# Application for Licence

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

| | |
|---|---|
| **Licence Number** | L9357/2022/1 |
| **Applicant** | MicroZinc Pty Ltd |
| **ACN** | 616 959 936 |
| **File number** | DER2021/000562 |
| **Premises** | Manna Soil Solutions<br>Lot 77 Wellard Road<br>LEDA WA 6170<br>Legal description -<br>Part of Lot 77 on Diagram 68183<br>As defined by the coordinates in Schedule 2 of the licence |
| **Date of report** | 29 May 2023 |
| **Decision** | Licence granted |

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# 1. Scope of assessment

## 1.1 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.

## 1.2 Application summary

On 15 August 2022, the applicant submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

The application is for the operation of a chemical manufacturing and liquid waste treatment facility at the premises, located in the suburb of Leda approximately 2.5 kilometres southwest of the city center. The facility was constructed under works approval W6293/2019/1, which was issued July 2020.

The premises relates to the categories and assessed design capacity under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in licence L9357/2021/1. 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 licence L9357/2022/1.

## 1.3 Background

Microzinc Pty Ltd (the applicant) is seeking to operate a nutrient recovery facility and animal fodder production area located within part of Lot 77 on Diagram 68183 Wellard Road, Leda. The lot is owned by Manna Enterprises Pty Ltd with a formal lease agreement in place. The prescribed premises is comprised of a nutrient recovery (chemical manufacturing and liquid waste processing) area and a vetiver grass propagation area connected by a pipeline corridor. The facility is in the suburb of Leda, within the City of Kwinana, approximately 2.5 kilometres southwest from the city centre and three kilometres to the east of the Kwinana Industrial Area.

Construction and time-limited operations of the facility were authorised under works approval W6293/2019/1, issued on 31 July 2020. The works approval was subsequently amended on 24 January 2022 to authorise an extension to time limited operations. DWER site visits in 2021 and 2022 identified a number of environmental and works approval compliance concerns (as outlined in Section 3.3.1) with the facility ceasing operations following the expiry of the time limited operations period in July 2022. The identified areas of concern included the installation and operation of infrastructure not in adherence with works approval conditions, and concerns relating to inappropriate waste acceptance, storage and stockpiling. This licence application included the submission of a final updated Environmental Compliance Report and associated documentation which included variations to the infrastructure specifications and proposed operations. The department has reviewed the documentation provided and considers the majority of the infrastructure installed in compliance with the specifications of the works approval. The justifications provided for the reported deviations to the infrastructure or proposed operations were deemed to be acceptable and any impacts to the risk profile of the premises have been considered within the risk assessment for this licence application. An assessment of the operator and overview of compliance history has been included in Section 3.3.1.

# 2. Overview of premises

## 2.1 Operational aspects (from application)

The applicant has developed methods to treat galvanizing waste which to recovers valuable zinc and iron salts as manufactured products and diverts a portion of industrial galvanizing waste from landfill. The process provides micronutrients in a form that can be offered in most markets,

as the salts are already soluble and available for application with dilution. The galvanising industry in Western Australia uses hydrochloric acid to remove iron scale from steel products prior to coating the steel with a thin layer of molten zinc metal. This process is called pickling. The pickling process also removes zinc metal. Consequently, iron (II) and zinc (II) dissolve into the hydrochloric acid solution (pickle liquor), resulting in the pickle liquor slowly losing the capacity to remove iron scale until it decreases in efficiency to a point where it is referred to as spent pickle liquor (SPL). Historically, SPL was treated by adjusting pH to precipitate the iron and zinc as insoluble hydroxides with absorbent material such as saw dust used for solidification of the saline liquid before disposal to landfill.

The applicant also proposes to treat low nutrient level industrial liquid wastes that will be received onsite as saline solutions. The treatment of these solutions includes pH adjustment (if necessary) and separation of insoluble salts through an onsite RO unit. Whilst the majority of the produced permeate water is reused in the nutrient recovery process, the applicant also intends to transfer some treated liquids to an on-site aboveground vetiver grass propagation system to provide a water source for the grass propagation. Harvested vetiver grass can be sold for use as animal fodder and in the production of essential oils.

The applicant has detailed four discrete processes occurring on the premises.

**'Process 1'** is the phase separation of iron and zinc arising from galvanising SPL within dedicated above ground process tanks. The recovered liquid will be sold, as is, into the market.

The SPL treatment processes developed by the applicant allow the recovery of four product streams, by separating the zinc and iron content of the SPL:

- Zinc chloride ($ZnCl_2.2H_2O$) is separated from iron chloride and precipitated from the solution to be recovered for sale into the agriculture industry.
- Iron chloride ($FeCl_2.4H_2O$). Ferrous chloride solution is subsequently reacted with sulfuric acid to generate ferrous sulfate, which is stabilised for disposal or recovered for sale into the agriculture industry.
- Hydrochloric acid (20% HCl) is regenerated.
- Calcium chloride ($CaCl_2.2H_2O$) is collected for use in the HCl acid regeneration process.

When this phase separation process is unavailable (e.g. during infrastructure maintenance periods), the SPL liquid will be stabilised (pH treated and solidified) for disposal at an authorised landfill facility. This is the industry standard treatment method for SPL.

**'Process 2'** involves the receipt, storage, and processing of various controlled wastes (mainly acids and sodium hydroxide) for use as reagents in Processes 1 and 3.

**'Process 3'** involves the receival and treatment of various industrial liquid wastes and may include pH adjustment and separation of insoluble salts through reverse osmosis. Permeate water produced is used in both Process 1 and Process 4.

**'Process 4'** involves vetiver grass propagation, growth and harvesting using the treated wastewater generated from liquid waste treatment (Process 3).

Operational aspects of the processes are detailed below and summarised in Figure 1. Maps showing the layout and location of all infrastructure are provided in Schedule 1 of licence L9357/2021/1.

A maximum of 4700kL of liquid wastes are anticipated to be received and processed on-site per year. Up to 2880kL of this liquid waste will comprise of SPL and the remainder will be low saline liquid wastes. No more than 150kL of unprocessed wastes will be stored at the facility at any one time. In year one of operations, this will require four deliveries every week; deliveries would increase to three per day if operating at full capacity.

A full summary of process inputs and outputs (reagents, products and waste) is provided in Appendix 1.

