Amendment Report

Application for Works Approval Amendment

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

Works Approval Number	W6265/2019/1
Works Approval Holder	Atlantic Vanadium Pty Ltd
ACN	610 583 090
File Number	DER2019/000145
Premises	Windimurra Vanadium Project Mining tenements: M58/178, M58/279 and M58/280 MOUNT MAGNET WA 6638 As defined by the Premises maps attached to the Revised Works Approval
Date of Report	10 March 2023
Decision	Revised works approval granted

Alana Kidd

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Alana Kidd
MANAGER, RESOURCE INDUSTRIES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

Works Approval W6265/2019/1 is held by Atlantic Vanadium Pty Ltd (Works Approval Holder) for the Windimurra Vanadium Project (the Premises), located approximately 70 km south-east of Mount Magnet.

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 W6265/2019/1 has been granted.

The Revised Works Approval issued as a result of this amendment consolidates and supersedes the existing Works Approval previously granted in relation to the Premises. As part of this amendment package the department has consolidated the works approval by incorporating changes made under Amendment Notice 1.

A summary of the proposed changes as they relate to this Revised Works Approval are detailed in Section 5.1. The department has not undertaken any additional risk assessment of the Premises (outside the scope of this amendment) related to the previous *W6265/2019/1 Decision Report* and *W6265/2019/1 Amendment Notice 1*, both of which will remain on the department's website for future reference and will act as a record of the department's decision making.

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 Amendment summary

On 11 November 2022, the Works Approval Holder submitted an application to the department to amend Works Approval W6265/2019/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Extend the duration of the current works approval (refer to section 2.2.1);
- Modify the definition of environmental commissioning (refer to section 2.2.2);
- Extend the duration of environmental commissioning to 180 calendar days (refer to section 2.2.2);
- Allow time limited operations (TLO) of the temporary wastewater treatment plant (WWTP) (refer to section 2.2.3);
- Amend the maximum capacity for the temporary WWTP (refer to section 2.2.3);
- Amend (previous) condition 15(c) to remove the requirement for the department to notify the Works Approval Holder that the environmental commissioning report required by (previous) condition 13 meets the requirements prior to proceeding with TLO;
- Remove previous condition 20; and
- Amend previous condition 21 that requires the calcine tailings storage facility (CTSF) leachate pond and calcine storage reticulation sump to be drained to test the integrity of the liner.

During this amendment, the department has made administrative changes to update the works approval to the current format – refer to section 5.1.

2.2.1 Extension of expiry date

The Works Approval Holder has requested that the works approval duration be extended by four years (i.e., from 24/03/2023 to 24/03/2027). This was requested to cover potential schedule delays.

Works Approval W6265/2019/1 was issued on 24/03/2020 for activities to support the recommencement of operations at the Premises. *Umwelt 2022* states that "*Recommencement of the Project was delayed to uncertainty associated with COVID-19*."

The department has made the requested change.

2.2.2 Environmental commissioning

The Works Approval Holder has requested that the definitions in works approval W6265/2019/1 are amended to incorporate the following two phases of activities (Umwelt 2022):

1. ***Construction and construction testing phase**, which would comprise the following:*
    a. *Construction of infrastructure.*
    b. *Verification of construction – comprising static checks on unpowered equipment to confirm that the infrastructure has been built according to specification and all required safety systems and interlocks are fully functional. No power circuits are energised, and no mechanical equipment is operated.*
    c. *Non-load testing – comprising test operation of "empty" equipment and facilities without the addition of reagents, ore, water, or compressed air. Equipment is energised to operability and verify conformance with design.*
    d. *Water testing – comprising test operation of equipment and facilities with air or water to verify integrity and stable operation. No reagents or ore are used.*
2. ***Environmental commissioning phase** and time limited operations – comprising:*
    a. *Ore commissioning – testing operation of equipment and facilities with reagents, ore and water*
    b. *Ramp up to operational capacity.*

Umwelt 2022, states "*The definition of environmental commissioning in Works Approval W6265/2019/1 includes "activities undertaken to test equipment integrity and operation". However, the Environmental Compliance Report required to be submitted before environmental commissioning can commence requires certification that each item of infrastructure has no material defects. Integrity testing of equipment needs to be undertaken to inform the engineer certification – which is currently part of the definition of environmental commissioning. Furthermore, the Critical Containment Infrastructure Report requires certification that liner hydraulic conductivity requirements have been met – this also requires activities to test equipment integrity*. "

Works Approval W6265/2019/1 defines the following definitions:

- environmental commissioning: means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.

- time limited operations: refers to the operation of the infrastructure and equipment identified under this works approval that is authorised for that purpose, subject to the relevant conditions.

It should be noted that the *Guideline: Industry Regulation Guide to Licensing* (DWER 2019), states "*Verification through an Environmental Compliance Report is not a test of the performance of the installed works or of any emissions. It is documented confirmation that what has been installed is authorised by the works approval*. "

This request has previously been addressed within *W6262/2019/1 Decision Report* as shown in Table 1 below.

