Decision Report

Review of Existing Licence

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

Licence Number	L7333/1997/10
Licence Holder	Vasse Felix Pty Ltd
ACN	009 181 444
File number	DEC7726/1
Premises	Vasse Felix Winery 71 Tom Cullity Drive COWARAMUP WA 6284 Being Lot 101 on Diagram 82806 as depicted in Schedule 1
Date of report	28/10/2022
Proposed Decision	Intent to grant licence

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1. Scope and purpose of assessment

1.1 CEO initiated licence review

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER, the department) determined to undertake a review of licence L7333/1997/10 (the 'existing licence') held by Vasse Felix Pty Ltd (the licence holder) under Division 3, Part V of the *Environmental Protection Act 1986* (EP Act). The review was initiated in accordance with section 59(1) of the EP Act to ensure accuracy and adequacy of existing licence conditions in response to concerns raised by the department that the current wastewater treatment and disposal system at Vasse Felix Winery (the premises) may not be fit for purpose and may pose a risk to the environment.

1.1.1 Background

The wine production process at the premises generates wastewater which is treated and disposed to land on-site via leach drains. Monitoring data reported by the licence holder in their 2020-2021 Annual Environmental Report indicates that the wastewater treatment plant (WWTP) may no longer be fit for purpose, particularly during peak wastewater flow during vintage (typically February to May). This concern is based on multiple lines of evidence, including treated wastewater quality, the volume of wastewater discharged to the leach drains, elevated contaminants detected in groundwater monitoring bores and the need for periodic replacement of leach drains due to loss of infiltrative capacity.

A deficient WWTP poses a risk to the environment through the potential discharge of wastewater with elevated concentrations of nutrients, salts and other cleaning chemicals to land. The likelihood of environmental harm is compounded given treated wastewater is disposed via leach drains installed beneath the seasonally high water table that require periodic replacement due to loss of function.

This review provides an assessment on whether existing licence conditions are adequate to mitigate and monitor the risk of impacts to the environment from emissions generated at the premises. Table 1 lists the prescribed premises categories in the existing licence.

Table 1: Prescribed Premises Categories in the Existing Licence

Classification of Premises	Description	Approved design capacity
Category 25	Alcoholic beverage manufacturing: premises on which an alcoholic beverage is manufactured and from which liquid waste is or is to be discharged onto land or into water.	2,100 kilolitres per year

1.2 Works approval application

On 3 February 2020, the licence holder submitted a works approval application to the department to undertake the following works:

- approval to replace one 30 m leach drain which has been invaded by plant roots causing it to lose its effectiveness; and
- approval to install a new sludge dewatering bin for the collection and storage of solids from the WWTP.

As per correspondence issued by the Department on 13 June 2021, the CEO determined that the replacement of the leach drains is unlikely to alter the nature of volume of wastewater emitted and therefore a works approval or licence amendment is not required for the periodic replacement of existing leach drains. The CEO has also determined that the proposed installation of a replacement

sludge dewatering bin amounts to maintenance and upkeep of the existing system. Therefore, the proposed works outlined in the works approval will not be subject to risk assessment or specific licence conditions and are excluded from the scope of this report.

1.3 Regulatory framework

In completing the assessment documented in this decision 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. Overview of premises

This section outlines existing infrastructure and operational aspects of the premises, including detail on the management of solid and liquid waste generated by the primary wine making activities.

2.1 Operational aspects

The winery was established in 1967 and became a prescribed premises in 1998 with issue of the first licence relating to *Category 25: alcoholic beverage manufacturing*. The premises is located about 15 km north of Margaret River at 71 Tom Cullity Road, Cowaramup and encompasses about 34 ha of land surrounded by other wineries, pastures, olive plantations and Wilyabrup Brook, which intersects the eastern end of the property.

2.1.1 Wine production

The licence holder manufactures wine from grapes grown on vineyards at the premises and from other properties. Grapes are sorted, processed and pressed to remove the juice from the berries during vintage, which typically occurs from February to April following the summer growing season. The juice is then fermented into wine, which is matured in stainless steel and oak barrels before being bottled for sale. The approved production capacity is 2,100 kL per year, while the current maximum production capacity is estimated to be about 2,600 kL per year, based on two fermentation cycles using the total capacity of the fermentation tanks within the winery building.

The wine production process generates solid waste and wastewater. In the 2020-2021 reporting period, 1,545 tonnes of grapes were processed to produce 1,200 kL of wine. This process generated 386 m^3 of solid marc waste and 3,903 kL of wastewater. Wastewater discharge volumes vary seasonally depending on activities in the winery. Approximately 10 kL of wastewater is generated daily at the premises throughout the year, with an average of 15,332 L/day and peak of 32,369 L/day during vintage. Winery processing infrastructure is contained within graded concrete hardstand designed to capture and convey wastewater to the WWTP via drains, sumps and pipelines.

2.1.2 Wastewater treatment and disposal

Wastewater is primarily generated from wash-water used to clean floors, barrels and equipment of wine solids and tartrate deposits after fermentation. Currently, grey water from the restaurant and cellar door and leachate and stormwater from the marc bay is also directed to the WWTP. Wash-water for cleaning is sourced from a dam located centrally within the premises that is also used for vineyard irrigation. Cleaning agents used include caustic soda and citric acid. Wastewater from the cleaning process therefore contains grape juice, wine, organic solids and chemicals used as cleaning agents. These elements cause elevated nutrient and salt concentrations in the wastewater stream.

Wastewater pre-treatment begins with wastewater entering three 3 kL buffering collection sumps, designed to reduce the potential pH shock to the WWTP and balance hydraulic fluctuations. Wastewater pH is neutralised in the second sump via a daily manual dosing of magnesium hydroxide, which also acts as a coagulant and is stored in a bunded 1,000 L intermediate bulk

container. The target pH level of 7.5 requires about 1 L of magnesium hydroxide per 1,000 L of wastewater. Magnesium hydroxide replaced sodium hydroxide as the pH neutralizing agent in 2018.

Following pH adjustment, a float switch is used to pump wastewater to an aerated wastewater treatment plant (WWTP). The treatment process involves screening gross solids, flocculation to remove suspended particles and aeration to reduce the nutrient load. Gross solids are removed via a physical screen into a solids bin. Wastewater is then directed to a 52 kL settling tank prior to aerobic treatment in a series of three 85 kL aeration tanks. Residence time is 57 – 114 days during vintage (flow 16 – 32 kL/day) and 186 days outside of vintage (8 kL/day). Following aerobic treatment, wastewater is dosed with another coagulant (Ultrion 44697) prior to entering a 3.5 kL inflow tank and 6.5 kL separation tank. Treated wastewater is discharged into a 4.8 kL storage tank prior to discharge to the leach drain field.

Most of the treated wastewater is directed into a 0.8 ha kikuyu covered leach drain field (referred to as emission point “L1”) for the final treatment process of subsurface attenuation, while about 1% is recirculated back through the WWTP. The field is divided into four zones, each comprising five 30 m leach drain modules for a combined length of 600 metres across the field. One zone is active while the remaining three “offline zones” are left to dry out, which enables the biological degradation of any sludge and slime build up in the modules. The maximum flow to the leach drains is 4 kL/hour, with rotation of the “active” zone occurring every 250 kL. A flow meter is used to track discharge volumes to the field, with excess water transferred to storage tanks.

Perforated agricultural pipe modules were installed when the leach drain field was created which have been gradually replaced with more durable cement modules since 1998. The field also has a slotted concrete collection sump designed to draw water from the surrounding leach field to assess water height.