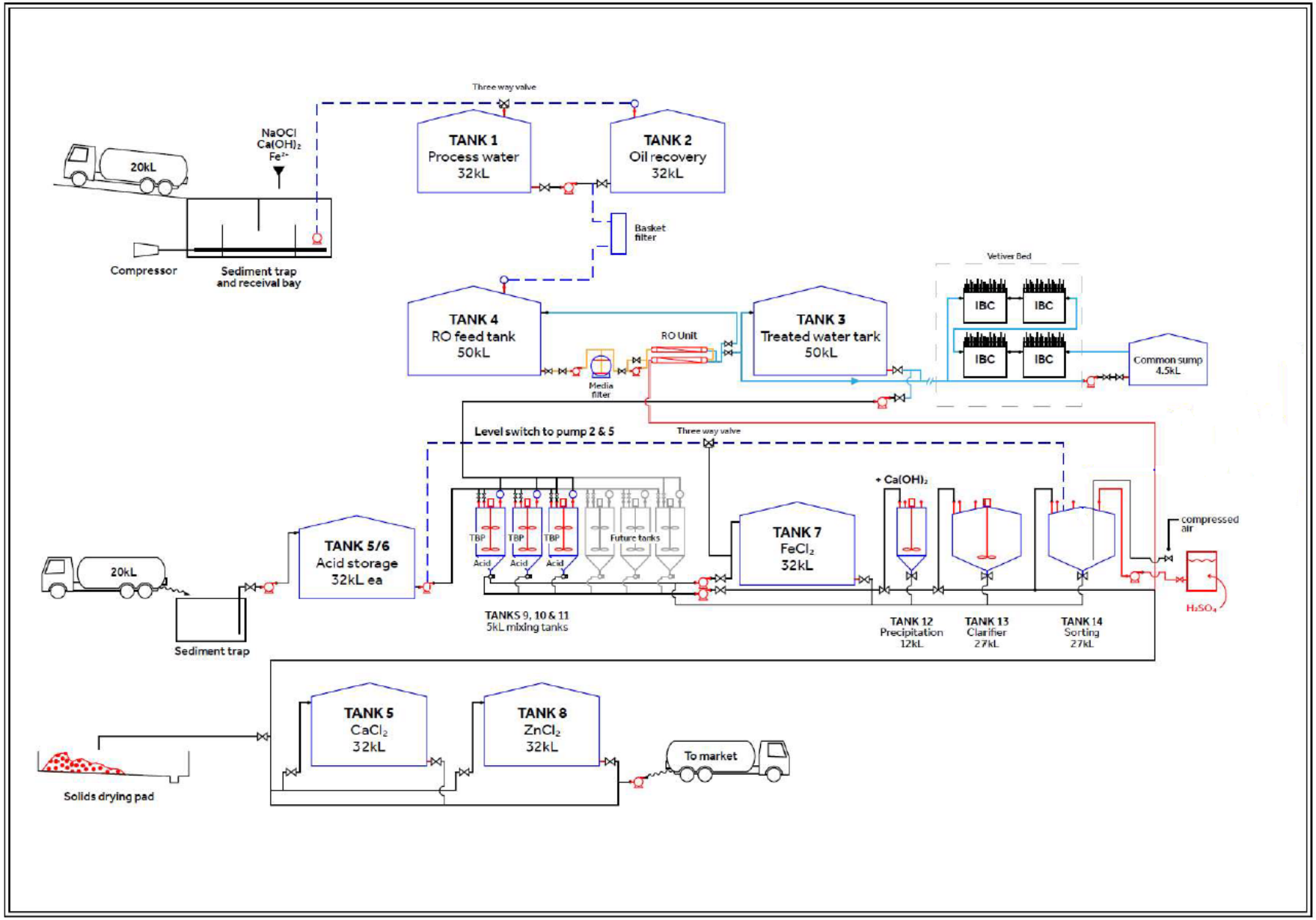



**Figure 1: Overview of the on-site treatment processes**

## 2.2 Process 1: SPL waste treatment

SPL is classified as a dangerous good (class 8 corrosive, as defined in the defined in the *Dangerous Goods Safety Act 2004*) when discharged from the galvanising processes. The galvanising industry uses 12% to 18% hydrochloric (pickle) acid to remove mill scale and rust from the steel surface to allow zinc to diffuse onto the clean steel. When the free hydrochloric acid reaches 32g/L, the SPL is removed from the process and replaced with fresh pickle acid. Typically, SPL is treated with an alkali at the generator site and transported with a pH > 2.5. SPL consists of saline solution with anticipated metal concentrations shown in Table 1.

**Table 1: Cation concentrations typically found in SPL (provided by applicant)**

| Dissolved Cation | Concentration |
|---|---|
| Iron (as $FeCl_2$) | 90 g/L |
| Zinc (as $ZnCl_2$) | 60 g/L |
| Chromium (III) (as $CrCl_3$) | 0.011 g/L |
| Nickel (as $NiCl_2$) | 0.037 g/L |
| Lead (as $PbCl_2$) | 0.061 g/L |
| Copper (as $CuCl_2$) | 0.004 g/L |

### 2.2.1 SPL processing

Incoming materials will be transported to the premises either packaged (mainly reagents) or bulk form (incoming liquid waste). The liquid waste arrivals will be pre-arranged with the site operator to ensure the facility has adequate capacity to accept the consignment and that it arrives with accompanying analyses certificates.

As part of Process 1, the SPL is discharged into the sediment trap (through the receival bay) to remove the solids. The liquid will then overflow into the liquid waste receival tank (which includes the oil interception) from where the SPL will be pumped into a 32kL holding tank (i.e. acid storage tank) within the processing hardstand.

Sediments collected in the sediment trap are placed in the solids drying sump for stabilisation and solidification before being placed on the solids drying pad for dewatering prior to disposal to landfill.

The details and specifications of the solvent extraction and nutrient recovery process is proprietary information, which the applicant considers to be commercially sensitive. However, DWER has considered the full detail of the proposed operations in its assessment of the potential impacts of emissions and discharges on the environment. A simplified description of the process is outlined in Table 2.

**Table 2: Summary of Process 1 (SPL processing)**

| Step | Description | Location | Products, wastes and disposal methods |
|---|---|---|---|
| Metal polishing | Lead, copper, chrome and nickel sulfides are precipitated from the received SPL and removed through a small plate and frame or basket filter. | Holding tanks (Tank 5 and/or 6) | Recovered sulfides will be solidified and disposed to landfill |

| Step | Description | Location | Products, wastes and disposal methods |
|---|---|---|---|
| Iron crystallisation | Sulfuric acid is mixed with the SPL to form iron sulfate, zinc sulfate and hydrochloric acid | Settling tank (Tank 14) | Precipitated iron sulfate is either solidified and sent to landfill or sold to market, where possible |
| Phase separation | The remaining polished, acidified SPL is mixed with tributyl phosphate (TBP) to separate zinc chloride from the residual iron chloride. | TBP mixing tanks (Tanks 9-11)<br>Iron chloride tank (Tank 7) | The iron chloride/ hydrochloric acid mixture is removed and resold back to the market as a regenerated hydrochloric acid product. |
| | Permeate water is used to recover zinc chloride, which is then sent to the zinc chloride precipitation tank | TBP mixing tanks (Tanks 9-11)<br>Precipitation Tank (Tank 12) | |
| Zinc recovery | Alkaline solution is added to precipitate zinc hydroxide which is then separated from calcium chloride supernatant through physical settling and separation of solids.<br>Precipitated zinc hydroxide is concentrated, and sulfuric acid added to form zinc sulfate. | Precipitation Tank (Tank 12)<br>Clarification tank (Tank 13) | Calcium chloride supernatant is used in the regeneration of hydrochloric acid.<br>Neutralised zinc sulfate will be collected in IBCs for sale into the agriculture market. |
| Hydrochloric acid from calcium chloride | Sulfuric acid is added to the calcium chloride to regenerate hydrochloric acid | Settling tank (Tank 14) | Regenerated hydrochloric acid is sold back to market.<br>Calcium sulfate (gypsum) is solid into the agriculture market or forwarded to landfill for disposal. |

In the licence application, the applicant proposed the use of nitrosylsulfuric acid as a reagent in the SPL treatment process which would result in the production of air emissions, predominantly nitric oxides (NOx). However, following consultation with the department on the suitability of the proposed pollution control options, the applicant has committed to further research into suitable air pollution control infrastructure options which may be the subject of a future licence amendment. At present, the premises does not have the appropriate pollution control infrastructure required to use nitrosylsulfuric acid (or any other NOx-producing acids) as a reagent in the SPL treatment process.

### 2.2.2 Alternative processing of SPL

Historically, SPL (controlled waste category A100) is treated using lime (or similar base) to precipitate metals from the SPL and an absorbent is added to solidify the saline liquid for disposal to landfill. This practice may still be undertaken on site on occasion when required during maintenance of the processing infrastructure.