Table 1: Extract from *W6265/2019/1 Decision Report* – Appendix 2

Condition	***Summary of Licence Holder comment***	***DWER response***
Conditions 3, 5, 9, 10 – Works Approval and Decision Report ***Section 10.1***	*It is requested that pre-commissioning, dry commissioning and wet commissioning, as previously described in Section 4.4.3 of Windimurra Vanadium Project Works Approval Application Supporting Documentation – Resubmission Umwelt (2019c), is permitted to be undertaken during the construction phase of the project. These activities are necessary for verification of functioning prior to ore commissioning, and to complete the Critical Containment Infrastructure Audit Compliance Report.* *It would take up to 18 months for the plant to ramp up to design capacity and achieve steady state operation. The complexity of commissioning the Windimurra plant means that a schedule with timeframes against itemised tasks cannot be produced.*	*Environmental commissioning does not mean that the equipment has to be tested to the nominal capacity. It allows specific testing to validate that equipment installed to regulate emissions to the environment, are adequately performing before operation. Partial commissioning can also occur as each piece of infrastructure is commissioned.* *Further information about Environmental Commissioning can be found in DWER Guideline: Industry Regulation Guide to Licensing, Section 4.* *The timeframe for Windimurra Environmental Commissioning is listed on Table 3.* *AVPL can continue to operate within the Works Approval under the Time Limited Operations Phase. Approval will be given for 180 days of Time Limited operation to allow for assessment of the Licence Amendment. Time limited operation is also outlined in DWER's Guide to Licensing.* *It is possible that several licence amendments may be required.*

The department's stance on the above has not changed.

The department has not updated the definition of environmental commissioning or time limited operations; nor included the two phases of activities as requested by the Works Approval Holder.

Conditions 4 and 6 of W6265/2019/1 have however been updated to the current works approval format. Reference to 'no material defects' has been removed from condition 4.

The Works Approval Holder has also requested that the duration of environmental commissioning be extended to 180 calendar days (approximately 6 months).

The department has extended the 'authorised commissioning duration' under this amendment to "*for a period not exceeding 180 calendar days*".

2.2.3 Temporary WWTP

The construction and commissioning of a temporary WWTP has previously been assessed within *W6262/2019/1 Decision Report*. The temporary WWTP was to have a 66 m^3/day production capacity; used for a maximum of six months; and was to be installed adjacent to the existing WWTP at the Premises.

Under this amendment the Works Approval Holder proposes changing the temporary WWTP to a 45 m^3/day unit.

The temporary WWTP will run in parallel with the existing WWTP, with sewage distributed to each system through a balance tank. Each WWTP will run an independent disposal system for treated wastewater, which will be irrigated into two separate sprayfield areas as shown in Figure 1.

The existing Works Approval W6265/2019/1 did not authorise TLO for the temporary WWTP. Under this amendment, the Works Approval Holder has requested that TLO for the temporary WWTP be authorised. Refer to section 3 for the department's risk assessment for TLO of the temporary WWTP.

