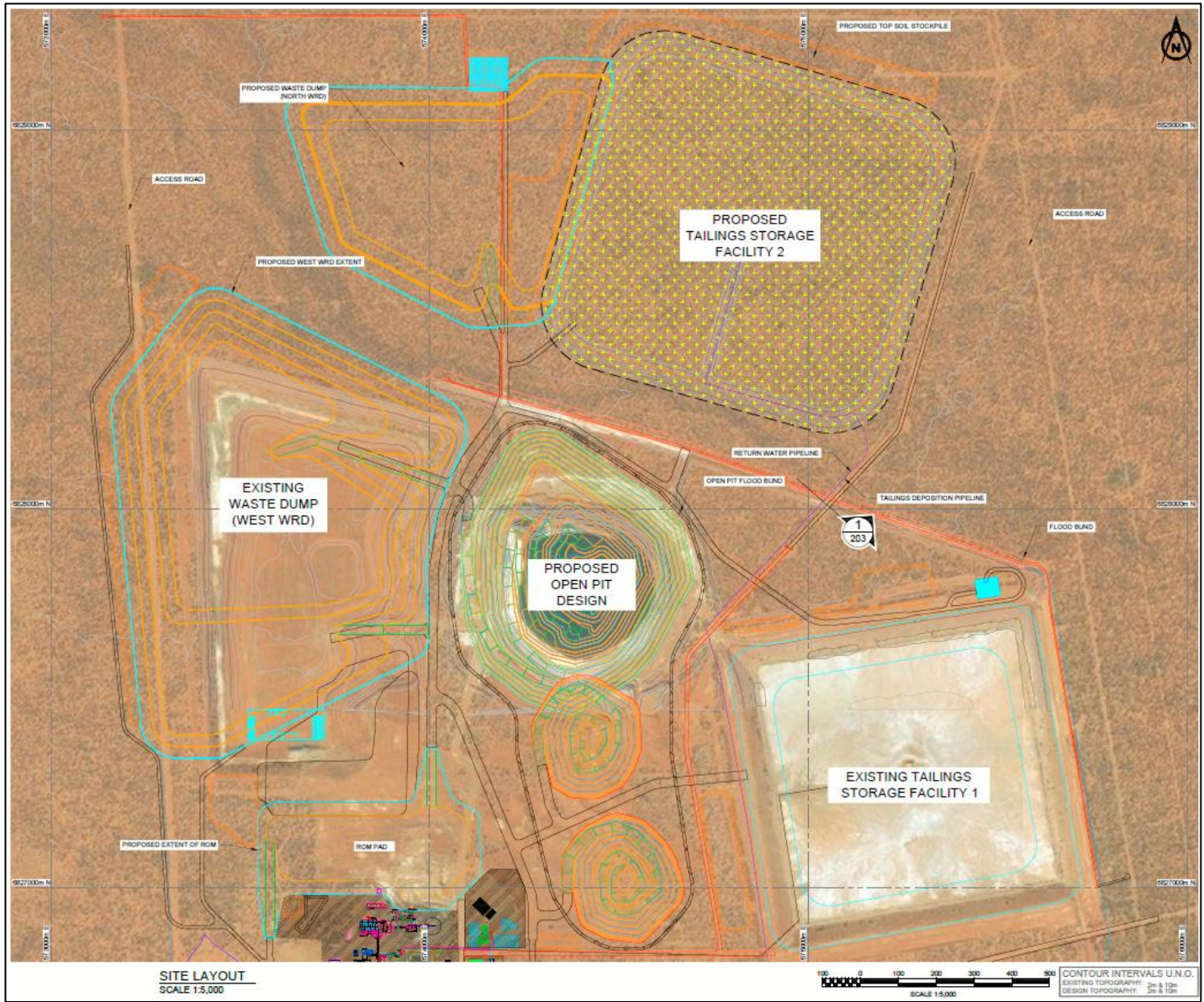


Figure 1: Kirkalocka Gold Mine infrastructure – TSF2 proposed location.

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Table 2: TSF 1 monitoring bores standing water levels. Red numbers depict SWL above 5 mbgl (licence L9195/2019/1 - condition 20).