In this process, SPL will be treated using lime (or similar) to precipitate metals and an absorbent (e.g. soil, sawdust or flocculant) to solidify the saline liquid ready for disposal to landfill. This mixing will be undertaken in the dewatering sump and mixed using an excavator bucket. The

solids will be placed within the bunded dewatering pad until disposal to an authorised facility. These solid wastes will be tested to confirm landfill acceptance classification, as required.

## 2.3 Process 2: Waste recycling as reagents

Controlled liquid wastes of category code B100 (hydrochloric, sulfuric, nitric and phosphoric acids) and C100 (sodium hydroxide) are valuable resources for adjustment of pH in both Process 1 and Process 3.

The applicant proposes to accept these wastes in IBCs as reagents for the other two processes. Received wastes may need to be filtered using reverse osmosis to remove suspended solids and then transferred into IBCs for storage as dangerous goods.

## 2.4 Process 3: Physio-chemical treatment of liquid wastes

The applicant proposes to receive up to twenty categories of controlled liquid wastes. All of these waste categories have a common factor that less than 10% of the mass is contaminant, the balance is water.

The applicant has proposed to assess the salinity of the received solutions before passing solutions through reverse osmosis (RO) water filtration to adjust their TDS (typically sodium /calcium chlorides and sulfates) to less than 500 mg/L prior to transfer to the vetiver grass propagation area. This aims to ensure salinity in the vetiver grass propagation system is kept to an acceptable level.

Tank levels will be visually monitored (level indicators) to prevent over-topping. After passing through the filtration system, the permeate is collected to reuse on site or transferred to the vetiver grass propagation system.

The saline solutions typically have minor contamination with cations such as cadmium (Cd), chrome (Cr), tin (Sn), zinc (Zn) and lead (Pb). There may also be some minor mineral oils associated with some loads. The concentration received will typically be less than 1000 mg/L and will be precipitated from the saline solution by addition of sodium hydroxide.

A simplified outline of Process 3 is provided in Table 3.

**Table 3: Summary of Process 3 (Physio-chemical treatment of liquid wastes)**

| Step | Description | Location | Products, wastes and disposal methods |
|---|---|---|---|
| Solids removal | Incoming liquids will be discharged into the sediment trap to remove any solids, then overflow into the liquid waste receival tank. | Sediment trap<br><br>Liquid waste receival tank | Oils accumulated in the oil separator will be collected through a submersible pump into an IBC for collection to an oil recycler.<br>Solids will be removed from the sediment trap, stabilised and solidified and sent for disposal to landfill. |
| Pre-treatment | Liquids will be pumped from the liquid waste receival tank into either the process water tank or oil/water recovery tank.<br>Liquid will then be pumped through a static mixer with pH adjustment chemical added. Precipitated cations are removed | Process water tank (Tank 1)<br>Oil/water recovery tank (Tank 2) | Precipitated cations disposed of to an authorised landfill. |

| Step | Description | Location | Products, wastes and disposal methods |
|---|---|---|---|
| | using a basket filter. | | |
| Reverse osmosis | Liquid is then pumped through the RO system with permeate collected in the 50kL permeate collection tank.<br>Produced RO concentrate/brine (approximately 15% of the RO inflow volume) will be collected in the remaining empty 32kL holding tank before undergoing stabilization and solidification on the solids drying pad. | Permeate collection tank (Tank 3) | Solidified RO concentrate/brine is disposed of to an authorised landfill.<br>Permeate water is either used in Process 1 as previously described or pumped to the vetiver grass propagation area. |

## 2.5 Process 4: Vetiver grass propagation

210 vetiver grass beds have been established aboveground, growing in the top of interconnected rows of IBCs. The IBCs will be located on a flat compacted (< $10^{-6}$ m/s) lime/gypsum mortar hardstand finished at higher than 8 metres Australian Height Datum (m AHD) and enclosed by compacted gypsum bund walls. Treated liquids will be a water source for the pots of sterile vetiver grass (*Chrysopogon zizanioides*) positioned at the top of each IBC. Transferred liquids will fill each IBC in sequence to 80% volume before overflowing to the next IBC. The initial IBC in the sequence is fitted with a floatation valve to prevent overfilling and the final IBC has an overflow outlet to divert excess liquid back to the common sump tank. Tank contents will be pumped back to the permeate storage tank daily to ensure the overflow common tank remains nominally empty. IBCs will be visually checked each workday to identify potential overflows, root blockages or structural defects. A pilot proof-of-concept test of this set up indicated that the average daily water use of each vetiver grass IBC was comparable to a control set up without grass (3.8L/IBC/day vs 3L/IBC/day for grass and control, respectively). IBC water usage varies seasonally from 2.5L/day in winter to 5.8L/day in summer. Annual water consumption per IBC averages ~1.5kL/IBC/year. Conservative estimations predict the 210 IBC system will evapo-transpire ~290kL per annum of treated wastewater.

## 2.6 Water management

Stormwater captured within the two main bunded concrete hardstands of the treatment facility will be diverted to the sediment trap through a graded slope and connected through a removeable plug. The bunded concrete solids drying pad hardstand is also graded to divert stormwater runoff and leachate to the 30kL solids drying pad sump via removeable plug.

Dewatered solids are typically insoluble (< 2mg/L ASLP) however, RO rejects may be soluble and have the potential to produce contaminated leachate. Captured stormwater will be passed through the reverse osmosis unit before being sent to the vetiver grass propagation area.

The current 5% AEP (20 year ARI) for the site is 103mm over 24 hours (BoM, 2022) which, given the surface area of 787$m^2$ would require a bund capacity of 81$m^3$ to provide sufficient stormwater containment capacity. The stormwater containment infrastructure of the main treatment area has a total combined capacity for 151$m^3$ of stormwater.

Rainfall on the vetiver grass propagation IBCs is not expected to meaningfully contribute to IBC volumes due to limited opportunity for rainwater to enter the IBCs. The vetiver grass propagation area is located on a flat compacted (< $10^{-6}$ m/s) limestone/road-base aggregate hardstand finished at height greater than 8 mAHD and is enclosed by compacted bund walls to prevent stormwater run-off. Due to the operational set up of the IBCs and bunded overflow sump,

stormwater within the vetiver grass propagation area is unlikely to be contaminated under normal operating conditions.

The currently installed 210 IBCs at the vetiver grass propagation area have a total holding capacity of 168kL, assuming an 80% capacity due to the overflow system. Based on local climate data (rainfall and evaporation rate) and the annual vetiver evapo-transpiration rates established in the proof-of-concept trial, the vetiver grass propagation system would have an annual total capacity in the first year of approximately 459kL (291kL evapo-transpiration and 169kL storage). However, the department has taken a conservative approach when assessing capacity of this system due to the following factors:

- evaporation rates fluctuate substantially throughout the seasons,
- the system has not yet been fully tested on a large scale across seasons, and
- there is clear potential for the storage capacity to be exceeded over time.

A summary of predicted annual volumes for liquid waste (other than SPL) and the vetiver grass propagation system have been shown in Table 4.