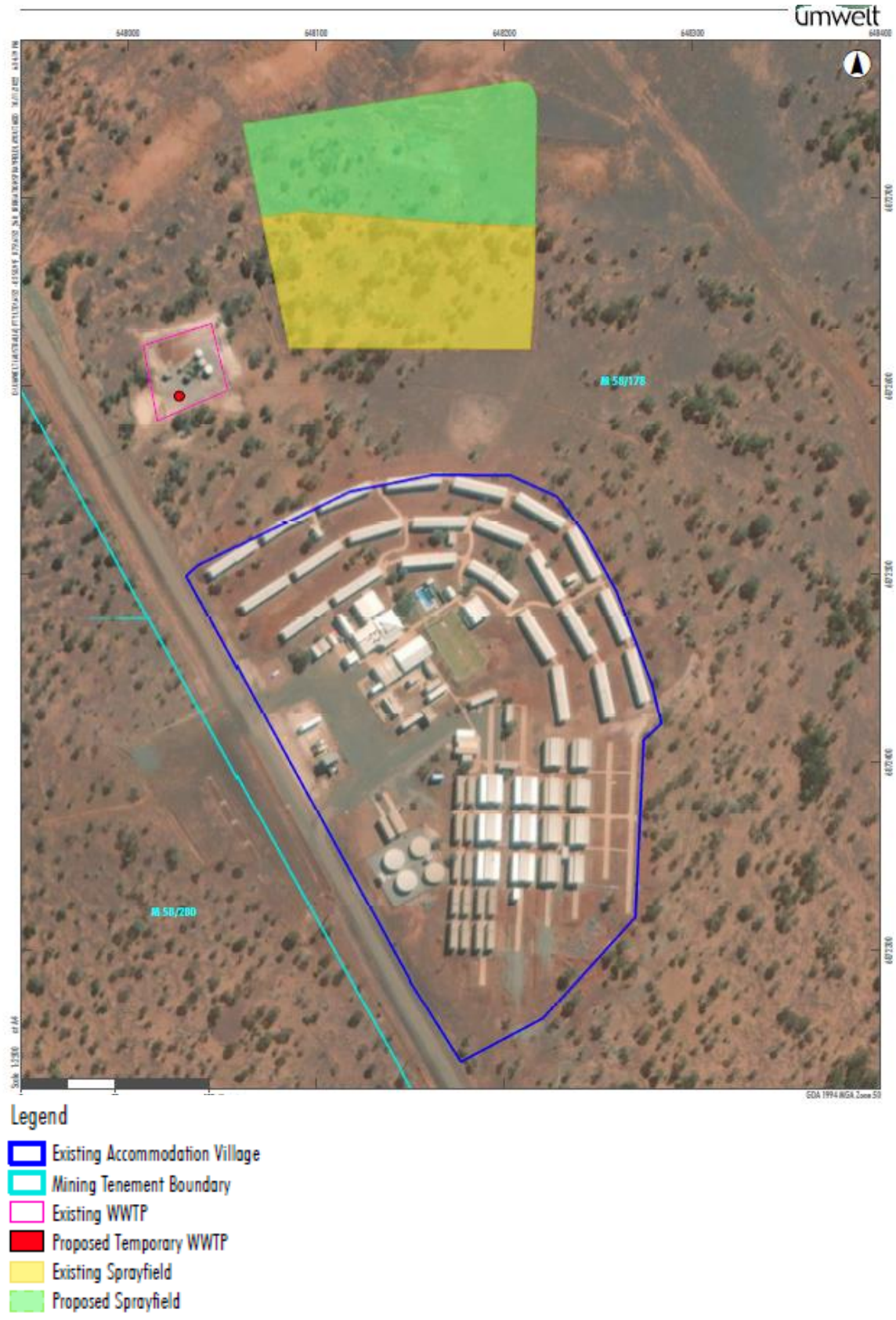

Figure 1: Existing and proposed temporary WWTP and irrigation sprayfield layout

2.2.4 Condition 15(c)

The Works Approval Holder has requested that previous condition 15(c) (now condition 14) remove the requirement for the department to notify the Works Approval Holder that the environmental commissioning report required by previous condition 13 meets the requirements prior to proceeding with TLO.

During this amendment, previous condition 15(c) has been removed based on the following:

- Condition 8 requires a Critical Containment Infrastructure Report to be submitted and the department to notify the Works Approval Holder that this Report meets the requirements of the works approval prior to environmental commissioning commencing for any Critical Containment Infrastructure.
- Condition 12 has been updated to capture the requirement to include the Critical Containment Infrastructure commissioned under Table 4 within an Environmental Commissioning Report.
- As the Critical Containment Infrastructure Report needs to be approved by the department under condition 8(b) prior to commissioning of this infrastructure, it is not necessary that the environmental commissioning report for this infrastructure (now required under condition 12) also need be approved by the department prior to proceeding to TLO.

2.2.5 Condition 20

In the department's original assessment (W6265/2019/1 Decision Report) there was limited and/or lack of data on the expected emissions and rates from the deammoniation kiln, fusion furnace, flacking wheel or packaging plant. Based on this, the following condition was applied to W6265/2019/1:

Condition 20: The works approval holder must submit to the CEO a revised ambient air dispersion model, completed to estimate the ground level concentrations for point source emissions to air from the offgas stack from the deammoniation kiln and the offgas stack from the packaging plant, fusion furnace and flaking wheel. The modelled emissions shall be the same parameters as listed in Table 5 and concentrations averaged over three minutes and one hour periods. Ground level concentrations shall be compared to the criteria in the draft DWER Guideline: Air Emissions. The results of the model shall be submitted to the CEO prior to commissioning commencing.

The Works Approval Holder committing to the following in *W6265/2019/1 Decision Report*:

- Undertake an air quality assessment as part of the detailed design for the project. A screening analysis will be completed for all criteria pollutants and if deemed necessary dispersion modelling will be completed to determine the expected ground level ambient concentrations for both normal and upset operating conditions (Umwelt, 2019).
- A monitoring verification program will be conducted during the commissioning phase to check that the emissions are as per the air quality assessment and that gas cleaning systems are functioning as designed (Umwelt, 2019).

The Works Approval Holder commissioned Environmental Technologies & Analytics Pty Ltd to undertake an assessment of emissions from the project, to determine the potential air quality impacts upon the surrounding area.

The scope of the modelling assessment is shown in Table 2.

Table 2: Scope of modelling assessment

Modelled meteorological period	1 January to 31 December 2021
Model selection	AERMET/AERMOD model suite
Key Pollutants	• Oxides of Nitrogen (NOX) from both the Power Station and Processing Plant • Ammonia (NH3) from the Processing Plant. • Hydrogen Chlorine (HCl) from the Processing Plant. • Particulates (as TSP) from the Processing Plant. As the available particulate emission estimates are not available in the sub-fractions (PM_{10} and $PM_{2.5}$) the modelling takes a conservative approach and assumes that the emissions of TSP are also equivalent to the emissions of PM_{10} and $PM_{2.5}$.
Meteorological data	The site-specific meteorological dataset was generated using a combination of onsite observations, TAPM upper air data and cloud data from the BoM Mt Magnet Aerodrome AWS
Project Emissions	Emissions from the Project under both normal operating and upset conditions formed the basis of the modelling assessment. The emissions for the project were supplied by AVPL.
Sensitive Receptors	Although the DWER Guidance Statement for Risk Assessment specifically excludes the consideration of on-site project related receptors this study has taken a conservative approach and identified the accommodation camp as a sensitive receptor.

The pollutants of concern were identified by the Works Approval Holder based on the potential sources of air emission from the operations. "*Carbon monoxide and sulphur dioxide were not relevant to evaluate as there are no identified sources of these emissions*."

The draft *Guideline: Air emissions* (DWER 2019) requires modelled pollutant concentrations to be reported as the 99.9th percentile for an averaging period of one hour, or as the 100th percentile (highest value) for averaging periods greater than one hour.

