



Application for Licence

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L9116/2018/1
Applicant	The Margaret River Dairy Company
ACN	054 628 723
File Number	DER2017/002077- 1
Premises	Margaret River Dairy 8063 Bussell Highway METRICUP WA 6280 Lot 108 on Deposited Plan 40314 Certificate of Title Volume 2549 Folio 790
Date of report	18 September 2018
Status of Report	Final

Table of Contents

Definitions of terms and acronyms	vii
1. Purpose and scope of assessment.....	8
2. Application details	8
3. Background.....	8
4. Overview of premises.....	12
4.1 Infrastructure	12
4.2 Operational aspects	14
4.2.1 Current operations	14
4.2.1.1 Raw material delivery, processing and storage.....	14
4.2.1.2 Wastewater and waste products.....	15
4.2.1.3 Wastewater Treatment System (WWTS) and irrigation (current and proposed)	16
4.2.2 Proposed operations – expansion of the irrigation area	16
5. Legislative context.....	19
5.1 Other relevant approvals	20
5.1.1 Planning approvals	20
5.1.2 Department of Health.....	20
5.2 Part V of the EP Act	21
5.2.1 Applicable regulations, standards and guidelines.....	21
5.2.2 Works approval and licence history.....	21
5.2.3 Historical monitoring data	22
Groundwater monitoring.....	22
Surface water monitoring	25
Treated wastewater monitoring (irrigation wastewater).....	26
6. Compliance history.....	27
7. Consultation.....	27
8. Location and siting.....	29
8.1 Siting context.....	29
8.2 Residential and sensitive premises.....	29
8.3 Specified ecosystems.....	31
8.4 Groundwater and water sources.....	31
8.5 Other site characteristics	32
8.6 Soil type	32
8.7 Topography	34
8.8 Meteorology	34

8.8.1	Regional climatic aspects	34
8.8.2	Wind direction and strength	35
9.	Risk assessment.....	37
9.1	Confirmation of potential impacts	37
9.2	Risk criteria	42
9.3	Risk treatment.....	43
9.4	Risk assessment - noise emissions from normal operations.....	43
9.4.1	Description of risk event.....	43
9.4.2	Identification and general characterisation of emission	43
9.4.3	Description of potential adverse impacts from the emission.....	43
9.4.4	Criteria for assessment.....	44
9.4.5	Applicant controls	44
9.4.6	Consequence	44
9.4.7	Likelihood of risk event	44
9.4.8	Overall rating	44
9.5	Risk assessment – odour emissions from normal operations	45
9.5.1	Description of risk event.....	45
9.5.2	Identification and general characterisation of emission	45
9.5.3	Description of potential adverse impacts from the emission.....	45
9.5.4	Criteria for assessment.....	45
9.5.5	Applicant controls	45
9.5.6	Consequence	46
9.5.7	Likelihood of risk event	46
9.5.8	Overall rating	46
9.6	Risk assessment - odour emissions from abnormal operations	46
9.6.1	Consequence	46
9.6.2	Likelihood of risk event	46
9.6.3	Overall rating	47
9.7	Risk assessment – discharge of treated effluent to land (irrigation) – nutrient and salt loading impact analysis	47
9.7.1	Description of risk event.....	47
9.7.2	Identification and general characterisation of emission	47
9.7.3	Description of potential adverse impacts from the emission.....	48
9.7.4	Criteria for assessment.....	49
9.7.5	Applicant controls	50
9.7.6	Key findings	51
9.7.7	Consequence	51

9.7.8	Likelihood of consequence	51
9.7.9	Overall rating	51
9.8	Risk assessment – discharge of treated effluent to land (irrigation) – hydraulic loading impact analysis	51
9.8.1	Description of risk event.....	51
9.8.2	Identification and general characterisation of emission	51
9.8.3	Description of potential adverse impacts from the emission.....	52
9.8.4	Criteria for assessment	52
9.8.5	Applicant controls	52
9.8.6	Key findings	52
9.8.7	Consequence	53
9.8.8	Likelihood of consequence	53
9.8.9	Overall rating	53
9.9	Risk assessment – discharges to land due to failure of containment and spills	53
9.9.1	Description of risk event.....	53
9.9.2	Identification and general characterisation of emission	53
9.9.3	Description of potential adverse impacts from the emission.....	54
9.9.4	Criteria for assessment	54
9.9.5	Applicant controls	54
9.9.6	Consequence	55
9.9.7	Likelihood of consequence	55
9.9.8	Overall rating	56
9.10	Summary of risk assessment and acceptability.....	56
10.	Determined regulatory controls	57
10.1	Operation and maintenance of infrastructure and equipment.....	58
10.1.1	Controls for odour	58
10.1.2	Controls for discharges to land – Infrastructure maintenance and other operational requirements.....	59
10.2	Additional controls regarding irrigation and wastewater	61
10.2.1	Irrigation area	61
10.2.2	Restrictions on irrigation volume and months where irrigation can occur ...	61
10.2.3	Treated wastewater emissions to land limits	62
10.3	Authorised Works	63
10.3.1	Groundwater monitoring bores.....	63
10.3.2	WWTS and irrigation area works	63
10.4	Monitoring and reporting	64
10.4.1	Treated wastewater monitoring.....	64
10.4.2	Groundwater monitoring	64