2.1.3 Solid Waste Management

Solid waste generated from the wine production process includes marc (grape stalks, seeds and skins) from the grape crushing, draining and pressing stages (vintage) and sediments (lees) containing pulp, tartrates and yeasts from the fermentation stage. Floated lees are disposed off-site via a licenced waste contractor. Marc and other organic solids and sludges from processing areas and sumps are directed to a bunded marc bay for composting. A sludge bag to screen solids was installed on the marc bay in July 2020. After a preliminary period of leaching, wood chips and occasionally manures are added to activate a compost which forms the basis of the vineyards nutritional program.

Compost is removed from the bay in early winter. In the period 1 July 2020 to 30 June 2021, 97 m^3 of compost from the previous vintage (2020) was applied to vineyard on the premises at a rate of 31.2 m^3/ha (Vasse Felix 2021). Compost beyond the requirements of the on-site vineyards is transported by road to other vineyards for use as soil conditioner and agricultural fertiliser.

Leachate and rainfall collected by the uncovered marc composting bay drains to a concrete sump where it was historically irrigated to a tree lot (referred to as emission point “L2”) adjacent to the bay or directed to the WWTP. However, during an inspection on 17 September 2019 it was noted that the tree lot irrigation system was in disrepair. Consequently, the licence holder now directs all leachate and rainwater from the marc bay to the WWTP. The marc bay receives an estimated 487 kL of rainfall per year based on average local rainfall rates (Vasse Felix 2021), which adds to the volumetric loading entering the WWTP.

Sludge produced from the WWTP is captured in two 3.5 kL tanks located on a covered concrete hardstand area. From these tanks the sludge is transferred via an aboveground pipe into a 12 kL sludge storage tank. Currently the sludge is transported off-site for treatment by registered contractors. However, the licence holder is planning to install a skip bin fitted with a geotube dewatering bag to enable sludge to be dewatered. Leachate would be drained back into Tank 2 for aerobic treatment and dewatered sludge transferred to the marc bay for composting.

2.1.4 Stormwater management

Rainfall captured on the roofs of the wine production buildings is directed away from the WWTP into the on-site dam, which overflows in winter to the Wilyabrup Brook. However, stormwater from the marc bay, which is potentially contaminated with winery waste throughout the year, is directed to the WWTP.

3. Legislative context

3.1 Part V of the EP Act

3.1.1 Non-compliance with licence conditions

The licence holder has reported exceedances of the biological oxygen demand (BOD) daily loading rate limit (licence condition 2.2.2) in three successive annual reporting periods (2018/19, 2019/20 and 2020/21). The breaches occurred during vintage when elevated BOD concentrations were reported in treated wastewater. The licence holder reported several causes for the elevated BOD concentrations, including the accidental discharge of floated lees to the treatment plant (2018/19), insufficient holding time in the aeration tanks during peak loading (2019/2020) and a heavy rainfall event causing an increased hydraulic loading in the WWTP (2020/21).

The licence holder installed sludge bags to screen high solids lees in the 2020-21 annual period and installed an additional 70 kL aeration tank to improve treatment capacity in October 2020. However, these improvements were not sufficient to prevent excessive BOD concentrations reported in March 2021. The Department subsequently advised the licence holder in June 2021 to investigate further improvements to the WWTP (DWER letter dated 13 June 2021). An assessment of the risk to environmental receptors from the discharge of wastewater with elevated BOD is presented in Table 5.

4. Monitoring data

The licence holder is required to monitor the quantity and quality of treated wastewater discharged to the leach drain field (L1) and irrigated wood lot (L2), in accordance with licence condition 3.2.1. The licence holder is also required to monitor potential impacts to groundwater from the disposal of wastewater to the leach drain field in accordance with licence condition 3.3.1.

This section summarises the results of treated wastewater sampling since the 2016-2017 annual reporting period and provides a comparison of water quality to industry standards. Breaches of licence conditions relating to water quality are outlined in Section 3.1.1.

This section also provides a review of groundwater monitoring data collected from bores P1, P2 and P3 since the 2015-2016 annual reporting period. The Delegated Officer notes that two new groundwater monitoring bores (P1A and P3A) were installed on 27 January 2022. Bore P1A is located next to P1 upgradient to the WWTP, while bore P3A is better positioned than bore P3 to measure impacts down-hydraulic gradient to the leach drain. The location of these bores in relation to the leach drain field is displayed in Figure 1, Schedule 1 of the revised licence.

4.1 Monitoring of treated wastewater quality

The licence holder samples WWTP outflow for pH, electrical conductivity, biological oxygen demand, total dissolved solids (TDS), total suspended solids (TSS), total nitrogen (TN) and total phosphorus (TP). In addition to providing an indication of WWTP performance, this data used to calculate BOD, TN and TP loading rates applied to the leach drain field, which are restricted by loading rate limits specified in licence condition 2.2.2.

4.1.1 Treated wastewater quality

The concentration of TDS, TSS and BOD in treated wastewater from July 2016 to June 2021 is displayed in Figure 1. The data indicates that all parameter concentrations are relatively stable throughout this period, typically peaking during or immediately following vintage. An exception is the peak BOD concentration in March (vintage), which has been increasing since 2018, with a maximum concentration reported in March 2021 of 6,580 mg/L. A review of TN and TP concentrations during the same period indicates that the concentration of these nutrients is relatively stable across years, with no apparent increase during vintage.

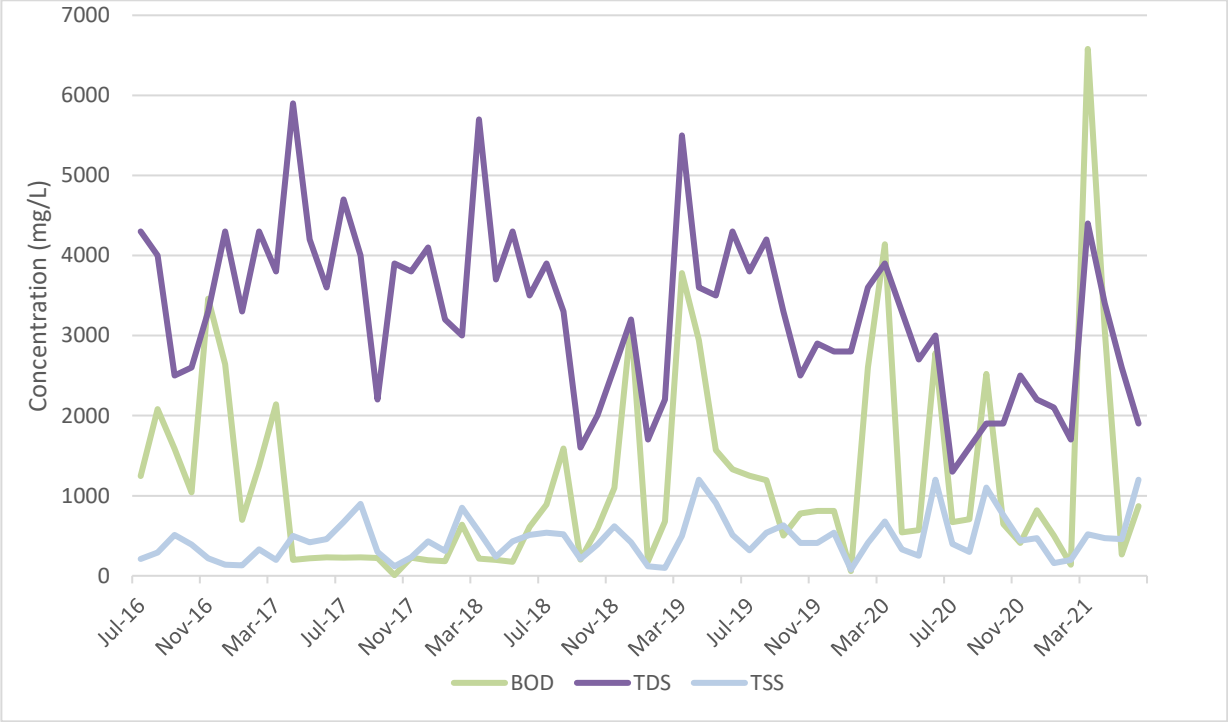

Figure 1 BOD, TDS and TSS concentrations in sampled treated wastewater (July 2016 - June 2022)