The modelled concentrations of the relevant pollutants are shown in Table 3. *Umwelt 2022* states the following:

- These results are the maximum (highest value) predicted at the accommodation camp (proxy sensitive receptor), except average values as indicated in the table.
- The modelled results have been compared to the *National Environment Protection (Ambient Air Quality) Measure* (NEPC 2021), the *draft Guideline: Air emissions* (DWER 2019); and *draft Guideline: Dust emissions* (DWER 2021).
- Upset conditions occur only for short periods of time, so they are not presented as an annual average.
- Ammonia modelled for a three-minute averaging period is provided to comply with the requirements specified in previous condition 20 and Table 5 of W6265/2019/1. There is no relevant standard as the previously used standard has been superseded.
- The PM_{10} and $PM_{2.5}$ proportion of the total particulate emissions were not able to be estimated. Therefore, a conservative approach was taken, and the TSP concentration was assumed to also represent PM_{10} and $PM_{2.5}$. The modelled particulate emissions are very low and would not trigger either type of pollutant guideline value.

Table 3: Summary of modelled results predicted at the accommodation camp

Pollutant	Averaging Period	Concentration Statistic	Normal Operations		Upset Conditions		Maximum Concentration Standard	Source
			µg/m³	% of standard	µg/m³	% of standard		
Nitrogen dioxide	1 hour	Maximum	18.2	12.1%	36.2	24.0%	151 µg/m³ [1]	NEPC 2021
	Annual	Average	0.9	3.2%	N/A	N/A	28 µg/m³ [1]	NEPC 2021
Ammonia	3 minutes	Maximum	14.3	N/A	570	N/A	N/A	N/A
	1 hour	Maximum	7.8	2.4%	313	94.8%	330 µg/m³ [1]	draft *Guideline: Air emissions (*DWER 2019)
Hydrogen chloride	1 hour	Maximum	0.4	0.3%	3.8	2.7%	140 µg/m³ [1]	draft *Guideline: Air emissions (*DWER 2019)
Total suspended particulates	24 hours	Maximum	2.7	3.3%	N/A	N/A	82 µg/m³ [1]	draft *Guideline: Air emissions (*DWER 2019)
Particulate as PM_{10}	24 hours	Maximum	2.7	5.9%	N/A	N/A	46 µg/m³ [1]	NEPC 2021
	Annual	Average	0.4	1.7%	N/A	N/A	23 µg/m³ [1]	
Particulate as $PM_{2.5}$	24 hours	Maximum	2.7	11.7%	N/A	N/A	23 µg/m³ [1]	NEPC 2021
	Annual	Average	0.4	5.0%	N/A	N/A	8 µg/m³ [1]	
Vanadium	24 hours	Maximum	0.16	17.4%	N/A	N/A	0.92 µg/m³ [1]	draft *Guideline: Air emissions (*DWER 2019)
Dust deposition	Month	Maximum	0.7 g/m²/month	35.0%	N/A	N/A	2 g/m²/month	draft *Guideline: Dust emissions (*DWER 2021)

Note 1: Concentrations referenced at 25°C

All modelled air emissions at the accommodation camp remain below the relevant concentration standards, including during upset conditions.

In accordance with condition 10 of W6265/2019/1 the Works Approval Holder is required to undertake three individual stack emissions testing during the commissioning period to verify compliance with design criteria, which may further validate the data presented in Table 3.

During this amendment, the department has removed previous condition 20.

2.2.6 Condition 21

In the department's original assessment (W6265/2019/1 Decision Report) it is stated "*Although the facility is lined with a 1mm HDPE liner and the extended section included as part of this Works Approval will be lined with a dual GCL / 1.5 mm HDPE liner, the groundwater monitoring data in the vicinity of the CTSF is inconsistent with the assertion that the existing liner is providing an effective barrier. The CTSF monitoring bores have recorded increased concentrations of metals (selenium and vanadium) and salts (calcium, chloride, magnesium, sodium and sulphate) compared to baseline levels*."

Based on this, the following condition was applied to W6265/2019/1:

Condition 21: Prior to commissioning the CTSF, the CTSF leachate pond and CTSF calcine storage reticulation sump are to be drained and the integrity of the existing HDPE liner tested. Any holes or tears are to be repaired and a report assessing the integrity of the liner submitted to the CEO.

The Works Approval Holder is requesting that condition 21 be amended to remove reference to draining the ponds. *Umwelt 2022* states that the Works Approval Holder "*has obtained a quote for liner integrity testing using electrical leak testing, which does not require the ponds to be drained*."

The two methods to be used for the electrical leak test are:

1. Dipole Testing Method (ASTM D7007) which will be utilised on the ponds with water to a depth of 700 – 800 mm and saturated solids; and
2. The Water Lance Method (ASTM D7703) which will be used for the liner areas not covered by water, such as batter slopes.

The department has updated previous condition 21 (now condition 19) to remove reference to the requirement that the CTSF leachate pond and CTSF calcine storage reticulation sump need to be drained. The Works Approval Holder will be required to repair any holes or tears detected in the liner in accordance with the intent of the original condition to ensure risk is appropriately managed.