10.4.3	Soil monitoring	65
10.4.4	Monitoring reports	66
11.	Appropriateness of Licence conditions.....	66
12.	Applicant’s comments.....	66
13.	Conclusion	66
Appendix 1: Key Documents		
Appendix 2: DoH Correspondence regarding approval for the MRDC WWTS		
Appendix 3: DWER Water Balance Assessment applied to irrigation area within Lot 108		
Appendix 4: Summary of Applicant’s Comments on Risk Assessment and Draft Conditions*		
Attachment 1: Issued Licence L9116/2018/1		

List of Figures

Figure 1: Prescribed Premises Boundary (Lot 108 on Plan 40314) including site layout (from Application)	10
Figure 2: Proposed premises boundary including proposed irrigation area in Lot 107 on Plan 40313.....	11
Figure 3: Process overview (from Application)	15
Figure 4: Wastewater Treatment System (WWTS) Flow Diagram (from Application)	17
Figure 5: Wastewater Treatment System (WWTS) Layout Plan (from Application)	18
Figure 6: Surface water, groundwater and soil sampling locations (from Application).....	24
Figure 7: Residential and sensitive receptors in relation to activity boundaries	30
Figure 8: Soil sampling locations.....	33
Figure 9: Witchcliffe WA mean rainfall and mean temperature	35
Figure 10: 9am and 3pm wind roses for Witchcliffe WA (BoM 1999 – 2017)	36

List of Tables

Table 1: Documents and information submitted during the assessment process.....	8
Table 2: Prescribed Premises Category	9
Table 3: Milk processing facility infrastructure	12
Table 4: Milk processing facility proposed infrastructure (from Application).....	14
Table 5: Relevant approvals and tenure.....	19
Table 6: Groundwater Analytical Results and Compliance Levels (from Application)	23
Table 7: Surface water quality – single monitoring event from 2016 (from Application)	25
Table 8: Treated wastewater monitoring results (from Application)	26
Table 9: Summary of incidents.....	27
Table 10: Summary of rural residents' comments on the Application	28
Table 11: Receptors and distance from activity boundaries	29
Table 12: Specified ecosystems.....	31
Table 13: Groundwater and water sources.....	31
Table 14: Other landscape features, relevant factors or receptors	32
Table 15: Summary of soil PRI results (from Application)*	33
Table 16: Identification of key emissions during operation	37
Table 17: Risk Criteria.....	42
Table 18: Risk Treatment.....	43
Table 19: Applicant controls for noise emissions (from Application)	44
Table 20: Applicant controls for odour (from Application)	45
Table 21: Effluent quality to be discharged to irrigation area (from Application).....	47
Table 22: Nutrient application criteria for treated wastewater	49
Table 23: Applicant controls for treated wastewater irrigation (from Application).....	50
Table 24: Applicant controls for spills (from Application)	54
Table 25: Risk assessment summary.....	56
Table 26: Summary of regulatory controls to be applied.....	57

Definitions of terms and acronyms

Term	Definition
ANZECC Guidelines	ANZECC & ARMICANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
BoM	Bureau of Meteorology
Category/Categories (Cat.)	categories of prescribed premises as set out in Schedule 1 of the EP Regulations
DER	Department of Environment Regulation (former)
Decision Report	refers to this document
Delegated Officer	an officer under section 20 of the EP Act.
DoH	Department of Health (WA)
DoW	Department of Water (former)
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Issued Licence	refers to the Licence in Attachment 1 to this document, which evidences the grant of a Licence by the CEO under s.57 of the EP Act, subject to the Conditions.
NIMP	Nutrient Irrigation Management Plan submitted as a part of the Application
Occupier	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Prescribed Premises	has the same meaning given to that term under the EP Act.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
WQPN 22	Water Quality Protection Note 22: Irrigation with nutrient rich wastewater, July 2008. Department of Water.
WQPN 33	Water Quality Protection Note 33: Nutrient and irrigation management plans, June 2010. Department of Water.

1. Purpose and scope of assessment

This application was initiated by The Margaret River Dairy Company Pty Ltd (Applicant) who lodged an application on 27 November 2017 for a licence (Application) for Category 17- Milk Processing being undertaken within Lot 108 on Plan 40314 and a proposal to dispose of milk processing treated effluent by irrigation on adjoining Lot 107 on Plan 40313.

The Applicant is seeking to license the existing milk processing and effluent treatment and disposal operations and to construct and operate an effluent disposal facility (irrigation) on an adjoining farm (Lot 107) which it proposes to lease. The milk processing wastewater treatment system was constructed under Works Approval W4904/2011/1.

This Decision Report includes an assessment of operational emissions and discharges from the existing and proposed prescribed activities on the Premises and on the adjoining property in accordance with the Department's *Guidance Statement: Risk Assessment*.

2. Application details

This Decision Report has been prepared based on information provided by the Applicant in the application form, supporting document and responses to several additional information requests, and includes information previously submitted in relation to compliance reporting for Works Approval W4904/2011/1. The documents submitted during the assessment process are listed in Table 1.

Table 1: Documents and information submitted during the assessment process

Document/information description	Date received
Application form and supporting documentation including: 1. Margaret River Dairy Company Nutrient and Irrigation Management Plan 2017; and 2. Lot 107 and Lot 108 Bussell Highway. Treated Wastewater Land Application Plan	27 November 2017
DWER further information required – Applicant responses	30 January 2018
	19 February 2018
	15 - 21 March 2018
	11 May 2018
DWER enquiry regarding change of ownership / lease agreement for Lot 107 – Applicant response	9 July 2018

The Application noted the location and use of two diesel fuelled boilers, but did not provide details of diesel fuel consumption rates for the operation of these boilers and their associated air emissions. Therefore emissions associated with the operation of these boilers have not been assessed or authorised under this Licence and associated Decision Report.