A comparison of treated wastewater quality during peak volumetric flows in vintage to typical effluent quality produced by secondary treatment processes is provided in Table 2. During the previous three vintage periods BOD and TSS concentrations were significantly elevated and exceeded typical concentrations ranges to be expected for these parameters from a secondary treatment system. The average BOD concentration was 90-135 times above the typical BOD range produced by a secondary treatment system, while the average TSS concentration is also 12-20 times higher than the typical TSS range. Nutrient concentrations were within typical ranges.

Table 2 WWTP treated wastewater quality compared to typical effluent quality

	Premises treated wastewater quality during vintage[1] (mg/L)	Typical effluent quality following secondary treatment[2] (mg/L)
Total nitrogen	22	20-50
Total phosphorus	9.8	6-12
BOD	2,718	20-30
TSS	490	25-40
TDS	3,511	-

[1] Average concentration throughout February, March and April (2019 - 2021)

[2] Values provided in the National Water Quality Management Strategy (NWQMS) *Australian Guidelines for Sewerage Systems – Effluent Management* (ANZECC and ARMCANZ 1997)

There is no value for typical TDS levels in Table 2. However, the *Australian guidelines for water recycling and managing health and environmental risk* (EPHC 2006) recommend a critical limit of 1,500 mg/L for TDS, above which operational corrective actions are recommended. The average TDS concentration in treated wastewater during vintage (3,511 mg/L) is more than double this recommended critical limit and has only been reported below 1,500 mg/L once in the previous five-year period.

4.2 Monitoring groundwater quality

The licence holder is required to sample groundwater in monitoring bores P1, P2 and P3 for pH, salinity, sodium, magnesium, calcium and sodium adsorption ratio (SAR) levels. Nutrient concentrations and standing water levels are not specified under groundwater monitoring requirements in the licence.

4.2.1 Salinity

Groundwater salinity reported in the premises monitoring bores since August 2015 is displayed in Figure 2, along with water salinity classifications (DoW 2017). Salinity levels are stable in all bores during the displayed monitoring period. Elevated TDS levels (>2,000 mg/L) were consistently reported in bore P2 indicating saline water quality, while TDS levels in bore P3 indicate marginal water quality (>500 mg/L). Bores P2 and P3 are located immediately up-hydraulic gradient and down-hydraulic gradient to the leach drains, respectively. This contrasts with fresh water (<500 mg/L) reported in bore P1, which is located up-gradient to the leach drain field and intended to represent baseline groundwater quality in the local area.

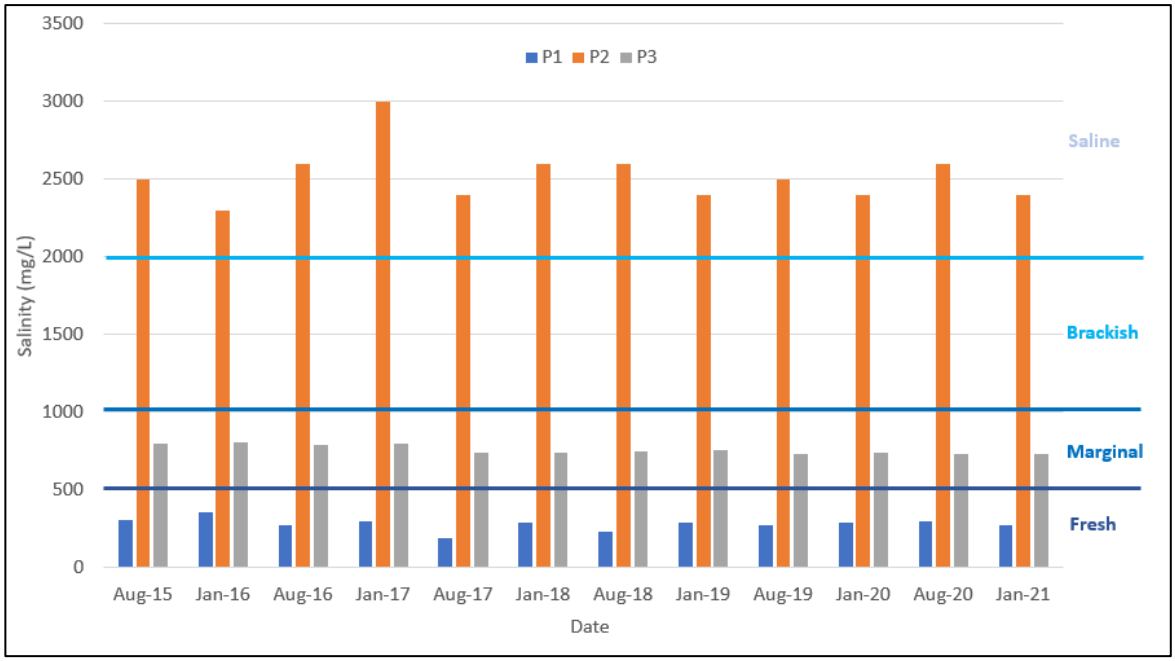

Figure 2 Groundwater salinity in monitoring bores P1, P2 and P3

4.2.2 Sodium adsorption ratio

Elevated SAR has been reported in groundwater near the leach drain field (bores P2 and P3) since August 2015 (Figure 3). The SAR reported in groundwater collected from bores P2 and P3 has consistently exceeded 8 meq/L which represents a risk to soil structure instability such as reduced permeability and waterlogging (NSW DEC 1998).