Date	Standing water level (mbgl)												
	TDP1	TDP2	TDP3	TDP4	TDP5	TDP6	TDP7	TDP8	TDP9	TDP10	TDP11	TDP12	TDP13
Oct-19	31.94	-	9.41	34.64	31.29	13.40	10.97	5.78	6.25	6.55	7.17	-	6.85
Nov-19	32.31	-	9.36	35.37	31.64	13.45	10.90	5.53	6.00	6.39	7.01	-	6.72
Dec-19	32.61	-	9.26	36.05	31.87	13.48	10.84	5.36	6.06	6.25	6.95	-	6.58
Jan-20	33.69	-	9.08	38.09	32.72	13.60	10.70	4.99	5.68	5.80	6.51	-	6.22
Feb-20	34.34	-	9.01	39.12	33.25	13.69	10.69	4.85	5.99	6.19	6.92	-	6.15
May-20	37.48	-	8.12	43.54	36.06	13.96	10.45	4.15	5.02	5.07	5.76	-	5.33
Jun-20	37.61	-	7.91	43.74	35.90	14.01	10.41	4.06	4.94	4.99	5.61	-	5.14
Jul-20	38.04	-	7.79	43.89	35.98	14.16	10.36	3.99	4.87	4.92	5.52	-	4.98
Aug-20	38.73	-	7.86	46.12	36.83	14.20	10.35	4.02	4.88	4.98	5.58	-	5.20
Sep-20	39.24	-	7.83	46.99	37.29	14.25	10.30	3.99	4.86	4.92	5.53	-	5.12
Oct-20	39.55	-	7.80	48.12	37.55	14.29	10.22	4.00	4.79	4.89	5.49	-	5.08
Nov-20	39.83	-	7.82	48.74	37.79	14.20	10.13	3.89	4.70	4.79	5.41	-	5.05
Dec-20	39.98	56.68	7.73	49.11	37.98	14.40	10.14	3.86	4.70	4.78	5.40	5.58	4.99
Jan-21	40.59	57.08	7.95	50.13	38.55	14.45	10.20	3.90	4.76	4.88	5.46	5.65	5.12
Feb-21	40.93	58.08	8.84	50.84	39.24	15.08	9.97	3.78	4.87	4.77	6.11	6.06	5.36
Mar-21	41.03	58.24	8.52	51.04	38.93	14.66	10.07	3.93	4.85	5.02	5.86	6.00	5.55
Apr-21	42.19	58.58	8.61	51.75	39.30	14.77	9.91	3.95	4.93	5.18	5.98	5.96	5.55
May-21	41.78	58.91	8.67	52.11	39.60	14.82	9.99	4.00	5.01	5.32	6.15	6.32	5.79
Jun-21	41.89	59.09	8.67	52.49	39.69	14.84	9.98	3.99	5.04	5.41	6.18	6.53	5.80

3. 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 2020).

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.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and time limited operation which have been considered in this decision report are detailed in Table 3 below. Table 3 also details the proposed control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Crushing of material, vehicle movements, lift-off from stockpiles and/or stored product, earthworks etc.	Air / windborne pathway	Keep all haul roads sprayed and wetted to minimise the generation of airborne dust Use of dust suppression including water carts / water sprays
Noise	Crushing and screening of material	Air / windborne pathway	Noise levels to comply with the requirements outlined in the Environmental Protection (Noise) Regulations. Implement noise mitigation measures if these levels do not meet the above requirement.
Operation			
Discharges to land	Pipeline leaks or spills from return water and tailings deposition pipeline	Direct discharge to land	Bunding, containments pits/sumps and leak detection infrastructure on pipelines, sufficient to contain and control potential discharges. Routine inspection of pipelines and leak detection. Tailings lines inspected a minimum of two times per shift.
Seepage	Tailings	Seepage through the gravels towards Kirkalocka Creek	<u>Seepage collection system</u> : toe drain (0.8 m deep and base width of 3 m). Pump sump for seepage collection (pump sump detail will be determined during operation phase) <u>Decant system</u> : decant tower near the centroid point of TSF2, comprising of 1.8 m diameter slotted concrete well liners with surrounded clean rockfill <u>Embankment foundation</u> : conditioned and compacted to a permeability of 10^{-7} m/s to retard seepage movements into the foundation (subsurface) and through embankment <u>Central underdrainage</u> : piping network around the decant facility to the extent of a decant pond of nominal 150 m radius <u>Recovery bores (contingency)</u> : Five shallow recovery bores comprising of 4" diameter finishing and 15 m deep Groundwater monitoring bores to be installed around TSF2 to monitor standing water levels and water quality. Baseline groundwater quality monitoring will take place once the bores are constructed.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors 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* (DER 2020)).