3. Background

The Premises, previously known as The Margaret River Cheese Company before merging in 1994 with Fonti Farm, is and has been operational prior to the Application being received, having operated at the Premises as a milk processing facility for over 20 years. The Margaret River Dairy Company (MRDC) was formed in February 2000, when Manassen Foods Australia Pty Ltd purchased the Premises. Following a fire that destroyed the facility in 2012, the processing facility

was rebuilt in 2014.

The Premises currently processes milk to manufacture cheese and yoghurt and discharges liquid waste to land via irrigation.

Works Approval W4904/2011/1 was granted on 19 May 2011, for the construction of a wastewater treatment system (WWTS) to treat the wastewater from milk processing. The WWTS design was based on the average daily throughput at that time of 32kL/day and a maximum volume of 45kL/day. Construction and commissioning of these works was completed in 2014, with some deviations from the original proposed works. A compliance document for the works approval was provided to DWER on 4 August 2016 as part of a previous licence application. This application was progressed, but subsequently withdrawn by the Applicant on 14 August 2017.

The Applicant submitted a new Licence Application on 27 November 2017 which includes the adjacent lot, (Lot 107) to be included in the proposed Premises boundary. Table 2 describes the prescribed premises category applicable to the Premises.

Table 2: Prescribed Premises Category

Classification of Premises	Description	Approved premises production or design capacity
17	Milk processing: premises on which — (a) milk is separated or evaporated (other than a farm); or 100 tonnes or more per year (b) evaporated or condensed milk, butter, ice cream, cheese or any other dairy product is manufactured, and from which liquid waste is or is to be discharged onto land or into waters.	Not more than 10,320 tonnes of milk per year received for processing ¹

¹ Current annual throughput is 1,000,000 litres of milk received for processing. Based on the density of cow milk as being between 1028 to 1035 kilograms per cubic meter, current throughput is equivalent to approximately 1,032 tonnes of milk received and processed annually. The design throughput capacity of 10,320 tonnes per annum is based on the maximum volume of milk that could be received for processing when operating within the Premises approved operating days and hours for milk deliveries.

The existing Premises (Prescribed Premises boundary) is shown in Figure 1 and the proposed premises boundary, inclusive of the proposed irrigation area in Lot 107 is shown in Figure 2 following.



Figure 1: Prescribed Premises Boundary (Lot 108 on Plan 40314) including site layout (from Application)