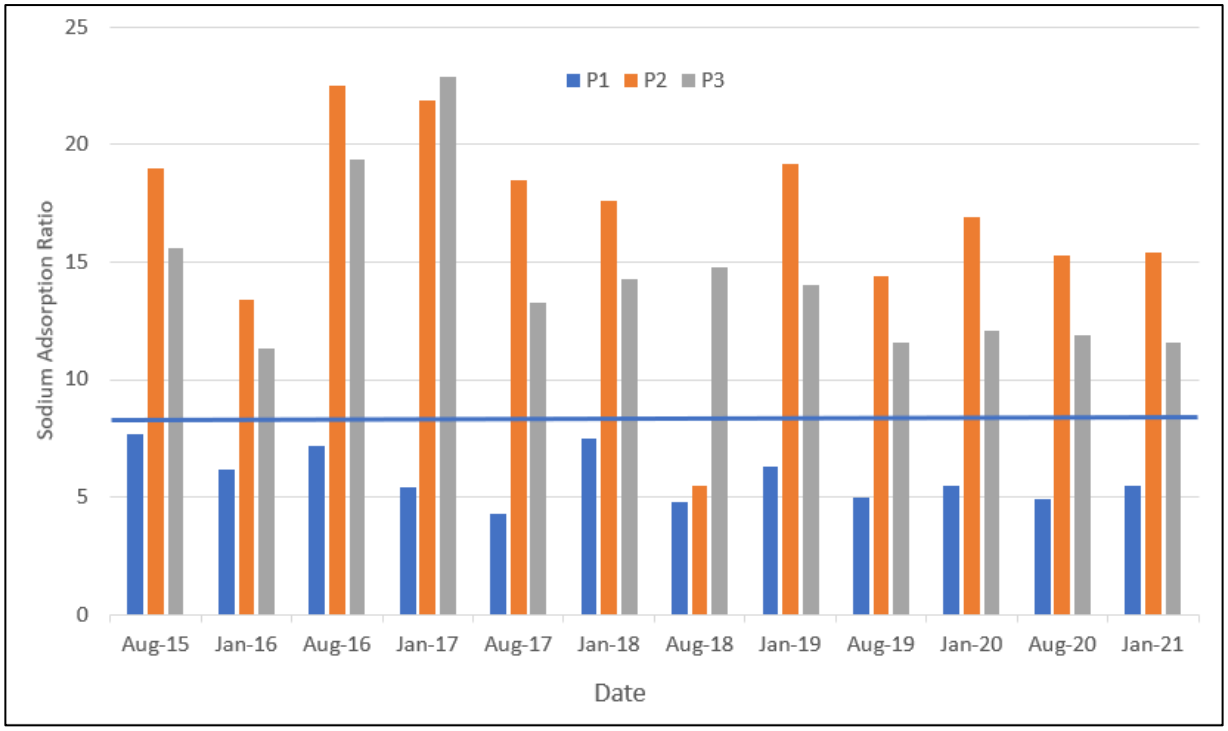

Figure 3 Sodium adsorption ratio in monitoring bores P1, P2 and P3

The Delegate Officer reviewed the information in this section and has found:

- Elevated TDS, TSS and BOD concentrations reported in treated wastewater indicate that the leach drain field has been subject to a high salinity loading and high BOD loading that may exceed its treatment capacity;
- Elevated salinity and sodicity (SAR) reported in groundwater bores adjacent to the leach drain field indicates that the leach drain field may have been subject to an excessive salt loading beyond the treatment capacity of the leach drains;
- Unless the potentiometric head measured in bore P2 is lower than the base of drains in the leach-field, it would be unlikely that elevated salinity values detected in bore P2 were derived from wastewater disposal. The rate of wastewater disposal into the leach-field is considered to be too low to cause significant groundwater mounding and flow towards bore P2;
- Measurement of BOD, nitrogen and phosphorus concentrations is not specified in groundwater monitoring requirements in the licence. Therefore, the potential impacts to groundwater from the disposal of treated wastewater to the leach drain field with excessive organic material (represented by BOD) cannot be assessed in this review; and
- The measurement of standing water levels in groundwater monitoring bores is not specified in the licence. Consequently, key information gaps exist in understanding contaminant exposure pathways (e.g. groundwater depth and flow direction) and the risk of impacts to environmental receptor health via the discharge to land of wastewater with elevated salt and BOD levels.

5. Leach drain capability assessment

The licence holder submitted a *Leach Drain Capability Assessment* (Emerge Associates 2022) to the department on 7 April 2022. This report provided a technical assessment of the leach-field

system at the site to determine the suitability of the system to receive ongoing wastewater discharge. The following technical findings were reported:

- There is inadequate groundwater separation for wastewater disposal when groundwater levels are high;
- The hydraulic capacity of the leach field is 29,300 L/day;
- The soil profile in the leach field consists of fill over natural soils, which were generally considered to be non-sodic to slightly sodic; and
- Soils in the leach field are capable of adsorbing and attenuating phosphorus and nitrogen in the wastewater and it would take more than 50 years to saturate the soil with phosphorus.

In consideration of the technical findings listed above, the report recommended that the leach drain field was suitable for ongoing use subject to the following operational controls:

- Installation of low-profile flatbed leach drains and suitable geotechnical fill material to achieve adequate groundwater separation in the west half of the leach field (to enable year-round discharge). Discharge to the west half of the field should be restricted to 14,500 kL/day;
- Restrict discharge to the east half of the leach field when there is less than 0.6 m of groundwater separation;
- Manage volumes of excess water during vintage when peak flows exceed the hydraulic capacity of the leach fine by adopting one of the following strategies:
    - Dispose excess wastewater off-site;
    - Add additional surge storage on-site; or
    - Reduce inflow to the wastewater system; and
- Increase scope of wastewater and groundwater monitoring, including:
    - Monthly monitoring of groundwater levels in bore P3;
    - Weekly monitoring of treated wastewater discharge flow meter;
    - Regular groundwater quality monitoring in bore PA3 (in February, April and August); and
    - Regular visual inspections of the leach field to ensure it is operating effectively.

5.1 DWER technical review

The department completed a technical review of the *Leach Drain Capability Assessment* and considers that, despite the proposed controls, the existing leach drain field does not have sufficient capacity to manage the seasonally high discharge rates and BOD levels in treated wastewater that are periodically imposed on the system. This is based on the following:

- An inappropriate methodology was used to estimate the hydraulic loading capacity for the leach-field system (29,300 m^3/day) which was receiving high-BOD wastewater. Water flow from the leach drains is controlled by the hydraulic conductivity of the biomat layer, which is likely to be much lower than the estimated rate (Beal *et al*., 2006);
- Use of the Department of Health “OWSAST” tool in the assessment is also not considered appropriate, given the tool has been designed to work with domestic-strength wastewater, whereas the peak BOD, total suspended solids (TSS) and total dissolved solids (TDS) levels in the winery wastewater are seasonally much higher than in domestic wastewater;
- Consequently, the daily loading rate for wastewater in soil used in the OWSAST tool was overestimated when calculating the length of leach drains required to discharge wastewater. It is likely that the required length of leachate drains would have to be at least 1,000 metres to sustainably accommodate the periodic high loading of BOD;
- Further, the methodology outlined in *AS/NZS 1547* for sizing leach-drains is likely to be of limited value for water with a high dissolved organic carbon content (Beal et al. 2006). This is because the initial hydraulic testing of the soils in a proposed infiltration area does not

indicate the long-term acceptance rate of the wastewater after a period of about a year, when a microbial biomat has become established in soils adjacent to the leach drains; and
- There is a significant risk the system will continue to experience hydraulic failure (e.g. clogging due to the excessive growth of microbial biomats in soils materials in the discharge area), which could lead to the surface expression and the overland flow of toxic effluent into Wilyabrup Brook.

The review also identified that the highly anaerobic conditions caused by the discharge of high BOD waste material to soil poses a significant risk of arsenic leaching from the iron-rich soils into groundwater (Julien, 2014; Julien and Safferman, 2015). Arsenic and iron should therefore be included in the suite of analytes that are measured in samples collected from monitoring bores at the site.

The department provided the above advice to the licence holder on 15 July 2022 and acknowledged that on-site wastewater disposal options such as irrigation are constrained by a lack of available land at the premises. Given expansion of the leach drain field also appears to be impractical, the department advised that treated wastewater quality must be improved to a level that will ensure the risk of hydraulic failure is reduced to an acceptable level.

In response, the licence holder advised that they would implement the following key controls to reduce the BOD and hydraulic loading applied to the leach drain field:

- Divert clean stormwater from the marc bay to the dam outside of vintage, reducing discharge to the leach field by 385 kL/year. A dedicated concrete bund will be installed to store sludge dewatering bags outside of vintage, allowing the marc bay to be clean during this period;
- Direct greywater from the restaurant to a dedicated leach drain, reducing discharge to the leach field by 588 kL /year; and
- Install a new balance tank (at least 160 kL) with an aeration system in the WWTP to balance water flows and quality prior to further treatment.