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

Human receptors	Distance from prescribed activity
Closest residential premises is Kirkalocka Station Homestead	More than 10 km away – not considered a receptor
Environmental receptors	Distance from prescribed activity
Vegetation – Mulga trees (<i>Acacia aneura</i>) Mulgas are shallow rooted (typically less than 5 m).	Adjacent to the TSF
<u>Groundwater</u> Water is used onsite for industrial and domestic purposes. Groundwater in the regional area may be used for stock watering. Two privately owned bores nearby the premises: <ul style="list-style-type: none"> • Curara Well (1.3 km south of the TSF) and • Callaloo Well (4.2 km north of the TSF). 	<u>TSF2</u> Prior to deposition of tailings in 2019 approximately 7 to 15 mbgl at TSF1, reaching depths of 35 m closer to the pit due to dewatering. Rising groundwater levels since tailings deposition recommenced in late 2019 (Table 2).
<u>Watercourses/ waterbodies</u> Poorly defined drainage channels and riparian vegetation. The area is used for pastoral purposes and water within creeks may be utilised by stock.	Poorly defined drainage channels adjacent to TSF2 The drainage lines drain north-west towards Kirkalocka Creek which is located approximately 6 km north-west of the premises.
<i>Rights in Water and Irrigation Act 1914</i> (RIWI Act)	Premises located within the East Murchison Groundwater Area

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant'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 applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 5.

Works approval W6512/2021/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 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. TSF2 tailings discharge activities. A risk assessment for the operational phase has been included in this decision 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, commissioning, and operation

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Construction								
Construction activities for TSF2, vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity	No close receptors	Refer to Section 3.1	C = Slight L = Possible Low risk	Y	N/A	N/A
	Noise							
Commissioning and operation (including time limited operations)								
Return water pipeline – tailings deposition pipeline /TSF2	Tailings containing metals, metalloids discharging to land	Direct discharge from rupture of pipelines causing contamination	Soils	Refer to Section 3.1	C = Moderate L = Unlikely Medium Risk	Y	Condition 1 construction conditions Condition 8, Table 3 included with Commissioning requirements for daily visual inspections Condition 16, Table 4 included for monitoring of pipelines during time limited operations	The works approval holders' controls have been conditioned within the works approval
Deposition of tailings into TSF2	Tailings containing metals, metalloids seeping into groundwater/ creek line	Seepage and infiltration through subsurface impacting the quality and ecology of surface water/groundwater. Mounding affecting vegetation	Creek line adjacent to TSF2 Hyporheic zone in creek sediments	Refer to Section 3.1	C = Major L = Likely High Risk	N	<u>Condition 1 - Table 1 TSF2 foundation permeability of 10⁻⁸ m/s or less</u> Condition 1 - Decant structures, cut-off trench and underdrainage. Condition 4 Table 2 for the installation of ambient groundwater monitoring and recovery network. <u>Condition 4 – specified design, construction and</u>	Refer to 3.3.1

							<p><u>installation requirements and timeframe requirements for monitoring and seepage bores. Includes requirement to install an additional two recovery bores (for a total of seven).</u></p> <p><u>Condition 6 and 13, comparison of baseline ambient groundwater conditions with water quality guidelines</u></p> <p>Condition 8 and 16, Table 3 and Table 5 - decant pond size minimized and freeboard of 500 mm</p> <p><u>Condition 9 and 17 - SWL during commissioning and TLO is below 5 mbql around TSF2.</u></p> <p>Condition 10, Table 4 to determine baseline ambient groundwater conditions at new monitoring bores.</p> <p><u>Condition 10, Table 4 - monitoring of tailings and decant during TLO</u></p> <p>Condition 18, Table 4 - monitoring of tailings and decant during time limited operations.</p> <p><u>Condition 22 - water balance for TSF2.</u></p>	
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Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

3.3 Detailed risk assessment for tailings deposition

3.3.1 Seepage

The historical groundwater monitoring results for Kirkalocka show groundwater mounding since tailings discharge started in TSF1 (Table 2). The south east corner of TSF1 is the worst affected, where SWL can be detected at 3.9 mbgl. Monitoring bore TDP1, TDP2, TDP4 and TDP5 show SWL below 39 m bgl. The data indicates that the monitoring bores located closer to the pit are affected by the cone of depression produced by pit dewatering. It also shows that seepage is accumulating in the gravels.