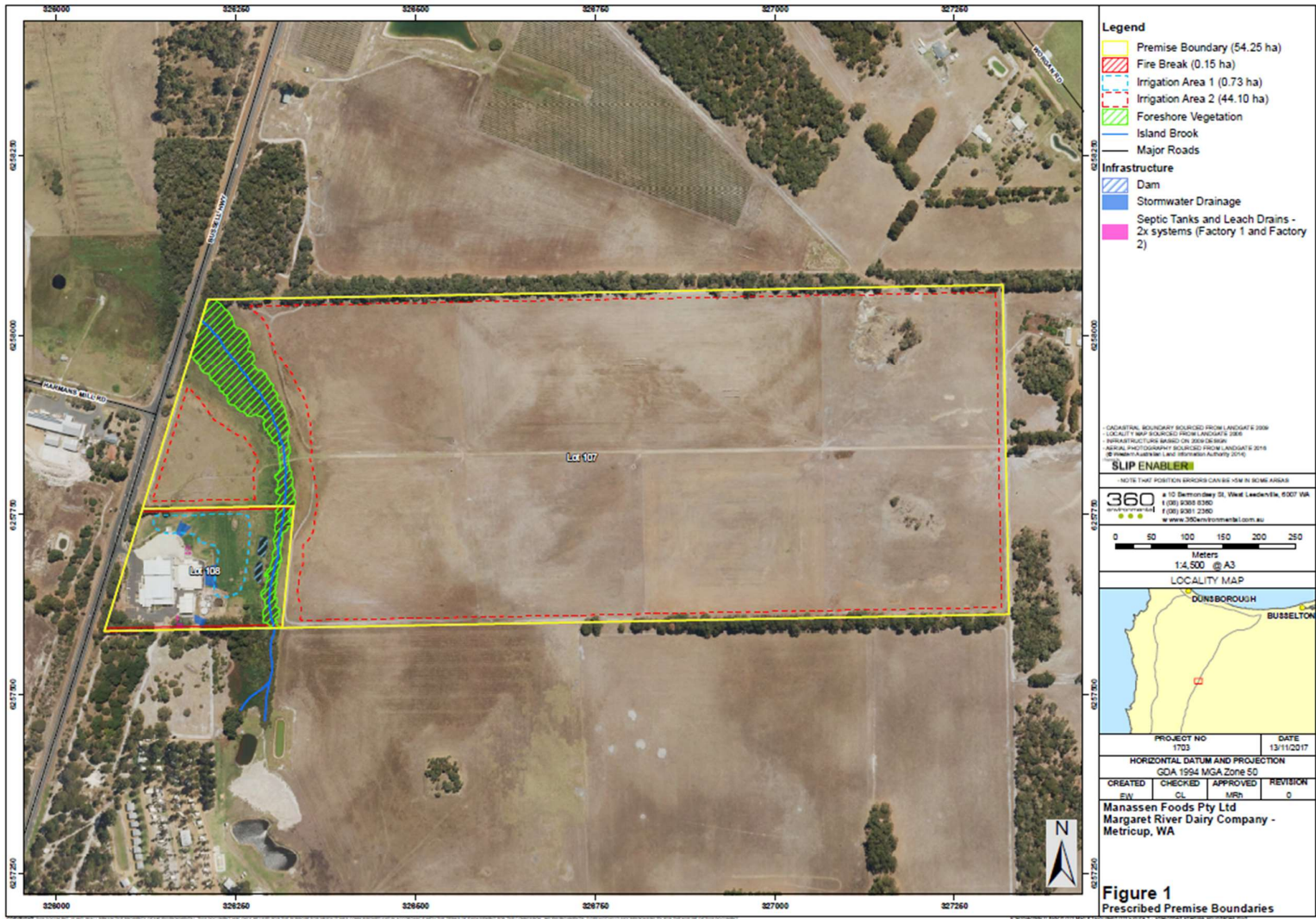


Figure 2: Proposed premises boundary including proposed irrigation area in Lot 107 on Plan 40313

4. Overview of premises

4.1 Infrastructure

The proposed Premises is approximately 54.2 hectares (ha) in total, consisting of Lot 108 (3.83 ha) being the lot containing the milk processing facility and wastewater treatment system, owned and operated by the Margaret River Dairy Company, plus the adjacent privately owned Lot 107 (50.4ha), of which up to 44.1 hectares is proposed to be irrigated with treated wastewater (TWW).

The existing milk processing facility infrastructure, as it relates to Category 17 activities, is detailed in Table 3 below and with reference to the site plan (attached in the Issued Licence and provided in Figure 1 above).

Table 3: Milk processing facility infrastructure

	Existing infrastructure
	Prescribed Activity Category 17
	Processing of milk to manufacture yoghurt, cheddar cheese and soft ripened cheese. Wastewater generated is treated in a WWTS that works as a biological activated sludge sequence batch reactor. Wastewater is processed in lined tanks, undergoing biological aeration, clarification and disinfection prior to disposal onto land via irrigation.
1	Milk unloading area, contoured towards an open drain 200mm x 200mm x 7m long. Drain connected to a below-ground collection sump that can direct spillage to the WWTS (by gravity feed) or with an option to release clean stormwater.
2	Silos for milk storage (x3), total capacity 28,000 litres (L), stainless steel (1 x 14,000L & 2 x 7,000L) Located in concrete bunded area (4m x 12m x 200mm deep) with drainage to the WWTS and the ability to remove clean stormwater.
3	Milk processing area (within an enclosed building), with drainage to the WWTS. Includes 4 x 4,000L enclosed stainless steel tanks containing milk and milk products, total capacity of 16,000L.
4	Milk transfer pump, 4,000L/hour.
5	Diesel powered boilers (x2) with boiler tank capacities of 4,500L and 2,400L; Fans and ventilation systems; Air compressors; Electrical transformers; Hydraulic lifts; Refrigeration units; Cheese vats; Water storage tanks; Hot water tank; Mix tanks; Brine tank; Whey tank; Diesel tank; Pipework; and Pumps.
6	Chemical and hazardous materials storage located in a concrete hardstand area with bunding to hold 110% of tank capacity.

	Existing infrastructure
7	Product storage area, 250 pallets in an enclosed cold storage area.
8	<p>Process water treatment system and storage tanks (x2).</p> <p>2 x Flow meters: (Arid Zenner PMN07 meter installed in May 2018) to measure the volume (Litres) of water drawn from the licensed bore (GWL65074(6) and flow meter measuring all potable water transferred from the rainwater storage tanks to the dairy processing facility.</p>
9	<p>3 enclosed tanks for whey storage consisting of:</p> <p>2 x 5,000L (fibreglass) 1 x 7,000L (stainless steel)</p> <p>Located in concrete bunded area (30m x 2.4m x 200mm deep) with drainage to the WWTS and the ability to remove clean stormwater.</p>
10	<p>Waste Water Treatment System (WWTS) - a series of lined galvanised and polyethylene tanks for aeration / biological treatment, clarification, disinfection and storage prior to irrigation or off-site disposal. Total system volume of 270 kL, designed for a maximum treatment capacity of up to 45kL per day to achieve the following treatment standards:</p> <p><50mg/L BOD; <20mg/L suspended solids; <20mg/L nitrogen; and <2mg/L phosphorus.</p> <p>WWTS consists of:</p> <p>inlet screen with grease trap; pre-processing storage tanks (x4), polyethylene enclosed; clarifier tanks (x4), capacity of 5kL moulded polyethylene, not enclosed; aeration tank, capacity of 230kL, plastic lined steel, not enclosed; sludge tank, capacity of 10kL, polyethylene, enclosed; and irrigation / polish tank, capacity 10kL, polyethylene enclosed.</p> <p>1 x Tyco flow meter and an electromagnetic digital readout (Emflux 2060) metering and recording the volume of treated wastewater discharged to irrigation area within Lot 108.</p>
11	<p>Irrigation system consisting of:</p> <p>Water pump and 50mm PVC plastic pipe, currently connected to the 10kL irrigation / polish tank to transfer treated wastewater to the main irrigation connection outlet.</p> <p>A moveable PVC irrigation pipeline laying on the ground surface across the existing irrigation area within Lot 108, connects to a.</p> <p>low pressure, self-propelled travelling spray irrigator with automatic cut-off valves and stopping blocks to control irrigation runs.</p>

To upgrade the WWTS, the following infrastructure listed in Table 4 is proposed to be installed.