The Delegate Officer reviewed the information in this section and has found:

- The existing leach drain field is unlikely to have sufficient capacity to manage the seasonally high discharge rates and BOD levels in treated wastewater that are periodically imposed on the system;
- Due to land constraints, there are no practical alternative options for the on-site disposal of wastewater. Therefore, to ensure the risk of hydraulic failure is reduced to an acceptable level, the licence holder must improve the quality of treated wastewater discharged to the leach field; and
- The licence holder has proposed several controls to improve treated wastewater quality that should be considered as revised licence conditions, including installing a new buffer tank and diverting greywater from the restaurant and clean stormwater from the marc bay away from the WWTP.

6. 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.

6.1 Source-pathways and receptors

6.1.1 Emissions and pathways

The key emissions and associated actual or likely pathway during premises operation which have been considered in this decision report are detailed in Table 3 below. Existing and proposed licence holder controls intended to prevent, control, abate or mitigate these emissions are provided in Table 5.

Table 3: Emission sources and potential pathways

Emission	Sources	Potential pathways and receptors
Leachate and contaminated stormwater runoff with elevated levels of organic matter, salts and BOD and moderate levels of nutrients (N and P)	Storage and composting of marc, lees, sludges and other organic solid waste on the marc bay	Leak or surface runoff to soil and infiltration to groundwater
	Outdoor wine blending and storage tank farm	Leak or surface runoff to soil and infiltration to groundwater
Wastewater with elevated levels of organic matter, salts and BOD and moderate levels of nutrients (N and P)	Overtopping event or loss of containment in wine processing or storage areas Cleaning tanks, floors and equipment in wine processing areas	Surface runoff of wash-down waters or tank contents to unsealed areas
	Disposal of treated wastewater to subsurface leach drains	Infiltration to soil and groundwater Migration of contaminants in groundwater to nearby Wilyabrup Brook creek system
	Overtopping event or loss of containment in the WWTP	Infiltration of tank contents to soil and groundwater
Contaminated stormwater	Marc bay	Overland runoff to soil and groundwater

6.1.2 Receptors

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

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

Table 4: Sensitive environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Soil structure and future beneficial use (agricultural) Soils are predominantly loamy gravel to 2.5 m bgl and clay from 2.5 m bgl to 5 m bgl at bore P3A near the leach drains	Soils potentially at risk are beneath and surrounding the leach drain fields and WWTP.

Superficial groundwater aquifer (protection of baseline quality, potential contaminant migration pathway) Groundwater water in the premises baseline bore P1 is fresh (salinity ranging from 290-360 mg/l since 2015)	On-site bore monitoring data indicates groundwater ranges from 0.5 – 2.4 m bgl in the vicinity of the leach drains and WWTP
Busselton-Capel - Cape to Cape North groundwater subarea (proclaimed under *RIWI Act 1914*)	Premises is within this area.
Wilyabrup Brook and groundwater dependent ecosystem flora and fauna	Wilyabrup Brook is about 250 m northeast to leach drains (down-hydraulic gradient) The on-site dam overflow channel that discharges into Wilyabrup Brook is about 60 m east and down-hydraulic gradient to leach drains
Busselton Coast – Wilyabrup surface water subarea (proclaimed under *RIWI Act 1914*)	Premises is within this area.

6.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and considers potential source-pathway and receptor linkages as identified in Section 6.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has existing mitigation measures/controls, these have been considered when determining the final risk rating. Where the Delegated Officer considers that the existing controls remain critical to maintaining an acceptable level of risk, these will be incorporated into the revised licence as regulatory controls.

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

Licence L7333/1997/10 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. winery production.

The conditions in the issued licence, as outlined in Table 5. have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 5: Risk assessment of potential emissions and discharges from the premises

Risk events						Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of licence	Justification for regulatory controls
Activities / Sources		**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder controls**				
Wine production and storage in winery building, red barrel hall and outdoor storage tank farm	Loss of containment in wine processing and storage tanks and cleaning of tanks, floors and equipment leading to surface runoff	Raw wastewater with elevated levels of organic matter, salts and BOD, moderate levels of nutrients (N and P) and chemical residues	Infiltration causing impacts to soil and groundwater	Soil and groundwater Wilyabrup Brook about 300 m northeast	• Wine production and storage areas designed with sloped hardstand and drainage designed to convey wastewater and spilled product to WWTP • All wastewaters from winery building, red barrell hall and outdoor wine tank farm to be directed to the WWTP	C = Slight L = Unlikely **Low Risk**	Y	Condition 1 (Maintenance of hardstand and drainage channels, direct all wastewaters to the WWTP)	The risk is low given the distance to receptors and licence holder controls are considered sufficient to reduce the risk of impact from the loss of containment to an acceptable level.
Operation of WWTP (including upstream wastewater drainage infrastructure)	Overtopping or loss of containment of tanks	Wastewater with elevated levels of organic matter, salts and BOD, moderate levels of nutrients (N and P) and chemical residues	Infiltration through soils causing adverse impacts to soil and groundwater	Soil and groundwater	• Sludge tanks, inflow tank and separation tank located on sheltered hardstand to control potential leachate and loss of containment • Prevent vegetation and floating debris from growing or accumulating in the aeration tanks • Installation of new balance tank to equalize water flow and reduce risk of overtopping • Six-monthly monitoring of groundwater bores located up and down-hydraulic gradient to the leach field and WWTP	C = Slight L = Unlikely **Low Risk**	Y	Condition 1 (Maintenance of WWTP hardstand and drainage infrastructure to prevent loss of wastewater to ground, prevent vegetation and floating debris from growing or accumulating in the aeration tanks) Condition 2 (installation of new aeration tank)	The risk is low given the capacity and content of the individual tanks, distance to sensitive receptors (Wilyabrup Creek) and licence holder controls are considered sufficient to reduce the risk of impact from an overtopping event or leaks the loss of containment to an acceptable level.
	Leaks in sludge storage tanks	Leachate from wastewater treatment sludge	Infiltration through soils causing adverse impacts to soil and groundwater						
Discharge of treated wastewater to leach drain field		Treated wastewater with elevated levels of organic matter, salts and BOD, moderate levels of nutrients (N and P) and chemical residues	Infiltration causing impacts to soil and groundwater	Soil Groundwater (water table less than 2 mbgl)	• Installation of a new balance tank (minimum 160 kL) with aeration system to enable at least 5 days retention time which will improving solids settling, stabilize flow and reduce maximum daily discharge to leach drains • Installation of a dedicated concrete bund adjacent to marc bay for storage of dewatering sludge bags, enabling marc bay to be free of solids outside of vintage • Direct all clean stormwater captured in marc bay outside of the vintage period to the on-site dam to reduce hydraulic loading to WWTP • Diversion valve recently installed in marc bay drainage line to enable control over stormwater flow direction • Divert restaurant greywater away from WWTP to reduce hydraulic loading • Six-monthly monitoring of groundwater bores located up and down-hydraulic gradient to the leach field and WWTP • Flow meter installed at WWTP outflow to record and control daily discharge	C = Moderate L = Possible **High Risk**	N	Condition 1 (WWTP to only receive wastewater or leachate generated from alcoholic beverage manufacturing operations in the winery, red barrel hall and outdoor tank farm) **<u>Condition 1 (no discharge to the east area (bank 3 and 4) from 1 June to 31 October, daily discharge limits of 14,500 L/day to each area, record daily discharge volumes and times during vintage [1 February to 30 April], monthly inspection of leach field surface)</u>** **<u>Condition 2 (replace leach drains in west area of leach field with leach drains to achieve at least 0.6 m separation to groundwater year-round)</u>** Condition 2 (installation of new aeration tank and concrete bund in marc bay) **<u>Condition 8 (BOD loading limit applied to wastewater discharged to leach</u>**	The Delegated Officer reviewed the licence holder controls and considers there is a medium risk of impact to the down-gradient receptors, noting the historical failure of leach drains, high BOD loading in discharged wastewater and high conservation value of the Wilyabrup Brook stream and groundwater dependent ecosystem. There is also a medium risk of impact to soils and groundwater in the vicinity of the leach drains. In addition to specifying the licence holder proposed controls, the Delegated Officer has determined that additional regulatory controls are required to reduce the risk of impact to an acceptable level. Given the leach field treatment capacity cannot be increased due to land constraints, these controls include a BOD loading limit and daily volumetric discharge limits to address the high risk of hydraulic failure. The Delegated Officer considers that existing loading rate limits set in the licence are not suitable given they are based on guidance for an irrigation scheme where there is some uptake of nutrients by vegetation. Therefore, a revised BOD loading limit has been set based on guidance produced by the Michigan Department of Environmental Quality (Michigan DEQ, 2015) which determined that BOD loads more than 56 kg/ha/day for prolonged periods can cause soil clogging in a leach-field. The revised limit of 1,680 kg/ha/month provides the licence holder time to adjust wastewater discharge to the field to meet compliance, given the risk of clogging and thus hydraulic failure is caused by repeated discharges of elevated BOD over an extended period of days to weeks. The Delegated Officer also considers it to be a practical limit given the licence holder has demonstrated that it can generally achieve compliance with this limit, with the BOD only exceeding 56 ka/ha/day on five occasions since the 2017 vintage period. In the most recent annual period, BOD only exceeded 56/kg/ha once (71.1 kg/ha/day reported in March). The Delegated Officer also notes that management measures proposed by the licence holder to improve wastewater quality are scheduled to be implemented by January 2023, which is prior to the next vintage period and provides sufficient time to adjust operations to comply with the new BOD loading limit. The Delegated Officer has also specified additional operational
			Migration of contaminants in groundwater to dam overflow channel and Wilyabrup Brook GDE	Dam overflow channel about 60 m east that drains into Wilyabrup Brook about 250 m northeast of the drains		C = Major L = Unlikely **Medium Risk**			