Groundwater quality around TSF1 also shows increase in nitrate and cobalt concentration in groundwater that are above ANZG 2018 - 95% species protection (Attachment 3). Seepage from the waste fines into the gravels and groundwater has potential to negatively impact downstream groundwater quality and impact the hyporheic zone of nearby creeks.

Site investigation was conducted within the proposed TSF2 footprint. Twelve test pits were excavated and the results show that the top layer (between 3 – 4 m deep) is composed of clayey sand comprising of fine to medium grained sand particles. Measured standing water levels from three boreholes ranged between 7.33 and 7.65 m below ground surface. The result of the in-situ permeability test indicates that the permeability of the area is around 10^{-6} m/s.

The proponent has proposed to compact the area underneath the decant pond area and around the perimeter embankment to a permeability of 10^{-7} m/s. No further soil conditioning was proposed for the remaining area. Soils with permeability between 10^{-6} and 10^{-7} m/s are considered semi permeable (Padzdro, Kozerski 1990). Discharge of tailings to the proposed TSF2 without further measures to prevent seepage though the base of the TSF will increase mounding of tailings water in the gravel layer. Similar to the situation around TSF1.

Thus, further controls should be put in place to prevent groundwater mounding and deterioration of groundwater quality.

The works approval will require:

- TSF2 footprint – condition soil to permeability less of 10^{-8} m/s;
- Installation of additional recovery bores to the north (already proposed as contingency) and east of TSF2;
- Monthly water balance calculation;

4. Consultation

Table 1 provides a summary of the consultation undertaken by the department.

Table 1: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 22 February 2021	None received	N/A
Application referred to the Department of Mines, Industry Regulation and Safety (DMIRS) for comment on 27 April 2021	20 July 2021 DMIRS have not yet received a response to the RFI for TSF1 and TSF2 revised mining proposal. There has been no communication between	N/A

	Adaman and DMIRS since 17 June.	
Applicant was provided with draft documents on 20 July 2021	Comments received on 13 August 2021 Refer to Appendix 1	Refer to Appendix 1

5. Conclusion

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

References

1. ANZG 2018. Australian and New Zealand Governments and Australian state and territory governments. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra. <http://waterquality.gov.au/anz-guidelines>
2. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
3. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
4. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
5. Talis 2020 (a), *Kirkalocka Project - TSF 2 Works Approval supporting document - Project number: TE20073*, Perth, Western Australia.
6. Talis 2020 (b), *Kirkalocka: Mining proposal – Rev 1.5, Tenements: M59/232, M59/233, M59/234 and L59/127*, Perth, Western Australia.
7. Correspondence dated 24 May 2021 from Adaman Resources providing response to request of historical surface water levels data.
8. Correspondence dated 2 June 2021 from Adaman Resources providing response to request of historical groundwater quality data.
9. Pazdro Z, Kozerski B 1990, *Hydrogeologia ogolna* [Hydrogeology]. Wydawnictwa Geologiczne, Warsaw
10. Correspondence dated 14 July 2021 from DMIRS. Internal reference A2026268.
11. Correspondence dated 20 July 2021 from DMIRS. Internal reference A2027879.
12. Correspondence dated 15 September 2021 from Kirkalocka Gold providing response on type of decant structure. Internal reference A2045912.