Table 4: Milk processing facility proposed infrastructure (from Application)

	Proposed Infrastructure
WWTS	Install a lined, zincalume treated wastewater storage tank*
Irrigation System	Water pump and PVC (Polyvinyl Chloride) irrigation pipes conveying treated wastewater from WWTS treated wastewater storage tank to the irrigation area within Lot 108.

* No further detail provided at the time of Application. The Works Approval had included the intention to install a 430kL storage tank as part of the WWTS

4.2 Operational aspects

4.2.1 Current operations

4.2.1.1 Raw material delivery, processing and storage

The Premises currently receives approximately 1,260kL of raw milk annually (based on average of the last 3 years intake), which is used to produce up to 2,190 tonnes of dairy products consisting of:

- ~1,820 tonnes of yoghurt;
- ~200 tonnes of cheddar cheese; and
- ~170 tonnes of soft ripened cheese.

The dairy processing facility is designed to be able to operate 24 hours per day, although routine operating hours are 6.00am – 6.00pm weekdays (operations for 260 days each year). Milk deliveries also occur outside of weekdays, between 6am to 1pm Saturday to Sunday.

The main stages of the milk processing are described below and shown in Figure 3:

- milk is delivered and stored in silos. It is pre-treated and standardised.
- milk is pasteurised before the addition of starter cultures that vary depending on the product.
- coagulation is achieved before the milk is either made into yoghurt or cheese.
- with yoghurt production, milk is fermented before the addition of flavours. Yoghurt products are packed and sold to the food industry and public.
- for cheese production, milk is fermented and curd is cut and heated before salting and ripening. Cheese products are packed and sold to the food industry and public.
- whey (byproduct of cheese making) is separated from the curd and reused in ricotta products and/or taken off site for disposal.

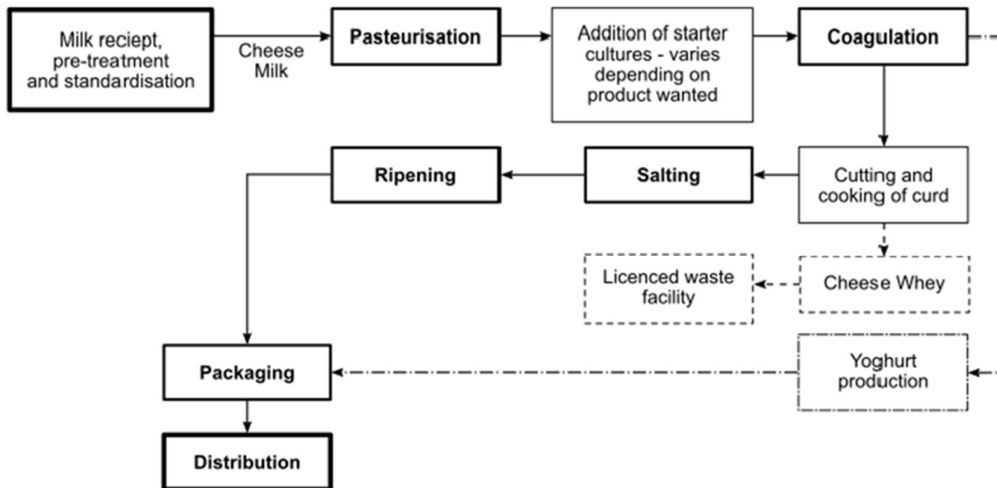


Figure 3: Process overview (from Application)

4.2.1.2 Wastewater and waste products

Wastewater is produced as a result of the use of water in dairy products processing and water used for cleaning. The total reported wastewater volume in 2017 was 11,860kL produced from the processing of 1,195kL of milk, indicating that approximately 10kL of wastewater is generated for each kilolitre of milk received and processed. The Applicant expects to generate an average of 45kL of wastewater per day, with a peak volume of 50kL per day, which is in excess of the WWTS design capacity of 45kL/day.

Based on a maximum of 260 operational days per annum and a peak volume of 50kL per operational day, this would generate a total of up to 13,000kL of wastewater for treatment and disposal per annum.

By-products generated as a part of the process include milk sludge and whey. Approximately 16,000 - 20,000L per week (70% whey) is produced for off-site disposal.

Wastewater is currently disposed of as follows:

- Following treatment in the WWTS (production and cleaning wastewater), an average of 45kL per day of treated wastewater is disposed of via irrigation across the existing irrigation area within Lot 108 (0.73ha). The Applicant has submitted a Nutrient Irrigation Management Plan (NIMP) describing proposed irrigation management practices for the irrigation area.

Waste products are disposed of as follows:

- Sludge and whey produced as by-products of milk processing and wastewater treatment activities are temporarily stored in either the 10,000L sludge holding tank or one of the three whey storage tanks (total capacity of 20,000L) prior to removal by a licenced waste contractor for disposal off-site at a licensed waste facility; and
- Off specification product, at approximately 2,500kg/annum, is stored in the cold stores prior to off-site disposal either for beneficial use or otherwise to landfill, as required.