**Table 4: Water balance calculations**

| Process description | Expected volume (per annum) |
|---|---|
| Volume of liquid wastes (other than SPL) accepted on-site for treatment | 1780kL |
| Expected net volume of rainwater collected | 175.5kL |
| **Total liquid input (liquid waste accepted + collected rainwater)** | **1955.5kL** |
| Anticipated loss from physiochemical treatment (RO reject) – approximately 15% | -293kL |
| Volume used in SPL processing | -1440kL |
| Predicted volume evapo-transpired from vetiver grass propagation system | -290kL |
| **Total loss of liquids through physiochemical treatment, SPL processing and evapotranspiration** | **-2023kL** |
| **Total net annual water balance (water input minus water loss)** | **-67.5kL** |

The conservative water balance calculations indicate that the annual net loss of liquids through SPL processing, evapotranspiration and physiochemical treatment is expected to be greater than the total amount generated. The storage capacity of the IBCs would provide an additional buffer during periods of high rainfall or low evapotranspiration. Excess wastewater will be disposed of to an appropriate licensed liquid waste facility should the volume exceed the storage capacity of the vetiver grass propagation system.

# 3. Legislative context

## 3.1 Contaminated sites

The premises occupies a portion of Lot 77 on Diagram 68183, which was classified as *contaminated – restricted use* under the Contaminated Sites Act 2003 on 14 September 2007 and a memorial placed on the Certificate of Title. The publicly available contaminated sites

summary of records for Lot 77 (DWER, 2023) outlines that the site has been used to stockpile phospho-gypsum, limestone and peat since 1976. The classification of Lot 77 was based on several soil and groundwater investigations that found sulfate is present in a groundwater plume from the southern portion of the site to the southwest at concentrations exceeding Australian drinking water guidelines. A screening risk assessment demonstrated that untreated groundwater at the site is unsuitable for potable and non-potable uses. The risk to surrounding receptors is low, however, if further monitoring indicates the concentration of sulfate moving off-site has continued to increase then further investigations may be required.

## 3.2 Other relevant approvals

### 3.2.1 Development approval

The local government authority for the proposal is the City of Kwinana. The premises is located within an area not zoned under the *Town of Kwinana Local Planning Scheme No. 2*. Therefore, the application was referred to the Western Australian Planning Commission (WAPC) for approval. On 11 June 2020 WAPC granted development approval, subject to conditions, to the landowner for the development of a nutrient recovery facility and animal fodder production area. The development approval will expire on 11 June 2045.

## 3.3 Part V of the EP Act

### 3.3.1 Operator history and assessment of operator

Construction and time-limited operations of the facility were authorised under works approval W6293/2019/1, issued on 31 July 2020. The works approval was subsequently amended on 24 January 2022 to authorise an extension to time limited operations.

A summary of site inspections and compliance history has been outlined in Table 5.

**Table 5: Summary of site inspection findings and operator compliance history**

| **Findings** |
|---|
| **December 2021 site visit**<br>*DWER officers noted a number of non-compliances and environmental concerns, including:* |
| The infrastructure constructed on-site was not consistent with the details provided in the submitted Environmental Compliance Report (ECR) which had been certified by a qualified engineer. Inconsistencies included:<br>• Sections of hardstand bund were not constructed to works approval specification.<br>• Sumps were overfilled and had not been installed in the locations specified.<br>• The orientation of the site layout and infrastructure locations were not consistent with works approval maps or ECR .<br>• Vetiver grass propagation system hardstand was not fully installed and did not meet construction requirements, as outlined further below.<br>• Common sump tank did not meet construction requirements and did not have any spill containment infrastructure.<br>Overall, the site visit demonstrated that the submitted ECR was not reflective (and often misleading) of the on-site infrastructure and could not be relied upon to confirm compliance with works approval conditions. |
| Only a limited number of the 2500 total vetiver grass propagation IBCs had been installed (less than 10%). |

| |
|---|
| Individual IBCs did not have float valves and overflow outlets that flow to the common sump installed, as required by the works approval.<br><br>Only one float valve had been installed in the initial IBC, with each IBC overflowing sequentially with no float valve to prevent overtopping. Only the final IBC in sequence was fitted with an overflow outlet back to the common sump. |
| IBCs were severely contaminated and in poor condition with cracks and structural defects. |
| Vetiver grass propagation hardstand had not been constructed and compacted sufficiently with appropriate bunding. Hardstand was likely not compliant with permeability requirements.<br><br>Hardstand permeability and construction details had been signed off as compliant in the ECR which was evidently inconsistent with constructed infrastructure on site. |
| Additional chemical processing and storage tanks had been installed without authorisation. |
| An unidentified white substance (possibly gypsum) had been stockpiled on unsealed soil outside of the process hardstand. |
| General site maintenance and housekeeping concerns including evidence of spills and leaks, contaminated stormwater pooling within the hardstands, inappropriate chemical storage, and stockpiling of solid waste. |
| ***Site visit - May 2022***<br><br>*DWER officers noted the continued presence of **all** previously identified non-compliances and environmental concerns as outlined above.*<br><br>*Officers also noted a number of additional non-compliances and environmental concerns, including:* |
| Excessive stockpiling of solid waste with large volumes of solid waste spilling over the incomplete bunding to unsealed land.<br><br>Stockpiled solid waste had also accumulated around the base of multiple tanks and throughout the process hardstand. |
| Installation and potential operation of an item of unauthorised, self-constructed pollution control infrastructure believed to be an improvised air scrubber. |
| Presence and inappropriate storage of an unauthorised controlled waste (nitrosylsulfuric acid). DWER had previously refused an application for interstate consignment authorisation relating to the transport and acceptance of this controlled waste from interstate. Signage on the controlled waste matched the waste that DWER had refused to authorise. |
| A number of IBCs containing controlled wastes, chemicals and reagents were stockpiled on unsealed land. |
| Further deterioration of general site maintenance:<br><br>• various coloured spills,<br>• large scale pooling of contaminated stormwater,<br>• inappropriate storage of waste/chemicals (within and outside of the site hardstands),<br>• overfilling of common sumps,<br>• general poor site housekeeping. |

Following the concerns identified in the initial site visit in December 2021 (as outlined above), the department requested that Microzinc Pty Ltd address these matters before submitting an updated and accurate Environmental Compliance Report to demonstrate that all infrastructure had been constructed in accordance with works approval conditions.

On 22 September 2021, Microzinc Pty Ltd submitted an application for a licence under Part V Division 3 of *the* EP Act. As the applicant was unable to provide an updated ECR demonstrating full compliance with works approval W6293/2019/1, the delegated officer declined to deal with the licence application. Microzinc Pty Ltd were advised that evidence of compliance with works approval W6293/2019/1 would be required to progress any future licence application.

On 27 April 2022, Microzinc Pty Ltd applied to further extend time limited operations. DWER officers attended the site again in May 2022 and noted that all previous concerns were ongoing with a number of additional environmental concerns identified as outlined in Table 5.

This application to extend works approval time limited operations was returned, as the issues identified during the site visits were ongoing with additional site management and waste storage concerns identified. As an updated ECR had not yet been received, the department had insufficient evidence that the site infrastructure and pollution controls had been constructed to an appropriate standard to permit further operations. The applicant was provided with a comprehensive compliance audit outlining the issues identified and requirements for compliance.

On 31 July 2022, the extended time limited operations period of works approval W6293/2019/1 ended. Microzinc Pty Ltd were advised to cease operations and remove all waste and chemical products from the site.

Following the submission of an updated ECR with this licence application, DWER officers visited the site again on 9 September 2022. During this visit, officers confirmed that the site had been suitably remediated and the site infrastructure had been constructed in compliance with W6293/2019/1 with some deviations. The justifications provided by the applicant for the deviations in infrastructure specifications were deemed to be acceptable and did not alter the risk profile of the site. The risk assessment in Section 5 was conducted based on the infrastructure installed at present and the updated proposed operations.