2.3 Part IV of the EP Act

The following Part IV approvals exist for the Premises:

- Ministerial Statement (MS) 481 includes the following, but not limited to:
    - Total ore extraction of 4,500,000 tonnes per annum (tpa);
    - Total production capacity (vanadium pentoxide flake (V_2O_5) and ferrovanadium) of 10,515 tpa;
    - 176,000 tpa of carbon dioxide emissions;
    - 3,200,000 tpa of inert non-magnetic tailings; and
    - 1,040,000 tpa calcine tailings.
- MS 565: Change to topic 4 of condition 4-1 of MS 481 where limits on nitrous oxides are to be regulated under Part V of the EP Act.

- MS 773: Land clearing (total area of disturbance not more than 815 ha in total) and mining below the base of weathering (depth of pit not more than 150 m).

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 operation which have been considered in this Amendment Report are detailed in Table 4 below. Table 4 also details the proposed control measures the Works Approval Holder has proposed to assist in controlling these emissions, where necessary.

Table 4: Works Approval Holder controls

Emission	Sources	Potential pathways	Proposed controls
TLO and operation of the temporary WWTP			
Sewage (treated, partially treated, untreated)	Rupture of sewage pipes and overtopping of holding tanks	Direct discharge	• Located 100 m from the ephemeral floodway. • Situated above ground on skids or a trailer or similar. • Include high level switches that automatically shut off flow when a tank is full. • Include an alarm system which includes audible alarms and flashing lights for high tank levels and pump faults. • Sized so that recirculating anoxic buffer tanks is only 40% full in typical operating conditions. The total tank volume is likely to be approximately 32 m^3, providing approximately 0.25 days contingency storage if operated at peak capacity. • Daily inspections undertaken to check for leaks, activated alarms and tank levels. • Sludge removed and disposed of by a suitably licensed contractor.
Nutrient rich water with pathogens	Irrigation of treated effluent to the irrigation sprayfield	Direct discharge	• Expected standard for effluent discharge are: ○ Biochemical Oxygen Demand - <20 mg/L;

Emission	Sources	Potential pathways	Proposed controls
			○ Total Suspended Solids - <30 mg/L; ○ Total Nitrogen - <20 mg/L; and ○ Total Phosphorus - <8 mg/L. • Located at least 40 m away from watercourse. • Sized at 0.9 ha. • Fenced and sign posted.
Contaminated stormwater	Rainfall ingress	Overland flow	• Area down gradient of the temporary WWTP contoured to direct any leaks from the WWTP to a nearby old borrow pit. • Ground level in the sprayfield at least 1 m above the predicted water level in a 1 in 100 year, 72-hour flood event.

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), 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 5 below provides a summary of potential environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental siting* (DWER 2020)).

Table 5: Environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Priority Ecological Community (PEC)	Priority 1 PEC – Windimurra calcrete groundwater assemblage type on Murchison palaeodrainage on Windimurra Station located within the premises boundary.
Threatened/Priority Flora:	The Priority 4 *Grevillea inconspicua* and Priority 1 *Ptilotus procumbens* have been recorded within the premises boundary.
Windimurra Pastoral Station	The premises is located within the pastoral lease. Windimurra Homestead no longer exists, and the pastoral lease was acquired by the neighbouring Challa station (approximately 22.5 km west of the premises). The local area has a beneficial use as pastoral land for stock animals, which are not restricted to exclusively being near the homestead.
Rights in Water and Irrigation Act 1914	The premises is located within the Proclaimed East Murchison Groundwater Area.

Environmental receptors	Distance from prescribed activity
Groundwater	Depth to groundwater at the accommodation village and sprayfield area is 20-25 m below ground level (mbgl).
Drinking water	The closest potable drinking water bore for the project is approximately 4.6 km away.
	The closest bore (Stag Well) for cattle drinking water is approximately 6.5 km northeast of premises.
Surface water: Two non-perennial lakes	Ephemeral watercourse located approximately 40 – 70 m away from the existing sprayfield.
Aboriginal and other heritage sites: ID 15746, 4460, 4459, 18214	Located within premises boundary.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change 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 Works Approval Holder 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 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 6.

The Revised Works Approval W6265/2019/1 that accompanies this Amendment Report authorises time-limited operations. The conditions in the Revised Works Approval have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

An amendment to licence L8314/2008/3 is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the operation of the Premises. A risk assessment for the temporary WWTP operational phase has been included in this Amendment Report, however licence conditions will not be finalised until the department assesses the licence application.

Table 6. Risk assessment of potential emissions and discharges from the Premises during time-limited operations and operation

Risk Event					Risk rating[1] C = consequence L = likelihood	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**				
TLO and operation								
Temporary WWTP	Sewage (treated, partially treated, untreated)	Rupture of pipes / overtopping of holding tanks resulting in sewage discharged to land	Vegetation PEC Soil contamination	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 9 Condition 16 Conditions on existing licence relating to notification of any failure or malfunction of any pollution control equipment	N/A
	Nutrient rich water with pathogens	Direct discharge from planned discharges to sprayfield resulting in nutrient loading	Vegetation in sprayfield area PEC	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 9 Condition 16 Condition on existing licence relating to emissions to land and the monitoring of these emissions	N/A
	Contaminated stormwater	Rainfall ingress into the WWTP and sprayfield becoming contaminated	Ephemeral watercourse PEC	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	*Environmental Protection (Unauthorised Discharges) Regulations 2004* apply.	N/A

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

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. Consultation

Table 7 provides a summary of the consultation undertaken by the department.