Stormwater from roofed areas discharges into water storage tanks for treatment and use in the dairy processing facility. Stormwater from the hardstand and containment areas discharges via

overland flow to areas within the Premises that include sections of the Lot 108 irrigation area. The three stormwater discharge points are shown in Figure 1 above.

4.2.1.3 Wastewater Treatment System (WWTS) and irrigation (current and proposed)

Wastewater from processing activities is treated in a WWTS that operates as a biological activated sludge sequence batch reactor (SBR), see Figures 4 and 5 below. The wastewater is treated in a series of tanks prior to discharge to the current irrigation area within Lot 108. Future irrigation of treated wastewater is proposed to include irrigation to Lot 107. The existing and proposed irrigation areas are shown in Figure 2 above.

The sequence of treatment through the WWTS is as follows:

1. Wastewater is passed through an inlet screen / grease trap into a holding (pre-process storage) tank;
2. Wastewater is then transferred from the holding tank to the first clarifier where a flocculant (anionic polyacrylamide product) is added;
3. In the clarifier, solids separate out from the liquid portion and are directed to the sludge storage tank, whilst the liquid portion flows to the main aeration tank (SBR);
4. In the aeration tank, with the combined treatment effects of active aeration (oxygenation) and biological breakdown of waste materials, some sludge settles out and the liquid portion is periodically pumped to the secondary clarifier for further solids separation;
5. Post the second stage clarification, disinfection with chlorine occurs prior to transfer of the treated wastewater to a small holding tank (irrigation / polish tank). Water is pumped from this tank through irrigation pipes to a travelling spray irrigator.

4.2.2 Proposed operations – expansion of the irrigation area

The Applicant proposes to irrigate up to a maximum of 50kL per day of treated wastewater to either the 0.73ha area within Lot 108 (existing irrigation area within the lot containing the dairy processing facility) or otherwise to be spread across up to 44.1 hectares within the adjacent privately owned Lot 107 as detailed in Figure 2.

Discharge to irrigation areas will only occur on production days (up to 260 days each year) and excludes weekends. The proposed irrigation areas within Lot 107 will be sown with an annual ryegrass (*Lolium rigidum*) crop, the primary vegetation intended for nutrient uptake of applied treated wastewater. The ryegrass will be grazed by sheep once it reaches a growth height of 6cm. Sheep will be removed from the area when the grass height is reduced to 2cm. Livestock will be given supplementary feed during dry periods to prevent overgrazing of the irrigated pastures.

As of 9 July 2018 it was confirmed in writing by MRDC that ownership of Lot 107 had changed hands since the Application was submitted and that MRDC were in negotiation with the new land owners to reach an agreement to allow for irrigation within Lot 107 and obtain planning approval from the City of Busselton.