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
Front page of works approval	Adaman Resources Pty Ltd is no longer under administration as of 27 July 2021	Works approval holder details updated.
1	<p>The applicant requested that the requirement for tailings slurry and return pipelines to be "equipped with automatic cut-offs in the event of ruptures" is removed. The applicant advised that it is not practical to implement, due to the downstream engineering requirements that would need to be constructed.</p> <p>The applicant confirmed commitments to implement bunding, containments pits/sumps and leak detection infrastructure on pipelines, sufficient to contain and control potential discharges.</p>	<p>Removal of requirement for tailings slurry and return pipelines to have automatic cut-offs in the event of ruptures is accepted.</p> <p>Applicant proposed controls are sufficient to manage the risk of discharges to land. Section 3.1.1 Emissions and controls, of this decision report (Table 3: Proposed applicant controls) has been updated to include the applicant's controls.</p> <p>Requirements in the works approval have been amended to align with applicant commitments which includes:</p> <ul style="list-style-type: none"> - Pipelines to be located in a bunded corridor which has scour sumps and is adequate to contain any spill for a period equal to the time between routine inspections, in areas where the pipeline does not drain into TSF2; and - Pipelines to be equipped with a leak detection system.
1	The applicant provided details of the spigots, including the spacing of the spigot off-takes, number and length of the TSF2 crest.	The spacing of the spigot offtakes has been specified in the works approval.
1	The applicant advised that they do not have the specifications for the decant pump and pipe designs. They noted that the expected decant water return will be 1,087 kL/day.	Noted. Details of pump capacity added to works approval.
1	The applicant advised that the cut-off trench is 2.0m depth rather than 1.0m depth.	Noted. Works approval updated.
8	The applicant noted that the works approval specifies a requirement for a 600mm freeboard for TSF2 and that the calculations provided and industry	<p>Noted. Works approval updated to 500 mm freeboard.</p> <p>The application supporting document refers in section 4.4 TSF 2 Description, to</p>

Condition	Summary of applicant's comment	Department's response
	guidelines for minimum freeboard is 500mm.	a total freeboard of 600 mm. The department notes that the 600 mm total freeboard referenced included a 100 mm buffer in addition to the minimum operational freeboard of 300 mm and a minimum beach freeboard of 200 mm. Total freeboard is the sum of the operational and beach freeboard which is 500mm rather than 600 mm. 500 mm freeboard is acceptable.
11	The applicant has questioned the inclusion of dissolved oxygen as part of the groundwater monitoring in Table 4 of the works approval.	<p>Noted.</p> <p>The list of parameters are related to this works approval and related to TSF2 and not TSF1.</p> <p>The in field Dissolved Oxygen (DO) measurements can provide an indication of redox conditions.</p> <p>Requirement to monitor dissolved oxygen in groundwater monitoring bores removed as a monitoring parameter. However, the requirement to measure DO as a monitoring parameter will be reassessed as part of the following licence amendment for ongoing operations.</p>
20	The applicant requested that the requirement to not return seepage to the TSF2 decant is reconsidered as it would require significant additional infrastructure with the need to construct two sets of pipes from TSF2 to the process plant to meet this condition. The applicant intends on returning seepage water via a pipeline direct to the decant supernatant pond for eventual transfer to the process plant.	<p>Accepted.</p> <p>Requirement removed from the work approval. However, if monitoring results during time limited operations indicate an increase of the standing water level, this requirement will be reassessed as part of the following licence amendment for ongoing operations.</p>
Figure 7	The applicant has questioned what further detail the department requires for the figure showing the TSF2 decant tower sections and details.	<p>Noted.</p> <p>The document submitted with the works approval application was incomplete.</p> <p>Applicant clarified that a decant tower will be installed for TSF2. New figures were submitted to reflect the actual design.</p>
Schedule 2	The applicant provided the premise boundary coordinates.	Noted. Added to the works approval.
Decision report Section 2.2.1	The applicant notes that the decision report references a turret (Section 2.2.1) and concrete ring system (Table 3). The applicant confirmed that the decant system is a decant tower comprising 1.8 m diameter slotted concrete well liners with surrounded clean rockfill.	<p>Noted.</p> <p>Works approval supporting document (Talis, November 2020 – Ref: TE20073) shows the turret as recovery system. All the decant drawings refer to turret system.</p> <p>Applicant clarified that a decant tower will be installed for TSF2. New figures were submitted to reflect the actual design.</p>