Table 7: Consultation

Consultation method	Comments received	Department response
Works Approval Holder was provided with draft amendment on 07/02/2023	The Works Approval Holder responded on 27/02/2023 (Umwelt 2023) Refer to Appendix 1	Refer to Appendix 1

5. 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.

5.1 Summary of amendments

Table 8 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 8: Summary of works approval amendments

Condition no.	Proposed amendments
Registered business address	Updated as per the Application Form.
Duration	Expiry date changed from 24/03/2023 to 24/03/2027.
Prescribed premises category description and assessed production / design capacity	Category 54 has been removed and replaced with category 85. The temporary WWTP assessed under this Works Approval has a design capacity of 45 m^3/day. Once the existing licence L8314/2008/3 is amended to include the temporary WWTP then the category will change to category 54 to incorporate both the temporary and existing WWTPs.
Works approval history	Included as per the current format for works approvals.
Interpretation	Administrative changes to align with the current format for works approvals.
Works approval conditions	Included as per the current format for works approvals.
Condition 1 Table 1 for Refinery • Deammoniation kiln • Fusion furnace • Flaking wheel • Packaging plant	Reference to "*Bunding to be constructed as per the requirements of AS1940:2017*" deleted in accordance with W6265/2019/1 Amendment Notice 1.

Condition no.	Proposed amendments
Condition 1 Table 1 for the temporary WWTP and additional irrigation spray field	Updated as per sections 2.2.3 and 3 of this Amendment Report which outlines the process and assesses the risk of the temporary WWTP.
Conditions 3, 4, 5 and 6	Administrative changes to align with the current format for works approvals.
Condition 7	Administrative changes to align with the current format for works approvals.
Condition 8	Updated as per the current format for works approvals. This condition now outlines the requirements prior to commissioning the Critical Containment Infrastructure i.e.: • the Critical Containment Report required by condition 5 has to be submitted; and • the CEO has notified the works approval holder that this Report meets the requirements of the works approval.
Condition 9	Updated as per the current format for works approvals. The authorised commissioning duration for both Tables 3 and 4 infrastructure has been changed from “for a period not exceeding 60 calendar days” to “for a period not exceeding 180 calendar days” as per Works Approval Holder’s request under this amendment. Commissioning requirements for the temporary WWTP have also been included. Previous condition 10 has been removed and is now covered under condition 9.
Previous condition 10	Previous condition 10 has been removed. Reference to Table 4 for the environmental commissioning requirements for the Critical Containment Infrastructure is now covered by condition 9.
Previous condition 13 (now condition 12)	Updated to ensure that the Critical Containment Infrastructure commissioned under Table 4 is included within an Environmental Commissioning Report.
Previous condition 14 (now condition 13)	Administrative changes to align with the current format for works approvals. Updated to ensure the amount of wastewater processed through the temporary WWTP is captured as well as the treated sewage results against the expected output emission standards.
Previous condition 15 (now condition 14)	Updated as per the current format for works approvals. This condition previously only allowed TLO of the processing plant infrastructure. Reference to the processing plant infrastructure has been removed to allow an item of infrastructure identified in conditions 1 and 2 to commence TLO on the assumption that condition 14(a) and 14(b) are met. Previous condition 15(c) has been removed – refer to section 2.2.4 of

Condition no.	Proposed amendments
	this Amendment Report.
Previous condition 17 (now condition 15)	Administrative changes to align with the current format for works approvals.
Condition 16	Updated to allow TLO of the temporary WWTP with specified requirements to be met.
Previous condition 19 (now condition 18)	Updated to ensure the amount of wastewater processed through the temporary WWTP is captured.
Previous condition 20	Removed, refer to section 2.2.5 of this Amendment Report.
Previous condition 21 (now condition 19)	Updated, refer to section 2.2.6 of this Amendment Report.
Previous conditions 11, 12, 18, 22, 23, 24 and 25	Updated in line with new numbering format (now conditions 10, 11, 17, 20, 21, 22 and 23 respectively).
Previous condition 26 (now condition 24)	Administrative changes to align with the current format for works approvals.
Condition 25	Included as per the current format for works approvals.
Previous condition 27	Removed as per the current format for works approvals.
Definitions	Definitions removed as applicable. Definition for WWTP included.
Schedule 1: Maps	Administrative changes to align with the current format for works approvals. Inclusion of 'Infrastructure' heading. Previous Figure 13 replaced with a new figure depicting the proposed temporary WWTP and proposed sprayfield.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2019, *Guideline: Industry Regulation Guide to Licensing*, Joondalup, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
5. DWER 2019, draft *Guideline: Air emissions*, Joondalup, Western Australia.
6. DWER 2021, draft *Guideline: Dust emissions*, Joondalup, Western Australia.
7. Licence L8314/2008/3 available at: Search - Department of Water and Environmental Regulation (der.wa.gov.au).
8. National Environment Protection Council (NEPC) 2021, *National Environment Protection (Ambient Air Quality) Measure*, Canberra, ACT.
9. Umwelt (Australia) Pty Ltd (Umwelt) 2019, *Windimurra Vanadium Project Response to*

Works Approval Application Request for Further Information, November 2019 (DWERDT219952).