The delegated officer considers that the number and nature of compliance and site management concerns associated with the premises brings into question the applicant's ability to implement controls effectively through the management of operations at the site. The applicant's history of compliance concerns related to waste acceptance and storage, inconsistencies in information provided, infrastructure maintenance deficiencies, potential breaches of legislation, and general site maintenance concerns have been considered in the assessment of risks to the environment and public health and included in Section 6 below, in line with the department's *Guidance Statement: Risk Assessment* (2020).

### 3.3.2 Clearing

Clearing of native vegetation in Western Australia requires a clearing permit unless exemptions apply. The location is subject to a Vegetation Conservation Notice CPS6867/1 which was issued on 6 April 2016 to ensure no further unlawful clearing is undertaken by the landholder or the occupier. The applicant applied for and was granted a clearing permit to clear up to 0.87 hectares of native vegetation within specific areas outlined. A copy of the clearing permit and associated works approval conditions can be found in works approval W6293/2019/1, valid until 31/07/2023. Approximately 0.377 ha has been cleared so far, with an additional 0.13 ha to be cleared in future to complete construction of the vetiver grass hardstand area (when extending it to the north and east).

# 4. Location and siting

## 4.1 Siting context

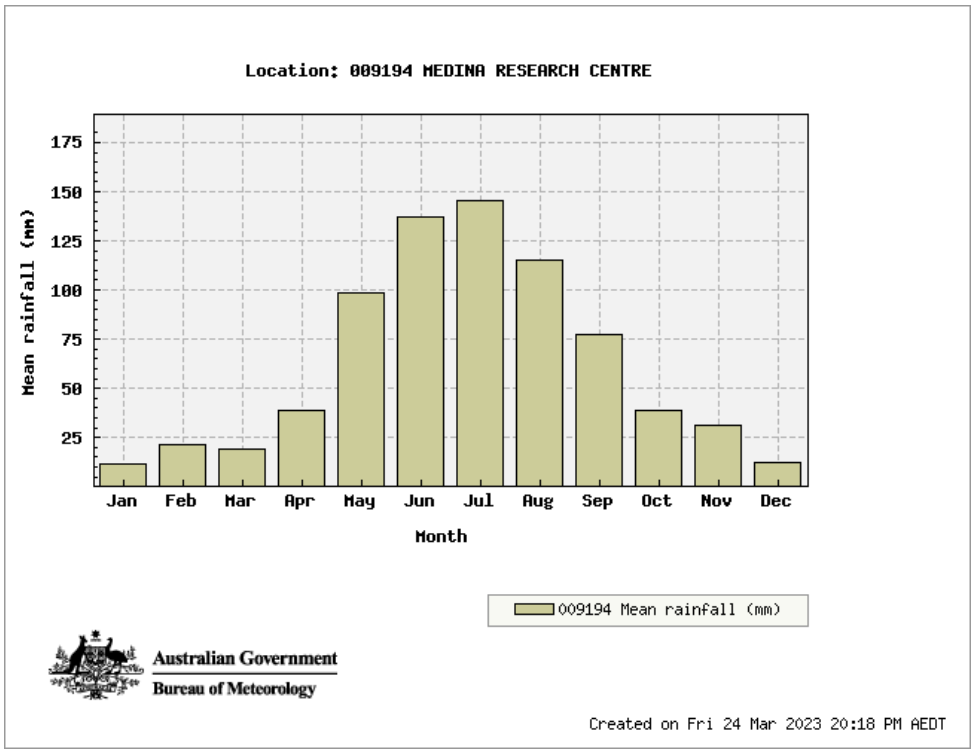
The premises is located on the Swan Coastal Plain in the suburb of Leda, in the City of Kwinana, approximately 2.5 kilometres southwest from the city centre and approximately three kilometres to the east of the Kwinana Industrial Area (KIA). Lot 77 Wellard Road is not assigned to a zoning category by the *Town of Kwinana Local Planning Scheme No. 2*. Surrounding land uses are industrial (general, specialist and light industry), residential, public purpose, and park recreation/drainage. The nearest residence is ~630 metres north of the vetiver grass propagation area within a non-zoned area. Lot 77 contains and is immediately surrounded by a large area of native vegetation, as in Figure 2.


**Figure 2: Location of the treatment facility and vetiver grass propagation area (red outline) within Lot 77 Wellard Rd, Leda**

## 4.2 Meteorology

The region experiences cool, wet winters and warm to hot, dry summers. The nearest Bureau of Meteorology (BoM) site was the Medina Research Centre (site number 009194) which was closed in April 2018 and was located approximately 3.5 km north of the premises. The annual mean rainfall at the nearest (closed) weather station is 750mm, with July having the highest mean rainfall of 145.5mm, as shown in Figure 3.

**Figure 3: Mean rainfall distribution (mm) for the nearest weather station (BoM, 2023b)**




The nearest active BoM weather station is Anketell (station number 009258), located approximately 8.5km north-east of the premises. The climate statistics are similar at the closest active station (Anketell).

# 5. 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.

## 5.1 Source-pathways and receptors

### 5.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this decision report are detailed in Table 6 below. Table 6 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

**Table 6: Proposed applicant controls (from application)**

| Emission | Sources | Potential pathways | Proposed controls |
|---|---|---|---|
| Fugitive dust | Vehicle movements on unsealed access roads | Air/ windborne pathway | • Deliveries to the premises will typically occur during business hours. Operation of the treatment facility will only occur between the hours of 7:00 am and 6:00 pm Monday to Saturday.<br>• Speed limit of 30km/h within the greater lot and 5km/h within the prescribed premises boundary. |
| Noise | Equipment or machinery used during normal operations | | |
| Light | Normal operation of the facility | Air pathway | • Operation will typically not occur outside normal daylight hours.<br>• Any operations during night-time hours, requiring lighting, only occur within the vetiver grass propagation area and will not generate light spill greater than a typical rural property. |
| Processing chemicals, reagents, wastes and intermediate products:<br>• sulfuric acid<br>• hydrochloric acid<br>• zinc chloride<br>• iron chloride<br>• calcium chloride<br>• tributyl phosphate (TBP)<br>• industrial liquid wastes<br>• SPL | Breach of containment (such as failure of pipes, tanks or bunds) associated with unloading, treatment and processing of industrial liquid waste and SPL | Direct discharge and infiltration | • The premises holds a Dangerous Goods Site Storage Licence under the *Dangerous Goods Act 2004* and the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 and storage of dangerous goods will be in accordance with this licence.<br>• Central sumps (including common sump) will be kept nominally empty when the site is not operational.<br>• The central sumps will operate with a minimum 200 mm freeboard.<br>• One operator to remain within the treatment area when pumping is undertaken to manage pumping activities.<br>• Inspect piping on a weekly basis for signs of leakage or damage. Repair immediately.<br>• Maintenance of a spill kit on site and immediate clean-up of any spills outside a bunded area.<br>• All IBCs accepted / emptied on site will be rinsed out within the hardstand area prior to re-use / removal from site.<br>• Infrastructure controls:<br>- Processing facility constructed with concrete and bunded to meet the Australian Standard AS 3780 (*AS3780-2008: Storage and Handling of Corrosive Substances*) to accommodate full containment of spills or container failure.<br>- All storage tanks are fitted with visual level indicators.<br>- Tanks containing corrosive materials will have overflow drains onto the bunded hardstand.<br>- Tanks are constructed from high density polyethylene (HDPE), valves are constructed using unplasticised polyvinyl chloride (UPVC) and ethylene propylene diene monomer (EPDM) and pipelines and pumps from ABS (acrylonitrile butadiene styrene). Agitator shafts are constructed from Grade 316 stainless steel coated with fibre reinforced plastic. |