Condition	Summary of applicant's comment	Department's response
		The decision report was updated to refer to the correct infrastructure.
Decision report Section 2.2.2	The applicant notes that comment "the low SWL at TDP1, TDP2, TDP4 and TDP 5 are due to these bores function as abstraction bores" is incorrect. The applicant notes that those bores are not abstraction bores and that the SWLs in these bores are influenced by their proximity to open pit dewatering activities.	Noted. Decision report updated.
Decision report Table 5	Likely typographical error with the reference made to "deposition of tailings into TSF3 and 5".	Noted. Decision report updated.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY		
Application type		
Works approval	<input checked="" type="checkbox"/>	
Date application received	12/11/20	
Applicant and Premises details		
Applicant name/s (full legal name/s)	Adaman Resources Pty Ltd	
Premises name	Kirkalocka	
Premises location	M59/234 & M59/233	
Local Government Authority	Mount Magnet Shire and Yalgoo Shire	
Application documents		
HPCM file reference number:	DER2020/000580	
Key application documents (additional to application form):	Works Approval Summary (Talis Consultants) TSF Design Report (Coffey, 2020) Groundwater Monitoring Strategy Tailings Characterisations (Wave Solutions, 2012) Seepage Assessment (AquaGeo, 2020) EOS Characterisation (Campbell, 2020) Baseline Monitoring (EEI, 2019) Subterranean Fauna Assessment	
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	Works approval Construction of a new tailings storage facility	
Category number/s (activities that cause the premises to become prescribed premises)		
Table 1: Prescribed premises categories		
Prescribed premises category and description	Proposed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5: Processing or beneficiation of metallic or non-metallic ore	2,500,000 tonnes per year	
Legislative context and other approvals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A

Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	N/A
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Certificate of title <input type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input checked="" type="checkbox"/> Expiry: M59/233: expires 3/11/2033 M59/234: expires 3/11/2033
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Approval: Expiry date: If N/A explain why? Site located on mining tenement
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	CPS No: 8367/1
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: N/A Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Application reference No: Licence/permit No: GWL20380(2)
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Type: RIWI East Murchison Groundwater Area Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Regional office: East Murchison Groundwater Area
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A

<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004</i>, <i>Environmental Protection (Controlled Waste) Regulations 2004</i>, <i>State Agreement Act xxxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>Mining Act 1976</i></p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Classification: N/A Date of classification:</p>

Appendix 3: Historical groundwater quality summary

Bore ID	Date	TDS	pH	Chromium	Cobalt	Copper	Molybdenum	Nitrate	Sulfate	Chloride	Fluoride
		mg/L	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TDP1	17/12/2019	1100	7.4	0.001	<0.001	0.002	0.011	6.6	120	440	0.6
TDP3	17/12/2019	2900	7.7	0.001	0.13	<0.001	0.007	8	310	1100	0.8
TDP4	17/12/2019	1300	7.4	0.002	0.005	0.002	0.008	12	120	490	0.7
TDP5	17/12/2019	1200	7.4	0.002	<0.001	0.001	0.013	7.8	130	480	0.7
TDP6	17/12/2019	1500	7.4	<0.001	<0.001	<0.001	0.017	11	140	560	0.9
TDP7	17/12/2019	1300	7.5	0.001	<0.001	<0.001	0.012	13	120	500	1.1
TDP8	17/12/2019	1300	7.8	0.002	<0.001	<0.001	0.019	13	120	450	1
TDP9	17/12/2019	1900	7.6	0.002	<0.001	<0.001	0.016	12	150	670	0.8
TDP10	17/12/2019	2700	7.7	<0.001	<0.001	<0.001	0.006	11	170	950	0.5
TDP11	17/12/2019	2600	7.2	<0.001	0.002	0.001	0.003	11	150	950	0.3
TDP13	17/12/2019	1600	7.7	0.003	0.027	<0.001	0.017	12	160	550	0.8
TDP1	28/05/2020	1200	7.5	<0.001	<0.001	0.002	0.011	5.1	130	480	0.6
TDP3	27/05/2020	2400	7.8	0.002	0.13	0.001	0.007	8.1	280	1200	0.9
TDP4	27/05/2020	1300	7.5	0.002	0.005	0.004	0.008	12	120	510	0.8
TDP5	28/05/2020	1400	7.4	0.003	<0.001	<0.001	0.015	5.9	160	580	0.8
TDP6	28/05/2020	1400	7.4	<0.001	<0.001	<0.001	0.016	11	140	560	0.8
TDP7	28/05/2020	1300	7.5	0.001	<0.001	<0.001	0.01	12	120	500	1
TDP8	28/05/2020	1300	8.1	0.002	<0.001	<0.001	0.017	13	120	470	0.9
TDP9	28/05/2020	1300	7.9	0.001	<0.001	0.001	0.015	9.2	90	490	0.7
TDP10	28/05/2020	1200	8.1	0.001	<0.001	0.001	0.024	11	98	500	0.8
TDP11	28/05/2020	1300	8	<0.001	<0.001	0.01	0.24	8.9	100	340	2.4
TDP13	27/05/2020	2200	7.7	0.002	0.085	0.16	0.012	8.9	240	940	1.1
TDP1	26/08/2020	1200	7.4	<0.005	<0.001	0.002	0.013	5.5	130	490	0.7
TDP3	26/08/2020	2600	7.7	<0.005	0.14	<0.001	0.007	9.1	250	1000	0.8
TDP4	26/08/2020	1400	7.4	<0.005	0.004	0.002	0.01	12	130	540	0.9
TDP5	26/08/2020	1300	7.4	<0.005	<0.001	0.002	0.015	7.5	140	520	0.8
TDP6	26/08/2020	1400	7.4	<0.005	<0.001	0.003	0.017	11	140	550	0.9
TDP7	26/08/2020	1300	7.5	<0.005	<0.001	<0.001	0.011	13	120	490	1.1
TDP8	26/08/2020	1300	7.8	<0.005	<0.001	<0.001	0.018	13	110	460	1
TDP9	26/08/2020	1400	7.7	<0.005	<0.001	<0.001	0.017	10	100	510	0.8
TDP10	26/08/2020	1300	7.8	<0.005	0.003	<0.001	0.022	13	110	430	0.8
TDP11	26/08/2020	1600	7.9	<0.005	<0.001	<0.001	0.19	9.2	130	480	2.1
TDP13	26/08/2020	2200	7.6	<0.005	0.089	0.002	0.012	9.4	250	850	0.8
TDP1	27/10/2020										
TDP2	27/10/2020										
TDP3	27/10/2020	2200	7.7	0.002	0.14	<0.001	0.007	9	260	1000	0.6
TDP4	27/10/2020	1200	7.6	0.003	0.003	<0.001	0.01	13	140	570	0.8
TDP5	27/10/2020										
TDP6	27/10/2020	1200	7.4	<0.001	<0.001	<0.001	0.016	12	140	530	0.7
TDP7	27/10/2020	1100	7.5	0.002	<0.001	<0.001	0.011	14	120	490	0.9
TDP8	27/10/2020	1200	7.8	0.002	<0.001	<0.001	0.017	14	120	450	0.8
TDP9	27/10/2020	1100	7.7	0.002	<0.001	<0.001	0.02	13	110	470	0.7
TDP10	27/10/2020	1100	7.8	0.002	0.006	<0.001	0.021	14	110	430	0.7