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of licence	Justification for regulatory controls
Activities / Sources	Potential emission	Potential pathways and impact	Receptors	Licence holder controls				
							field) Condition 10 (monitoring of WWTP outflow for flow rate, pH, conductivity, dissolved and suspended solids, total nitrogen and total phosphorus) Condition 11 (monitoring of groundwater in bores P1A and P3A for standing water level, pH, salinity, sodium, magnesium, calcium, SAR, **arsenic, total nitrogen and total phosphorus**) **Condition 16 (annual reporting of wastewater discharge and groundwater monitoring data)**	controls relating to the discharge of wastewater to the leach field. A maximum daily discharge limit of 14,500 L/day to each area (west and east) aligns with the hydraulic loading capacity of the drains and enables rest periods to reduce the risk of a biomat layer forming around the drain modules. Daily discharge volumes must be recorded during vintage and annually reported to support enforcement of this condition. Due to the lack of groundwater separation, which poses the significant risk that contaminants in wastewater may be discharged directly to groundwater in winter, discharge to the east area (Bank 3 and 4) is not permitted from 1 June to 31 October when the groundwater level is seasonally high with less than the recommended 0.6 m of separation from the base of the leach drain modules to the water table. To enable discharge to the west field to continue throughout the year, the Delegated Officer has specified the replacement of leach drains in the west area with leach drains to increase groundwater separation. Monthly inspections of leach field surface and perimeter for seepage or flooding have been specified to ensure they are maintained to be fit for purpose. The Delegated Officer has also specified that only wastewater from winery processing operations can be directed to the WWTP. Until recently, greywater from the restaurant (about 588 kL/year) was directed to the WWTP. The licence holder is planning to direct this greywater to a new leach drain (dependent on LGA approval), which is expected to further reduce nutrient and BOD load to the wastewater system. Groundwater monitoring bores P1 and P3 have been replaced by bores with superior construction (P1A and P3A). Bore P3A is also in a better position than bore P3 to measure down-gradient groundwater impacts from the leach drain field. Further, the groundwater monitoring suite of analysis has been expanded to include arsenic, TN and TP in bore P3A. These additional parameters will improve monitoring to protect the environmental values of Wilyabrup Brook. The Delegated Officer has removed the existing loading limits for TN and TP, given current levels of these nutrients in treated wastewater are below the recommended short-term limits for agricultural irrigation water set in the ANZ guidelines (ANZECC and ARMCANZ 2000).
Storage and composting of solid waste (marc, lees and wastewater treatment sludge) on the marc bay	Leaks and contaminated stormwater runoff	Nutrient rich leachate and stormwater	Infiltration causing adverse impacts to soil and groundwater	Soil and groundwater	• Maintain marc bay designed with a concrete base, concrete walls and a sloped surface that drains leachate to the WWTP • During vintage, all stormwater from bay is directed to the WWTP • Outside of vintage, sludge dewatering bags will be stored in a new concrete bund with all solids removed from the marc bay, enabling clean stormwater to be directed to the on-site dam instead of the WWTP	C = Minor L = Unlikely **Medium Risk**	Y	Condition 1 (maintenance of marc bay hardstand, direct leachate from marc bay and concrete bund to WWTP)	The licence holder control to maintain the marc bay infrastructure, which is designed to control leachate and stormwater within the marc bay and direct it to the on-site dam of WWTP, is sufficient to reduce the risk of impact to soil or groundwater to an acceptable level.
Application of solid waste to land (vineyards)		Nutrient rich leachate	Infiltration causing adverse impacts to soil and groundwater	Soil and groundwater	• All solid waste generated from wine production must be composted in the marc bay prior to application to vineyards	C = Minor L = Unlikely **Low Risk**	Y	Condition 5 (winery solid waste must be composted prior to application to land, evenly spread and only applied to vineyards) **Condition 6 (compost spreading buffers to sensitive areas (watercourses etc.)** **Condition 16 (annual reporting of solid**	In addition to the licence holder controls, the Delegated Officer has specified buffers to ensure that compost is not applied near sensitive receptors to reduce the risk of impact to receptors to an acceptable level.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of licence	Justification for regulatory controls
Activities / Sources	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder controls**				
							waste application rates to land)	

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.

7. Decision

The Delegated Officer has revied the existing licence and has determined that several amendments are required to ensure that ongoing operations at the premises do not pose an unacceptable risk of impacts to public health and the environment. This determination is based on the following:

- A review of AERs since 2016 identified elevated TDS, TSS and BOD concentrations in treated wastewater being dispose to land via leach drains, especially during peak flows in vintage, which indicates there has been a high salinity and BOD loading to land that poses a risk to the sensitive, down-gradient Wilyabrup Brook GDE and indicates the WWTP is not currently fit for purpose;
- A review of groundwater monitoring data identified elevated salinity and SAR reported in groundwater bores adjacent to the leach drain field that indicates the leach drain field may have been subject to an excessive salt loading beyond the treatment capacity of the leach drains;
- Inappropriate leach drain infrastructure design, given there is inadequate separation to groundwater during winter when the water table is seasonally high, which may result in contaminants in wastewater being discharged directly to groundwater; and
- Evidence that the historical periodic replacement of leach drains has been required due to loss of infiltrative capacity.