| Emission | Sources | Potential pathways | Proposed controls |
|---|---|---|---|
| | Stormwater contaminated with leachate generated during normal facility operations. | | • 787 $m^2$ concrete hardstand with a concrete bund will have combined capacity for 151 $m^3$ of stormwater and a hydraulic conductivity of $1x10^{-9}$ m/s. Hardstand is graded to divert stormwater to central sumps through removeable plugs.<br>• Bund wall 150mm higher than surrounding ground level to prevent sheet flow stormwater from entering the process area.<br>• Solid wastes stored on the dewatered solids pad and removed each week for landfill disposal.<br>• Solids will be removed offsite prior to scheduled rainfall events.<br>• Stormwater captured by facility hardstands will be directed to central sumps for use in SPL process or for treatment and use within vetiver grass propagation system. |
| Treated industrial liquid waste (containing sodium chlorides, calcium chlorides and sulfates, with a salinity of approximately 600 mg/L) | Breach of containment (such as rupture of pipes/ overtopping of holding tanks or IBCs) associated with irrigating treated industrial liquid waste to the vetiver grass propagation system | Direct discharge and infiltration | • Vetiver grass beds to be contained in individual IBCs located within a limestone / gypsum / recycled road-base hardstand (achieving $1x\ 10^{-6}$m/s hydraulic conductivity) to reduce risk to groundwater. The hardstand is more than 10 m above the fluctuating water table and is enclosed by compacted gypsum bund walls.<br>• Each IBC will have 110mm ullage controlled by an overflow system. Initial IBC will be volume controlled using a float valve and the final IBC will be fitted with an overflow outlet back to a 4.5kL common sump contained located within a bund (>5.7kL capacity).<br>• The common sump will be volume controlled by pumping excess liquid back to the treatment facility holding tank through a pipe. The common sump will be inspected at the end of each work week and emptied as appropriate.<br>• The IBCs will be visually inspected each weekday for signs of leaks. Any defective IBCs will be drained into standby IBCs and either repaired or replaced.<br>• Three groundwater monitoring wells will be installed along the western boundary of the vetiver grass propagation system. Samples proposed to be collected monthly for the first two years then quarterly thereafter.<br>• Low velocity pump used to transfer liquid to vetiver grass propagation area to reduce risk of overtopping of IBCs. Pumping to the vetiver grass propagation system will only be undertaken once an assessment is made regarding the amount of water needed to prevent overfilling.<br>• Liquids to be transferred to the vetiver grass propagation system will be tested and if required, passed through a reverse osmosis treatment to reduce salt levels. |

### 5.1.2 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 7 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 2020)).

**Table 7: Sensitive human and environmental receptors and distance from prescribed activity**

| **Human receptors** | **Distance from prescribed activity** |
|---|---|
| Residential premises | ~630m north |
| **Environmental receptors** | **Distance from prescribed activity** |
| Geomorphic Wetlands | Unnamed Resource Enhancement Wetland – ~2m west of the vetiver system and 100m west of the treatment facility (within Lot 77 Wellard Road, Leda).<br>Unnamed Conservation Wetland – ~480m south and 820m east |
| Parks and Wildlife Managed Lands and Waters | Crown freehold – Department interest land ~230m west and 1.1km south of the treatment facility.<br>Leda Nature Reserve ~1.5km south of the treatment facility. |
| Bush Forever: Regional open space or proposed regional open space | ~100m east |
| Threatened Ecological Communities and Priority Ecological Communities | Critically endangered Threatened Ecological Communities (SCP19b) are within the treatment facility and vetiver propogation sites. |
| Major watercourses/waterbodies | Unnamed waterbodies (lake/swamp) ~920 metres northeast |
| Groundwater | Depth to groundwater is encountered at ~1 - 3 metres below ground level (mbgl) at the proposed vetiver grass propagation area and 5.5 - 7.5 mbgl at the proposed treatment facility site (Stass Environmental, 2021). Depth to groundwater at the treatment facility is estimated to be between 5.5 - 7.5 mbgl. Groundwater levels are expected to fluctuate due to seasonal variation. Groundwater flows westward at the premises location.<br>Groundwater salinity in the area is 1000-1500 mg/L which is considered brackish.<br>There is a bore located within the premises (GWL 155853). |
| Soil | Soil type at the premises is classified as Tamala Limestone: predominantly calcarenite/Qpck<br>The vetiver grass propagation area has high to moderate acid sulfate soil risk within 2 m below the natural ground level. |

## 5.2 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 5.1. 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 5.1), 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 licence 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 8.

Licence L9357/2021/1 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. chemical manufacturing and liquid waste treatment.

The conditions in the issued licence, as outlined in Table 8 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

**Table 8: Risk assessment of potential emissions and discharges from the premises during operation**

| Risk events | | | | | Risk rating[1]<br>C=consequence<br>L=likelihood | Conditions[2]<br>of licence | Reasoning |
|---|---|---|---|---|---|---|---|
| **Sources / activities** | **Potential emission** | **Potential pathways and impact** | **Receptors** | **Applicant controls** | | | |
| ***Operation of the treatment facility***<br>Transport, handling and processing of SPL and industrial liquid waste<br>Bulk storage of chemicals, reagents and received waste including SPL and industrial waste. | Light | Direct light emissions causing impacts to amenity | Residential premises 950m north of the treatment facility | Refer to Section 3.1 | **C = slight**, minimal impact to amenity at a local scale<br>**L = unlikely**, will probably not occur in most circumstances<br>**Low Risk** | None | Given the distance to the nearest public receptors the delegated officer considers that the noise, dust and light associated with the operation of the premises is unlikely to impact the nearest receptors, therefore presents a low risk of impacting public amenity and specific controls are not required.<br>Operations will predominantly be conducted during daylight hours. Additionally, as conditioned in the Development Approval, the applicant was required to submit a Dust Management Plan and a detailed overall management plan to the specification of the City of Kwinana prior to commencement of works. The management plan requirements included noise mitigation measures and acoustic reporting.<br>General provisions of *the EP Act* and the provisions of the Environmental Protection (Noise) Regulations 1997 (Noise Regulations) will apply. |
| | Noise | Air / wind dispersion causing impacts to health and amenity | | | **C = slight**, minimal impact to amenity at a local scale<br>**L = unlikely**, will probably not occur in most circumstances<br>**Low Risk** | | |
| | Fugitive dust | Air / wind dispersion causing surface water contamination or impacts to vegetation growth | Wetlands and waterbodies adjacent to premises<br>Surface water contamination | | **C = slight**, minimal impact to amenity at a local scale<br>**L = unlikely**, will probably not occur in most circumstances<br>**Low Risk** | | |
| | Contaminated stormwater | Contamination of land, surface water or groundwater through direct discharge, runoff or infiltration | Soil and groundwater beneath the premises (ranges from 1 - 3 mbgl)<br>Wetlands and waterbodies adjacent to premises | Refer to Section 3.1 | **C = moderate**, mid level onsite impacts and low level offsite impacts at a local scale<br>**L = possible**, the risk event could occur at some time<br>**Medium Risk** | Condition 1<br><br>**<u>Condition 5 (Table 3)</u>** | Due to the nature of the wastes and chemicals being used on site, and the treatment facility site location surrounded by native vegetation, there is an inherent risk of stormwater becoming contaminated and runoff impacting on nearby soil and vegetation. Stormwater collected within the main process area hardstands is diverted to central sumps and either used within the SPL process or treated by reverse osmosis prior to transfer to the vetiver grass propagation system for use as a water source for the grass.<br>As some solid materials stored on the solids drying pad are water soluble and may contaminate stormwater, the delegated officer considers the applicant's proposed collection of leachate from the solids drying pad within the solids drying sump to be essential for the management of risks from contaminated stormwater. This control has been included as an operational control within the licence.<br>The applicant initially proposed to test collected stormwater to determine if treatment via reverse osmosis is required prior to transfer to the vetiver grass propagation area. However, the delegated officer considers the applicant's compliance history of large scale inappropriate long-term stockpiling of solid waste, potential for stormwater run-off from large solid waste stockpiles, and consistent pooling of stormwater within hardstand areas during site visits to present an increased risk of stormwater contamination and discharge to the environment. Therefore, additional regulatory controls are required to manage risks associated with contaminated stormwater. The delegated officer has determined that proper maintenance and integrity of the containment infrastructure and appropriate solid waste management are essential to mitigate the risks associated with contaminated stormwater. As such, controls relating to containment infrastructure maintenance and monthly solid waste removal have been implemented in the licence. The licence also includes reporting conditions requiring the annual reporting of waste acceptance and removal volumes.<br>Additionally, the potential for discharge of untreated contaminated stormwater through breach of the unbunded pipeline or through IBC overtopping presents an unacceptable risk of soil and groundwater contamination. As such, |