10. Umwelt 2022, *Windimurra Vanadium Project Works Approval (W6265/2019/1) Amendment Application Supporting Documentation* (Report No. 6152/R75), November 2022 (A2138470).
11. Umwelt 2023, *Briefing Note – Subject : Draft amendment to Works Approval W6265/2019/1*, 27 February 2023 (DWERDT741687).
12. W6265/2019/1 Amendment Notice 1 available at: Search - Department of Water and Environmental Regulation (der.wa.gov.au).
13. W6265/2019/1 Decision Report available at: IR-T04 Decision Report Template (der.wa.gov.au).
14. Works Approval W6265/2019/1 available at: Search - Department of Water and Environmental Regulation (der.wa.gov.au).

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
Prescribed premises category description	The Works Approval Holder has requested confirmation that the prescribed premises categories authorised under existing Licence L8314/2008/3 (categories 64 and 85) continue to apply in addition to the category 63 and 85 authorised under this works approval.	The existing Licence L8314/2008/3 authorises the operation of category 5, 7, 44, 64, 84 and 85 activities with conditions. As stated within this Amendment Report, the Works Approval Holder will be required to amend Licence L8314/2008/3 to authorise emissions associated with the operation of the Premises / infrastructure assessed under this works approval. During that licence amendment and on the provision of submission of compliance reports, category 63 will be included on the licence and category 85 will convert to category 54 (incorporating both the temporary (45 m^3/day) and existing (62 m^3/day) WWTPs). There is no change to Licence L8314/2008/3 by the granting of this revised works approval. Any conditions and requirements within Licence L8314/2008/3 remain in effect.
Condition 1 Table 1 for Crushing, milling, beneficiation circuit	The Works Approval Holder has requested the removal of the equipment size as shown in strikethrough below: ~~8 MW~~ SAG Mill ~~2.5 MW~~ Regrind Ball Mill The Works Approval Holder has stated that the exact equipment has not been procured and it likely there will be small changes to equipment sizing that won't change the overall air emissions	The department has removed reference to the size of the SAG Mill and Regrind Ball Mill. Under this works approval, category 5 activities have been assessed at a design capacity of 4,500,000 tpa.

Condition	Summary of Works Approval Holder's comment	Department's response
	profile.	
	The Works Approval Holder has also requested the removal of previous Figures 3 and 5. Stating that these figures include dimensions and details of equipment that might be different from what is procured.	The department has removed previous Figures 3 and 5.
Condition 1 Table 1 for Refinery: • Deammoniation kiln • Fusion furnace • Flaking wheel • Packaging plant	The Works Approval Holder has requested the removal of previous Figure 10. Stating that Figure 10 has been superceded by Figure 11 and that these two figures show two different iterations and conflict with each other.	The department has removed previous Figure 10.
Condition 1 Table 1 for Refinery: • Two stage offgas scrubbing system	The Works Approval Holder has requested the following changes to the two stage offgas scrubbing system. The deletion of text is shown in strikethrough and inclusion of text is shown in bold underline below: Infrastructure - Refinery: Two stage offgas scrubbing system (**baghouse** ~~venturi scrubber~~ followed by dilute acid scrubber) Design and construction requirements – • Capture all emission from the deammoniation kiln **except burner combustion gases** • **Baghouse** ~~Scrubbers~~ to be designed to 99.9% efficiency • pH measurement and control on ~~both~~ scrubber~~s~~ • ~~Stack height and design criteria to meet the particulate emissions concentrations of 50 mg/m3 and an ammonia concentration of 0.6 mg/m3 over a 3 minute average~~	The department has made the requested changes based on the following: • The Works Approval Holder is required to undertake three (3) individual tests during the commissioning period for the two stage offgas scrubber system from Deammoniation Kin at the exit stack post scrubbing. • These monitoring results are required to be submitted to the department within the Commissioning Report as stipulated by condition 12. • The department will review the Commissioning Report. • *W6265/2019/1 Decision Report* Table 32 under Resulting Regulatory Controls for the Licence states "*Ongoing monitoring of emissions will be required by the licence; frequency and parameters to be determined following*

Condition	Summary of Works Approval Holder's comment	Department's response
	The Works Approval Holder has stated the following: • *Text refers to a previous iteration of the proposed air emission controls, as of 2019 when the works approval application was submitted.* • *The proposed changes correspond to the updated air emissions controls, which were modelled in the Air Quality Assessment submitted with the Works Approval amendment.* • *Reference to stack height and design criteria for air emissions to be removed. This was a commitment for control of air emissions before the air modelling was undertaken.*	*commissioning stack testing program*."
Condition 1 Table 1 for Refinery: • Baghouse filter system	The Works Approval Holder has requested the following changes for the baghouse filter system. The deletion of text is shown in strikethrough and inclusion of text is shown in bold underline below: • Capture all **particulate** emissions from the fusion furnace, flaking wheel and packaging plant • **Baghouse** ~~Scrubbers~~ to be designed for 99.9% efficiency The Works Approval Holder has stated the following: • *Text refers to a previous iteration of the proposed air emission controls, as of 2019 when the works approval application was submitted.* • *The proposed changes correspond to the updated air emissions controls, which were modelled in the Air Quality Assessment submitted with the Works Approval amendment.*	The department has made the requested changes.
Condition 1 Table 1 for the Temporary	The Works Approval Holder has requested that "*Flow meters installed to monitor flow at each end of the line*" is deleted.	The department has removed this requirement. Noting that the under the Licence the volume of wastewater discharged to the environment (i.e.