To address the potential for immediate impacts to soil and groundwater that may result from winery operations and continued disposal of treated wastewater to land via the leach drain system, and to enable proactive management to protect downgradient surface water receptors, the following key controls have been added to the existing licence:

- Operational restrictions on the discharge of treated wastewater to land, including:
  - A restriction on discharge to the east half of the leach field (banks 3 and 4) during winter when adequate groundwater separation cannot be achieved (following installation of automation system);
  - A hydraulic loading limit of 14,500 kL/day to the west and east leach field areas (as defined in Figure 2, Schedule 1 of the revised licence); and
  - A BOD loading limit of 1,680 kg/ha/month, considered appropriate to prevent failure of the leach drain modules;
- Replacement of existing leach drains in the west area of the leach field (banks 1 and 2) to enable continued use of the field throughout the year;
- Construction of a new balance tank in WWTP and marc pad bund to reduce and stabilise flow through the WWTP;
- Improved groundwater monitoring with new bores P1A and P3A and an expanded suite for analysis including arsenic and nutrients to monitor leach drain performance and the risk to down-gradient receptors; and
- Restricted on-site solid waste disposal, with solid winery waste required to be composted, spread evenly and only to vineyards if applied to land within the premises boundary.

In revising the licence, the Delegated Officer has also:

- Updated the format and appearance of the licence;
- Deleted the redundant AACR form set out in schedule 1 of the previous licence; and
- Revised condition numbers and removed any redundant conditions and realigned condition numbers for numerical consistency.

7.1 Licence holder comments on draft decision

The licence holder was provided with the draft decision report and draft revised licence on 26 September 2022 for comment. The licence holder's comments are summarised, along with the department's responses, in Appendix 1.

8. Consultation

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

Table 6 Consultation

Consultation method	Comments received	Department response
Review advertised on the department's website for 21 days on 7 September 2022	None received	N/A
Local Government Authority and Department of Health (DoH) advised of licence review on 7 September 2022	DoH response received on 6 October 2022: DoH raised concern that the original onsite WWTP and disposal area approved in 1998 is undersized given it was designed to process approximately 8,100 litres of wastewater per day and wastewater volumes and sewerage legislation have changed considerably since 1998. Further, DoH notes the original system was designed for both human and industrial waste streams and recommends that an audit is carried out to determine accurate tonnage of grapes processed, volumes of the industrial stream system, and peak flows of human effluent waste based on the number of personnel and patrons on site. The daily wastewater volumes should then be determined based on the requirements of the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* and the Government Sewerage Policy (2019).	The Delegated Officer notes the licence holder has completed several upgrades to the WWTP since the original plant was constructed and further upgrades are planned, which have been specified in the revised licence. Blocked leach drains have also been periodically replaced. DWER has undertaken a technical review of the capacity of the current WWTP and leach drain disposal area, which has been considered in this report. The review identified additional regulatory controls to be specified to ensure the risk of excessive hydraulic and nutrient loading to the leach drain disposal system has been reduced to an acceptable level. Further, treated wastewater quality is subject to regular monitoring which has informed the performance assessment of the WWTP, which is considered sufficient to accommodate the current hydraulic and nutrient loading, subject to upgrades specified in the revised licence. At this stage, an audit is not considered necessary, with WWTP outflow measurements enabling DWER to set outcome-based controls to manage the risk of discharge of wastewater to land. Human effluent waste is not directed to the WWTP and industrial leach drain system. Rather, blackwater from the

		restaurant is disposed on-site to a separate, smaller scale leach drain system immediately north of the restaurant. Greywater has historically been directed to the WWTP, however this practice is no longer permitted. Therefore, only wastewater from the winery processing sheds and marc pad is ow directed to the WWTP.
	Clarification on whether this proposal is situated on one lot as the lot appears to be divided between two Local Government jurisdictions, the Shire of Augusta Margaret River and the City of Busselton.	The premises is located entirely within the Shire of Augusta Margaret River.

9. Conclusion

Based on the assessment in this decision report, the Delegated Officer has determined to grant revised licence L7333/1997/11, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

9.1 Summary of amendments

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

Table 7 Summary of licence amendments

Condition no.	Proposed amendments
Introduction	Deleted, consistent with current DWER template. This guidance is now available in DWER's Guide to Licensing (June 2019).
Licence history	Updated, consistent with current DWER template.
Interpretation	Inserted, consistent with current DWER template.
1.2.1	Deleted, redundant condition
1.2.2	Deleted, redundant condition
1.3.1	Condition incorporated into new Table 1
1.3.2	Condition incorporated into new Table 1
1.3.3	Deleted irrigation operational requirements given irrigation is no longer permitted at the premises Compost spreading requirements incorporated into condition 5 and 6
1.3.4	Condition incorporated into new Table 1
Condition 1 – Table 1	New table added to specify design and operational requirements for key site infrastructure, including winery processing and storage buildings, wastewater treatment and disposal systems and the marc bay composting facility.
Condition 2 – Table 2	New table added to specify design and construction requirements for new infrastructure to be built or installed, including the marc bay sludge dewatering bund, WWTP balance tank and replacement leach drain modules.
Condition 3 and 4	New requirement to submit an compliance report for the infrastructure items listed in Table 2
Condition 5 and 6	Solid waste storage and on-site disposal requirements previously specified in Table 1.3.2

2.1.1	Deleted, redundant condition
2.2.1	Condition incorporated into new condition 7
Condition 7	Authorised discharge points previously specified in Table 2.2.1 'Leachate irrigation area' or 'L2' removed as an authorised discharge point
2.2.2	Condition incorporated into new condition 8
Condition 8	Emission and discharge limits previously specified in Table 2.2.2 Revised BOD loading limit to 1,680 kg/ha/month Deleted redundant limits for TN and TP
3.1.1 and 3.1.2	Condition incorporated into new condition 9
Condition 9	General monitoring requirements previously specified in condition 3.1.1
3.1.3	Deleted, redundant condition
3.1.4	Deleted, redundant condition
3.1.5	Deleted, redundant condition
3.2.1	Condition incorporated into new condition 10
Condition 10	Treated wastewater monitoring requirements previously specified in Table 3.2.1 Deleted monitoring requirements for discharge point 'L2' given irrigation is no longer authorised at the premises
3.3.1	Condition incorporated into new condition 11
Condition 11	Groundwater monitoring requirements previously specified in Table 3.3.1 Added new monitoring bore sampling points P1A and P3A Deleted monitoring bore sampling points P1, P2 and P3 Added requirement to measure standing water level, total nitrogen, total phosphorus and arsenic
4.1.1	Condition incorporated into new condition 15
Condition 12	Complaints management requirements previously specified in condition 4.1.4
4.1.2	Deleted, redundant condition
4.1.3	Condition incorporated into new condition 13
Condition 13	Annual audit compliance reporting requirements previously specified in condition 4.1.3
4.1.4	Condition incorporated into new condition 12
Condition 14 and 15	Requirement to maintain records in auditable books previously specified in condition 4.1.1
4.2.1	Condition incorporated into new condition 16
Condition 16	Annual environmental reporting requirements previously specified in condition 4.2.1 Additional detail specified for wastewater and groundwater monitoring reporting
4.2.2	Deleted, redundant condition
4.3.1	Deleted, redundant condition
Definitions	Updated to reflect new and deleted definitions
Schedule 1, Figure 1	Consolidated existing Maps 1 and 2 to include updated monitoring bores, wastewater sampling points and key site infrastructure
Schedule 1, Figure 2	New figure displaying leach drain field layout and location of new marc bay concrete bund
Schedule 2: Reporting and notification forms	Deleted, redundant attachments

References

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14. Vasse Felix 2021, *Annual Environmental Report (2020-2021)*, submitted to DWER on 28 September 2021.