Bore ID	Date	TDS	pH	Chromium	Cobalt	Copper	Molybdenum	Nitrate	Sulfate	Chloride	Fluoride
		mg/L	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TDP11	27/10/2020	1500	7.8	0.002	<0.001	<0.001	0.078	13	170	600	1.1
TDP12	27/10/2020										
TDP13	27/10/2020	1800	7.6	0.002	0.091	<0.001	0.012	10	250	840	0.6
TDP1	12/01/2021	1300	7.5	<0.001	<0.001	<0.001	0.014	5.3	160	560	0.7
TDP3	12/01/2021	2300	7.7	0.001	0.14	<0.001	0.007	8.5	250	1100	0.7
TDP4	12/01/2021	1300	7.6	0.002	0.003	<0.001	0.01	13	150	590	0.9
TDP5	12/01/2021	1300	7.4	0.003	<0.001	0.001	0.016	7.1	160	570	0.8
TDP6	12/01/2021	1300	7.4	<0.001	<0.001	<0.001	0.017	12	140	560	0.9
TDP7	12/01/2021	1300	7.5	0.001	<0.001	<0.001	0.011	14	120	500	1
TDP8	12/01/2021	1300	7.9	0.002	<0.001	<0.001	0.018	14	120	480	0.9
TDP9	12/01/2021	1300	7.8	0.002	<0.001	<0.001	0.02	13	110	460	0.8
TDP10	12/01/2021	1300	7.8	0.002	0.011	<0.001	0.021	14	120	480	0.7
TDP11	12/01/2021	1500	8	<0.001	<0.001	<0.001	0.21	8.6	120	450	1.9
TDP12	12/01/2021	1800	7.8	<0.001	0.002	0.001	0.043	11	180	700	1
TDP13	12/01/2021	2200	7.6	0.002	0.1	<0.001	0.013	11	250	890	0.6

Note: Yellow cells depict ANZECC water quality trigger values for heavy metals and metalloids in livestock drinking water. Orange cells represent nitrate levels above ANZG 2018