Condition	Summary of Works Approval Holder's comment	Department's response
WWTP	The Works Approval Holder has stated the following: • That flow meters at each end of the line was a proposed control in the works approval amendment application, relating to the risk of rupture of raw sewage pipes for the temporary WWTP. • Upon closer review, it has been clarified that the only new pipe transporting raw sewage to the temporary WWTP will be from a holding tank/sump within the current WWTP enclosure. The pipe would be no more than 10 m long. • Having differential flow meters at each end of the pipe to detect changes in flow rate would not be viable.	sprayfield) will need to be monitored and recorded.
Condition 2 Table 2 for the CTSF extension area	The Works Approval Holder has requested the deletion of the following text: *Process control for return pumps for leachate pond and calcine storage reticulation sump operation interlocked to levels within each sump. Pumps able to operate automatically to return leachate to process plant* The Works Approval Holder has stated the following: • The calcine storage reticulation sump is an existing lined facility and will not be constructed. • The leachate pond and the calcine storage reticulation sump are both already fitted with pumps and level controls that can automatically return leachate to the process plant.	The department has made the requested change. Noting that condition 9, Table 4 states "*During commissioning, the pumping system for transferring CTSF leachate to the processing plant via the calcine storage reticulation sump shall be tested and provision made for automatic pump operation activated by level controls for both the CTSF leachate pond and CTSF calcine storage reticulation sump."*
Condition 2 Table 2 for the Non-magnetic TSF (NMTSF) Cell 1	The Works Approval Holder has requested the following changes for the NMTSF. The deletion of text is shown in strikethrough below: Freeboard: • Total freeboard of 0.5 m	The department has removed the heading "freeboard" to avoid confusion, while retaining the total freeboard of 0.5 m. The department has retained the Internal embankment between southern end of NMTSF (Cell 1) which was previously assessed in the *W6265/2019/1 Decision*

Condition	Summary of Works Approval Holder's comment	Department's response
	• ~~Internal embankment between southern end of NMTSF (Cell 1)~~ The Works Approval has stated "*It is not clear what the reference to "internal embankment between southern end of NMTSF (Cell 1)" means. It seems to indicate this is where freeboard should be measured. Freeboard does not typically have a specific location it is measured and would apply through the whole facility*."	*Report.* The request to remove this internal embankment requirement was not part of this works approval amendment application and has not been risk assessed. The Works Approval Holder will need to request this under another works approval amendment, if required.
Other requests	**Summary of Works Approval Holder's comment**	**Department's response**
Add power station changes	*Umwelt 2023* states that the Works Approval Holder is proposing changes to the power station and requests the proposed changes to the power station are included in the works approval.	The department has not assessed the proposed changes to the power station under this works approval. This works approval does not contain construction or operational requirements for the power station. The power station is authorised for operation under existing Licence L8314/2008/3 for category 84 (electric power generation). Any changes proposed to the power station will need to be assessed under a licence amendment, which will need to be submitted separate to this works approval amendment.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY					
Application type					
Amendment to works approval	☒	Current works approval number:	W6265/2019/1		
Amendment to licence	☐	Current licence number:			
		Relevant works approval number:		N/A	☐
Registration	☐	Current works approval number:		None	☐
Date application received		11/11/2022			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Atlantic Vanadium Pty Ltd			
Premises name		Windimurra Vanadium Project			
Premises location		Lot 120 on plan 220039 M58/178, M58/279, and M58/280 at Mount Magnet, Western Australia, 6638			
Local Government Authority		Shire of Mount Magnet and Shire of Sandstone			
Application documents					
HPCM file reference number:		DER2019/000145			
Key application documents (additional to application form):		Works Approval Amendment Supporting Document Works Approval Amendment Application Form			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Works approval amendment • Extend the expiry date of the works approval to March 2027. • Extend the duration of environmental commissioning to 180 calendar days. • Modify the definition of environmental commissioning to account for integrity testing timeline of infrastructure. • Allow TLO of a temporary WWTP. • Amend condition 15(c) to remove requirement for Work Holder to wait until environmental commissioning compliance has been confirmed to start TLO. • Remove condition 20 that requires a revised air dispersion model be completed and submitted prior commencing commissioning. • Amend condition 21 to not require draining of the CTSF pond and sump.			

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed 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	4,500,000 tonnes per annum	N/A
Category 7: Vat or in situ leaching of metal	1,200,000 tonnes per annum	N/A
Category 44: Metal smelting or refining	10,515 tonnes per annum	N/A
Category 63: Class I inert landfill site	5,000m^3	N/A
Category 54: Sewage facility	128 m^3 /day	45 m^3/day temporary WWTP assessed under this Amendment Report

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 ☐ No ☒	Referral decision No: N/A Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☒ No ☐	Ministerial statement No: 481, 565 and 773 EPA Report No: Bulletin 887, Bulletin 1008, and Bulletin 1288
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☒ Expiry: M58/178 – 11/07/2033 M58/279 and M58/280 – 03/06/2041 Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? The premises occurs on Mining Act Tenure

Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Licence/permit No: GWL161706(4) & GWL161714(4)
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	Name: East Murchison Groundwater Area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☒ Regional office: Mid-West Gascoyne
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☒
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	*Environmental Protection (Noise) Regulations 1997* *Environmental Protection (Unauthorised Discharges) Regulations 2004* *Mines Safety and Inspection Regulations 1995*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	N/A
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	N/A
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: Contaminated – remediation required (C–RR) CSS Site ID: 3115 Date of classification: 22 August 2019