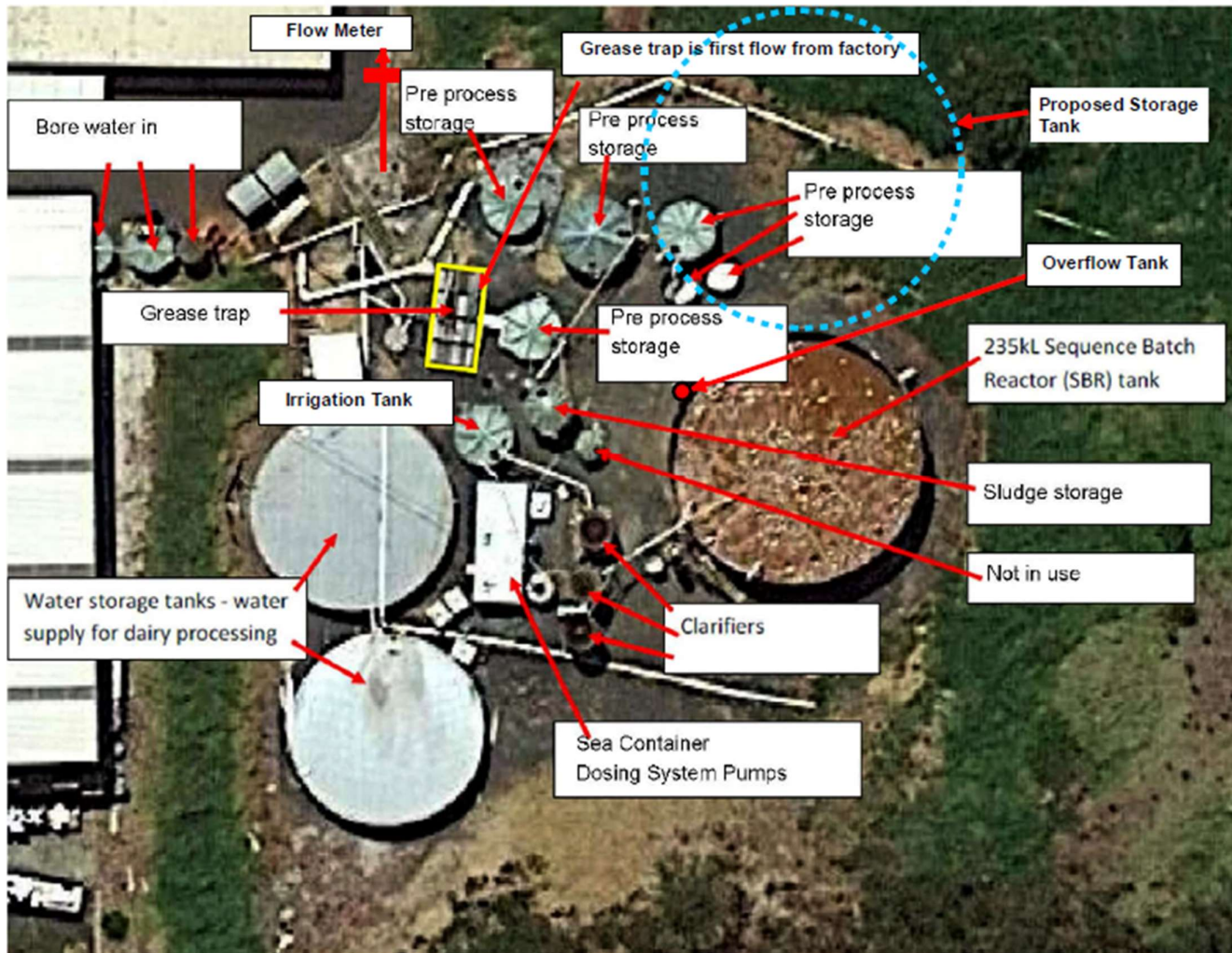


Figure 5: Wastewater Treatment System (WWTS) Layout Plan (from Application)

5. Legislative context

Table 5 summarises approvals relevant to the assessment.

Table 5: Relevant approvals and tenure

Legislation / Tenure	Number	Subsidiary	Approval
<i>Rights in Water and Irrigation Act 1914</i>	GWL65074(3)	The Margaret River Dairy Company	To take up to 20,000 kilolitres per annum of groundwater for purposes listed as dairy purposes, product processing, wash down and water use in industrial processing.
<i>Planning and Development Act 2005</i>	DA10/0232	The Margaret River Dairy Company	City of Busselton Planning Consent to construct the WWTS and irrigate within Lot 108 granted 21 September 2010 with a condition of approval that all components of the waste water recycling system have a minimum setback of 30m from Island Brook.
	HA17/0389		City of Busselton – Application for approval to irrigate waste water within Lot 107 – Approval pending – Associated Development Application has not been submitted. Referred to DoH.
<i>Health Act 1911 Health (Treatment of sewage and disposal of effluent and liquid waste) Regulations 1974</i>	EHB 02700	The Margaret River Dairy Company	Department of Health - Approval to construct or install an apparatus for the treatment of sewage. In principle approval only for dairy wastewater treatment system to receive and treat up to 45kL/day (provided September 2010). Subject to submission of verification monitoring data for treated wastewater quality. ¹ Permit to Use / verification monitoring is still outstanding
Lease Agreement	Lot 107 on Plan 40313	Privately owned	Lease agreement with current Lot owner is outstanding ²

Note 1: Copy of DoH correspondence and verification requirements in Appendix 4

2: Ownership of Lot 107 has changed since the application was submitted, making the Lease Agreement as submitted with the Application invalid.

5.1 Other relevant approvals

5.1.1 Planning approvals

The Premises is located in an 'agriculture' zoned area under the City of Busselton Local Planning Scheme No. 21.

The City of Busselton (City) granted planning consent in July 2010 (DA10/0232) to construct the WWTS within Lot 108. DWER referred the MRDC Licence Application to the City on 2 March 2018 seeking advice on the status of any required planning approvals. The City of Busselton advised DWER on 1 May 2018 that planning approval was not in place to allow for the irrigation of treated wastewater to Lot 107 on Plan 40313.

Subsequent to discussions held on 22 May 2018 between the City of Busselton, Department of Health and DWER representatives to review all relevant outstanding applications and approvals, the City of Busselton confirmed it had advised the Applicant on 8 June 2018 that with respect to the application to discharge treated wastewater on Lot 108 and Lot 107:

- submission of a Development Application in relation to the discharge of treated wastewater to Lot 107 was outstanding;
- the proposal to discharge waste water onto another lot other than the lot on which it is generated does not meet the requirements of the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* and *Government Sewerage Policy 2018*; and
- the Margaret River Dairy Company was granted 'Approval in Principle' from the Department of Health in September 2010 for the installation of the Waste Water Treatment Plant. The final approval was pending submission of results from six consecutive samples of treated waste water demonstrating the water quality complied with the required parameters. The City confirmed that it has no record of waste water monitoring results as required and the final approval for the installation of the Waste Water Treatment Plant remains outstanding; and

The City had referred the application to install an effluent disposal system (Lot 108 and 107) to DoH for consideration and advice on 7 June 2018.

5.1.2 Department of Health

The Department of Health (DoH) has a regulatory role in the approval of apparatus producing more than 540L per day of sewage (industrial treated wastewater is considered to be sewage under the *Health Act 1911*). This includes the use of recycled water (irrigation) and sets conditions of approval for recycled water schemes.

DWER sought confirmation from DoH on 15 May 2018 as to whether they had received from MRDC a recent application for the reuse of treated wastewater from the WWTS on Lot 108 (including any proposal to dispose of treated wastewater via irrigation to Lots 107 and 108). DoH confirmed on 16 May 2018, that no recent applications for installation or modifications to the wastewater treatment system or proposal for reuse of treated wastewater at the Margaret River Dairy Company dairy processing facility had been received, noting that the previous 'in principle' approval was for a 45kL per day WWTS, not for treatment of up to 50kL per production day.