| Risk events | | | | | Risk rating[1]<br>C=consequence<br>L=likelihood | Conditions[2]<br>of licence | Reasoning |
|---|---|---|---|---|---|---|---|
| **Sources / activities** | **Potential emission** | **Potential pathways and impact** | **Receptors** | **Applicant controls** | | | |
| | | | | | | | the delegated officer considers it necessary to treat all liquid wastewater (including collected stormwater) using the RO unit before transfer to the vetiver grass propagation area to reduce the risks of contaminated stormwater discharge and has imposed this control on the licence. Collected stormwater that is used within the SPL processing stream without leaving the hardstand area does not require treatment.<br><br>Due to the constructed infrastructure and operational set up of the vetiver grass propagation area, the delegated officer has determined that stormwater runoff in this area is unlikely to be contaminated under normal operating conditions. However, as previous DWER site visits have identified contaminated and structurally defective IBCs, the delegated officer considers applicant controls and additional regulatory controls relating to the inspection and maintenance of IBC integrity to be required to mitigate the risk of stormwater contamination and runoff within this area of the site. These have been included in the licence as infrastructure and operational controls.<br><br>The delegated officer does not consider the management of potentially contaminated stormwater within the site to present an unacceptable risk, subject to the implementation of controls as outlined above. |
| | Spills and leaks of SPL, industrial waste, chemicals or reagents associated with breach of containment during liquid storage and handling | Contamination of land, surface water or groundwater through direct discharge, runoff or infiltration | Soil and groundwater beneath the premises (ranges from 1 - 3 mbgl)<br><br>Wetlands and waterbodies adjacent to premises | Refer to Section 3.1 | **C = moderate**, mid level onsite impacts and low level offsite impacts at a local scale<br><br>**L = unlikely**, the risk event could occur at some time<br><br>**Medium Risk** | Condition 1 | The main processing area consists of two adjacent concrete hardstand areas constructed with bunding of a minimum height of 150mm and a combined containment capacity of 230kL/m$^3$, as well as a solids drying pad with concrete hardstand and bunding ranging from 150mm to 700mm in height. All chemical processing and storage tanks are located within the bunded hardstand areas, which are sufficiently sized to contain greater than 110% of the maximum tank volume. All tanks and pipelines are constructed from materials designed to withstand corrosive liquids.<br><br>In addition to constructed infrastructure outlined above, the applicant proposes to prevent the discharge of liquids to the environment through several operational controls:<br>• maintaining a 200mm freeboard limit within all sumps,<br>• chemical processing and process liquid transfers only occurring within the hardstand area and with a staff member present,<br>• solid waste management procedures and frequent disposal,<br>• infrastructure maintenance; and<br>• RO unit throughput limit of 10.6kL per day<br><br>The delegated officer considers the above operational controls are required to mitigate the risk of land contamination due to containment loss therefore has imposed the applicant's controls as operational requirements in the licence. |
| **Vetiver grass propagation system**<br><br>Transfer and storage of treated liquid waste within vetiver grass propagation IBCs to support growth of vetiver grass | Breach of containment (such as rupture of pipes/ overtopping of IBCs) resulting in emission of treated industrial liquid waste | Contamination of land, surface water or groundwater through direct discharge, runoff or infiltration | Soil and groundwater beneath the premises (ranges from 1 - 3 mbgl)<br><br>Wetlands and waterbodies adjacent to premises | Refer to Section 3.1 | **C = moderate**, mid level onsite impacts and low level offsite impacts at a local scale<br><br>**L = possible**, the risk event could occur at some time<br><br>**Medium Risk** | Condition 1<br><br>**Condition 2**<br><br>**Condition 5 (Table 3)**<br><br>**Condition 7**<br><br>**Conditions 10 and 11**<br><br>Conditions 13 and 14 | The delegated officer has determined that additional regulatory controls are required to reduce the risk of impact from breach of containment within the vetiver grass propagation area to an acceptable level. Given that the applicant proposes to store and transfer hazardous chemicals and treated wastewater of an unknown quality, and the effectiveness and storage capacity of the vetiver grass system is yet to be tested, the delegated officer considers the removal of excess wastewater beyond the storage capacity of the premises to be critical for preventing overflow of the vetiver grass propagation system. The delegated officer has taken a conservative approach to all water balance and storage capacity estimations due to the limited information on the effectiveness of this system and the high potential for overflow due to root blockages or overfilling. Therefore, additional controls limiting the volume of liquid wastes to be accepted on-site and transferred to the system have been implemented the licence to reduce the risk of the vetiver grass propagation system overflow. This risk assessment has been based on anticipated volumes as outlined in Appendix 1. An additional operational control relating to the removal of excess wastewater to an appropriate licensed waste facility has also been implemented on the licence to reduce the risk of IBC overflow. The licence also includes reporting conditions requiring the annual reporting of monthly waste acceptance and removal volumes.<br><br>The applicant controls include:<br>• the vetiver grass propagation area hardstand and bunding,<br>• IBC infrastructure set up (one float valve, an overflow system and one return overflow outlet),<br>• daily emptying of the common sump tank,<br>• daily visual inspections of infrastructure integrity and assessment of remaining storage capacity,<br>• the use of a low-pressure pump to transfer water to the vetiver grass propagation area during staffed operational hours |

| Risk events | | | | | Risk rating[1]<br>C=consequence<br>L=likelihood | Conditions[2]<br>of licence | Reasoning |
|---|---|---|---|---|---|---|---|
| Sources / activities | Potential emission | Potential pathways and impact | Receptors | Applicant controls | | | |
| | | | | | | | The delegated officer considers the above controls to be sufficient to mitigate the risk of land contamination due to containment loss therefore imposed the applicant's controls as operational requirements in the licence.<br><br>The applicant also proposed to undertake groundwater monitoring at three locations within the site boundary adjacent to the vetiver grass propagation area bi-annually. The delegated officer considers groundwater monitoring to be an effective tool for indicating the level of potential impact of unauthorised liquid discharges from the premises operations and has therefore specified conditions requiring groundwater monitoring to be undertaken quarterly at three locations to validate the effectiveness of the applicant's liquid storage and handling controls on an ongoing basis. The delegated officer considers the increased monitoring frequency to be appropriate for prompt identification and management of groundwater impacts. The groundwater monitoring condition imposed on the licence requires quarterly testing for a limited suite of parameters (predominantly heavy metals) with an expanded suite of parameters to be tested annually. The delegated officer considered the wide variety of hazardous waste types accepted to the premises along with the anticipated effectiveness of reverse osmosis treatment of wastewater when determining the parameters and frequency of groundwater monitoring. The licence also includes reporting conditions requiring the annual reporting and analysis of groundwater monitoring results. |

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.