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

Condition	Summary of applicant's comment	Department's response
1 (Table 1 – Item 5)	The WWTP currently receives restaurant/kitchen grey water. There is a proposal to divert this away from the WWTP. Recommend that in dot point 1 add "and grey water from the Vasse Felix restaurant" until it is diverted (subject to Shire Approval).	Amended to enable continued discharge of greywater to the WWTP until LGA approval is granted to divert greywater to a new leach drain system. LGA approval is likely to be granted prior to the next vintage season. Waste must be diverted no later than October 2023.
	Request dot point 2 remove or re-word to exclude tanks that operate with a floating sludge layer (settling tank). Floating organic solids are common in the settling tank. The surface crust that forms is not removed as it helps reduce odour from this anaerobic tank.	Amended to specify vegetation and floating debris to be prevented from growing or accumulating in the *aeration* tanks.
1 (Table 1 – Item 6)	Currently there is no automation to start or stop the discharge to allow daily control of volumes to the east or west leach fields. Discharge events start and stop depending on inflow rates. A manual valve is used to direct wastewater discharge as evenly as possible to the west and east areas. Historically the daily discharge volume has been calculated on a monthly average which allows for variable discharge flows from day to day. Automation can be investigated as part of the leach field replacement project. As the leach field is not operating evenly, flexibility to divert to the east and west areas throughout the year is required to reduce the risk of flooding. Vasse Felix requests that all leach field areas be available for discharge throughout the year until the leach field is refurbished in January 2024. This will reduce the risk of seepage or overflow from the leach field. Note: The marc bay stormwater diversion is already in place which will further reduce the hydraulic loading during this period	The Delegated Officer has agreed to postpone the requirement to cease discharge to the east area (Bank 3 and 4) from 1 June to 31 October until 1 February 2024, by which point an automation system is to be installed for the discharge of wastewater to the field. An automation system has been specified in the leach field construction design requirements (Condition 2 - Table 2). The delay will result in discharges to the east area of the leach drain field throughout winter in 2023. However, the Delegated Office considers this to be acceptable, given additional controls are now in place to reduce the hydraulic loading to the WWTP and mitigate the risk of impact to the down-hydraulic gradient Wilyabrup Brook. These controls include a limit on the daily discharge to each leach field area, the diversion of marc pad stormwater and greywater away from the WWTP, the installation of a new balance tank and a new monitoring bore down-gradient to the leach drain field.
	Monthly inspection of the leach drain modules (pipes and concrete) for leaks and blockages is not possible as they are buried. An inspection of leach field surface and perimeter can be carried out monthly to identify seepage or flooding	Amended accordingly.
	Daily wastewater discharge volumes can be recorded 7 days a week during vintage but	Amended to allow for two missed readings per monthly period.

Condition	Summary of applicant's comment	Department's response
	as this is a manual process there is a risk of human error resulting in missed readings. Vasse Felix requests that there be a clause to allow for 2 missed readings/month.	
2 (Table 2)	Though flatbed drains will be the likely solution Vasse Felix would like the opportunity to consider alternative leach drain distribution methods that still meet the intent (groundwater separation).	Amended accordingly.
6	Compost is a stable organic form of fertiliser which reduces the risk of nutrient run off compared to inorganic fertilisers. This condition restricts applications of compost to a significant area of existing vines (see Figure 1 attached at the end of this table). If the organic waste compost cannot be used in these areas, then other forms of fertiliser will be required. Composted waste described in condition 5 must be spread evenly and may only be applied to vineyards	Amended to specify that the solid waste undergoing 'composting' on marc pad is not applied to land within 50 m from of any defined watercourse, wetland or external property boundary during the wet season (define as the period 1 May and 31 August). This is considered necessary to reduce the risk of surface runoff during storm events.
8	Vasse Felix supports the use of a monthly load limit to allow operational changes to the WWTP during the month if a high BOD concentration is measured. The decision document (Table 5 under 'discharge of treated wastewater to leach drain field') states that if a 56kg/had/day limit had been in place historically it would have been exceeded on five occasions since 2017 vintage. There would have been 18 exceedances since 2017 vintage. This discrepancy is because the historic loads were reported using a leach field area of 8,000 m^2. Moving forward the leach field area of 1800m2 will be used to calculate the equivalent load per hectare. It is expected that the new balance tank and additional aeration will reduce BOD but until the system is commissioned the overall load reduction is not known. Other incremental improvements may be required. Vasse Felix can monitor and report performance against the DEQ guideline of 56kg/ha/day but if it is applied as a licence limit before commissioning of the new tank it is likely there will be instances of non-compliance. Consider removing the BOD load limit until the new tank is commissioned. Include a requirement to report the load of total BOD kg/ha/day (calculated monthly) with a comparison to the DEQ load guideline of 56 kg/ha/day. Vasse Felix requests that the DEQ load guideline is specified as 56kg/ha/day (calculated monthly) consistent with the format of the DEQ guideline to allow for variable days in the month and to avoid confusion in future.	The Delegated Officer has retained the monthly BOD load limit, which provides the licence holder with options to avoid an instant breach, such as adjusting discharge volumes in the event of a high BOD level being detected, or to undertake additional sampling to demonstrate a lower BOD average for a given month. As noted by the licence holder, the new balance tank and additional aeration are expected to reduce BOD levels in treated wastewater and are due to be installed and commissioned prior to the next vintage season.
11	Bore P2 was not re-drilled during the recent bore installations. It was not expected that this would continue to be monitored as P1A is the upgradient bore and P3A is the	The Delegated Officer agrees that bore P2 can be removed from

Condition	Summary of applicant's comment	Department's response
	downgradient bore. There are no bore logs available for P2 and it is suspected that it is blocked in sections and frequently has anomalous results. It is not currently shown in the figure in Schedule 1 as it was expected that it would be removed from the licence.	the sampling program based on the following: • Bore functionality is likely compromised; • DWER technical review identified that it is unlikely high salinity levels historically detected in bore P2 are linked to the leach drain field, given the rate of wastewater disposal is considered too low to cause significant groundwater mounding and flow towards bore P2; and • Bore P3A is considered sufficient to identify any potential down-gradient impacts from the discharge of wastewater to the leach drain field.
	Change salinity to electrical conductivity (EC) to match specified units. As EC is measured in the wastewater it is useful to measure this in the groundwater, rather than salinity, to allow comparison.	Amended accordingly.
	If arsenic results remain below the freshwater guidelines by the time the west leach field is refurbished this will indicate that anaerobic conditions are not causing arsenic mobilisation. Long term monitoring for arsenic, unless there is a potential impact, incurs unnecessary additional costs as water samples must be sent to a third-party lab as local lab not NATA certified.	Amended to include end date for arsenic sampling if there are no detections of arsenic at or above the freshwater guidelines.
	Add a note to Table 6 to allow for a missed sample if a bore is dry (bore will be re-visited during the sampling period to try and get a sample but if it is dry a sample may not be able to be collected).	Bore 1A will typically be dry during summer, given historical groundwater depth during this period is about 4.2 mbgl and bore 1A was drilled to 4 m bgl. Therefore, a clause has been added requiring an attempt to re-sample bore 1A in March or April. Sampling frequency has also been amended to ensure the bi-annual sampling events target the end of dry and wet seasons, respectively.