# 6. Decision

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the operation of the premises. As a result of this assessment, licence L9357/2021/1 has been granted.

Based on the assessment in this decision report, the delegated officer has determined that the proposal to operate the nutrient recovery and animal fodder production facility will not pose an unacceptable risk to public health or the environment, subject to the implementation of the controls outlined. This determination is based on:

- the limited population within the surrounding areas, with adequate separation distance to the nearest human receptors;
- the absence of emissions or discharges under normal operating conditions;
- limited volumes of waste received and processed to ensure adequate storage capacity is maintained for all liquids on site;
- inclusion of adequate secondary containment infrastructure for all potentially hazardous materials in the premises design; and
- ongoing groundwater monitoring to assess any potential impacts from operations.

The applicant's containment, process and monitoring controls are considered critical to maintaining an acceptable level of risk of environmental impacts, and in accordance with the *Guidance Statement: Setting Conditions* (DER 2015) have been imposed on the licence as infrastructure and operational controls.

The delegated officer determined to apply some additional controls in the licence to mitigate the risk of impacts associated with breach of containment due to the presence of hazardous materials and contaminated stormwater within the premises and the operator's history of poor maintenance of the site and infrastructure. These include:

- higher frequency of groundwater monitoring than proposed by the applicant to assess impacts to groundwater from ongoing operations;
- waste management controls including:
    - waste acceptance limits,
    - operational controls relating to waste storage, and
    - monitoring and reporting of waste inputs, waste outputs and leak detection inspections
- controls relating to the vetiver grass propagation system including:
    - treatment of all liquids/wastewater prior to transfer to vetiver grass propagation area;
    - a limitation on the volume of treated wastewater to be transferred to the vetiver grass propagation system; and
    - disposal of excess wastewater off-site in the event that there is insufficient storage capacity in the vetiver grass propagation system.

Based on the assessment in this decision report, the delegated officer has determined that a licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

# 7. Consultation

Table 9 provides a summary of the consultation undertaken by the department.

**Table 9: Consultation**

| Consultation method | Comments received | Department response |
|---|---|---|
| Application advertised on the department's website on 4 November 2022 | None received. | N/A |
| Local Government Authority consulted on 7 November 2022 | None received. | N/A |
| Landowner consulted on 7 November 2022 | None received. | N/A |
| Department of Mines, Industry Regulation and Safety (DMIRS) Dangerous Goods branch advised of proposal on 7 November 2022 | DMIRS replied on 28 November 2022 advising that the site holds an existing dangerous goods licence and is currently managed under the associated legislation.<br>DMIRS had no further comment. | Noted. |
| Applicant was provided with draft documents on 30 March 2023 and 23 May 2023 | Applicant comments were limited to confirmation of details relating to on-site processes including stormwater capacity and waste input/output volumes. | The requested information (volumes and process specifications) was incorporated into the decision report and licence documents. |

# References


1. Bureau of Meteorology (BOM) 2023a, *Design Rainfall Data System – IFD Design Rainfall Depth (mm)*. Accessed January 2023 at http://www.bom.gov.au/water/designRainfalls/revised-ifd/
2. Bureau of Meteorology (BOM) 2023b, *Climate Data Online – Climate statistics Mardie site number 05008*. Accessed January 2023 at http://www.bom.gov.au/climate/data/.
3. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2016. Vegetation Conservation Notice CPS 6867/1. Department of Environment Regulation, Perth.
5. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
6. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
7. Department of Water and Environmental Regulation (DWER) 2023. *Basic Summary of Records Search Response, Lot 77 Wellard Rd Leda*, Report Generated on 29/03/2023 Perth, Western Australia.
8. Department of Water (DoW) 2006. *Water Quality Protection Note 30: Groundwater Monitoring Bores*. Perth, Western Australia

## Appendix 1: Summary of process inputs and outputs (provided by applicant)

| Input or Output | Material | Volume (per annum) | Controlled Waste Category | Description |
|---|---|---|---|---|
| Input | SPL (spent pickle liquor) | 2880kL | A100 | **REAGENT**<br>Used in Process 1 |
| | Hydrochloric acid, sulfuric acid, nitric acid and phosphoric acid | Combined maximum volume of 1780kL | B100 | **REAGENT**<br>Used as a reagent in Processes 2 and 3 for pH adjustment, as outlined above. |
| | Sodium hydroxide | | C100 | |
| | Other industrial liquid wastes, including:<br>- Waste resulting from heat treatment and tempering processes which use cyanide<br>- Inorganic cyanide<br>- Inorganic fluorine compounds (excluding calcium fluoride)<br>- Arsenic and arsenic compounds<br>- Chromium compounds<br>- Cadmium and cadmium compounds<br>- Copper compounds<br>- Cobalt compounds<br>- Nickel compounds<br>- Lead and lead compounds<br>- Zinc compounds<br>- Vanadium compounds<br>- Nontoxic salts<br>- Inorganic sulfides<br>- Phosphorus compounds (excluding mineral phosphates)<br>- Waste oil and water mixtures or emulsions, and hydrocarbon and water mixtures or emulsions<br>- Car and truck wash waters<br>- Industrial wash waters contaminated with a controlled waste<br>- Waste from production or formulation of photographic chemicals or processing materials. | | A110<br>A130<br>D110<br>D130<br>D140<br>D150<br>D190<br>D200<br>D210<br>D220<br>D230<br>D270<br>D300<br>D330<br>D360<br>J120<br>J130<br>L100<br>L150<br>T120 | **REAGENT**<br>Other industrial wastes to be treated using Process 3, as outlined above.<br><br>Permeate produced from reverse osmosis used in Processes 1 and 4 |
| | Lime and absorbents (e.g. soil, sawdust or flocculant) | 700kL (400 tonnes) | N/A | **REAGENT**<br>Used in alternative SPL processing |
| Output | Regenerated HCl | 2600kL (2800 tonnes) | B100 | **PRODUCT**<br>Sold to market |
| | Neutralised zinc sulfate (produced in zinc recovery step) | 970kL | N/A | |
| | Iron sulfate | 1738 tonnes | | **PRODUCT OR WASTE**<br>Sold to market, where possible otherwise disposed of to landfill |
| | Calcium sulfate (gypsum) | 500kL (solidified) | | |
| | Zinc hydroxide solids | 980 tonnes | | |
| | Iron hydroxide | 50kL (solidified) | N205 | **WASTE**<br><br>Solidified and sent to landfill (or other appropriate licensed waste facility) |
| | Recovered sulfides (produced in metal polishing step) | 20kL (solidified) | | |
| | SPL sediment (produced in sediment trap) | 200kL (solidified) | | |
| | Treated and solidified SPL (produced in alternative processing of SPL) | Expected volume: 500kL (may vary, as required) | | |
| | Precipitated cations and contaminants (produced in Process 3 pre-treatment step) | 20kL (solidified) | | |
| | RO concentrate/brine | 90kL (solidified) | | |
| | Oils and solids (produced from oil separation and sediment trap in Process 3) | 70kL | J130 | |