The Applicant confirmed on 9 July 2018 that DoH approval of the WWTS was still outstanding, with the required validation water quality monitoring program currently in progress.

Key Findings:**The Delegated Officer has reviewed the status of relevant approvals and has found:**

1. Occupancy and Planning Consent over Lot 107 on Plan 40313 has not been demonstrated for the purpose of DWER being able to grant a licence over Lot 107.
2. The risk assessment will consider future potential irrigation to Lot 107. However, in accordance with DWER Guidance Statement: Land Use Planning a regulatory determination with respect to irrigation to Lot 107 will not be made in the absence of demonstrated occupancy and planning approval/s.
3. The Applicant will need to submit an amendment application for the Issued Licence to authorise any expansion of the Prescribed Premises boundary (and irrigation) beyond Lot 108.

5.2 Part V of the EP Act

5.2.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations. Other relevant legislation includes the *Environmental Protection (Noise) Regulations 1997* (WA) (EP Noise Regulations) and *Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA) (UDR).

Appendix 1 lists key documents informing this assessment, including all relevant DWER Guidance Statements.

5.2.2 Works approval and licence history

The construction of the WWTS was assessed under Works Approval W4904/2011/1. Conditions of the works approval included requirements to submit a compliance report (following construction and *prior to commissioning*) and to submit a Nutrient Irrigation Management Plan (NIMP), by 1 July 2011. The compliance report and NIMP were submitted on 4 August 2016 well after completion of construction and commissioning of the WWTS.

The WWTS was approved based on a treatment design capacity of 45kL/day and 260 production days per annum and to achieve the following treatment quality:

- Biological Oxygen Demand (BOD) <50mg/L
- Total Suspended Solids (TSS) <20mg/L
- Total Nitrogen (TN) <20mg/L
- Total Phosphorus (TP) <2mg/L

Information obtained through the current Application process has confirmed that the following infrastructure was not installed in the new WWTS as proposed in the Works Approval application:

- the final filtration / membrane filtering system;
- the online continuous monitoring equipment for measuring pH and Total Dissolved Solids; and
- a 430kL lined zincalume treated wastewater storage tank.

Further to this, the irrigation / polishing storage tank capacity as installed is approximately 10,000L, not 35,000L as proposed in the Works Approval.

MRDC had previously submitted a licence application on 4 August 2016. This application, to undertake milk processing and wastewater treatment and disposal activities at the Premises within Lot 108 only, was progressed but subsequently withdrawn by the Applicant on 14 August 2017.

5.2.3 Historical monitoring data

Groundwater monitoring

The location of groundwater bores and surface water monitoring sites in relation to operational infrastructure such as the WWTS and existing irrigation area within Lot 108, are shown in Figure 6 below. Based on the Above Height Datum (ADH) records for the three existing bores, the Applicant has noted that probable groundwater flow direction is easterly towards Island Brook.

Groundwater monitoring at the site has been infrequent with extended sampling intervals. Four groundwater monitoring bores were originally installed within Lot 108 in 2009, one of which is no longer functional. There are currently no groundwater bores located within Lot 107. The Application included a summary of groundwater monitoring results from the sampling of the three existing bores within Lot 108 undertaken from June to August 2016. There have been no further groundwater samples collected, or measurements of standing water levels recorded, since August 2016, though irrigation to the small area (0.73ha) within Lot 108 has continued.

Results from the 2016 monitoring indicate that groundwater is very close to the surface, being between zero and 1.45m below ground level in the eastern section of the current Lot 108 irrigation area (i.e. two bores closest to Island Brook, high season depth to groundwater). A summary of groundwater monitoring results for 2016 is provided in Table 6 below noting that the highest contaminant levels follow the topography of the land and occur in the northeast portion of the Premises immediately adjacent to the existing irrigation area (MW2 is equivalent to MB02 as shown in Figure 6).

Table 6: Groundwater Analytical Results and Compliance Levels (from Application)

Sample ID:		MW 2	MW3	MW4 ¹
Parameters	ANZECC & ARMCANZ Trigger Values			
pH value	6.5-8.5	6.97-7.55	3.83-4.27	4.10-5.17
Total Dissolved Solids (mg/L)	-	3660-4600	646-698	358-591
Suspended Solids (mg/L)	-	48-346	374-2040	29-246
Total Nitrogen (mg/L)	2	11.4-18.3	<0.5-1.2	0.4-1.1
Total Phosphorus (mg/L)	0.2	0.01-4.35	<0.01-0.46	<0.01-0.29
Biochemical Oxygen Demand (BOD) (mg/L)	-	3-9	<1-12	3-5
<i>E.coli</i>	-	44-4100 ²	<1-300	<1-2
Oil and Grease	-	<5	<5	<5

¹ MW4 is upstream of the MRDC site activities and for comparative purposes is considered a background sample.

² The first sampling event identified that the integrity of Bore MW2 had been compromised. The bore had been compromised during mowing and slashing activities, where the capping and casing of the bore had been destroyed. Consequently it is expected that some contaminants (faeces from grazing sheep) leaked into the bore and caused exceedance in *E.coli*. The bore was re-purged following the first sampling event.

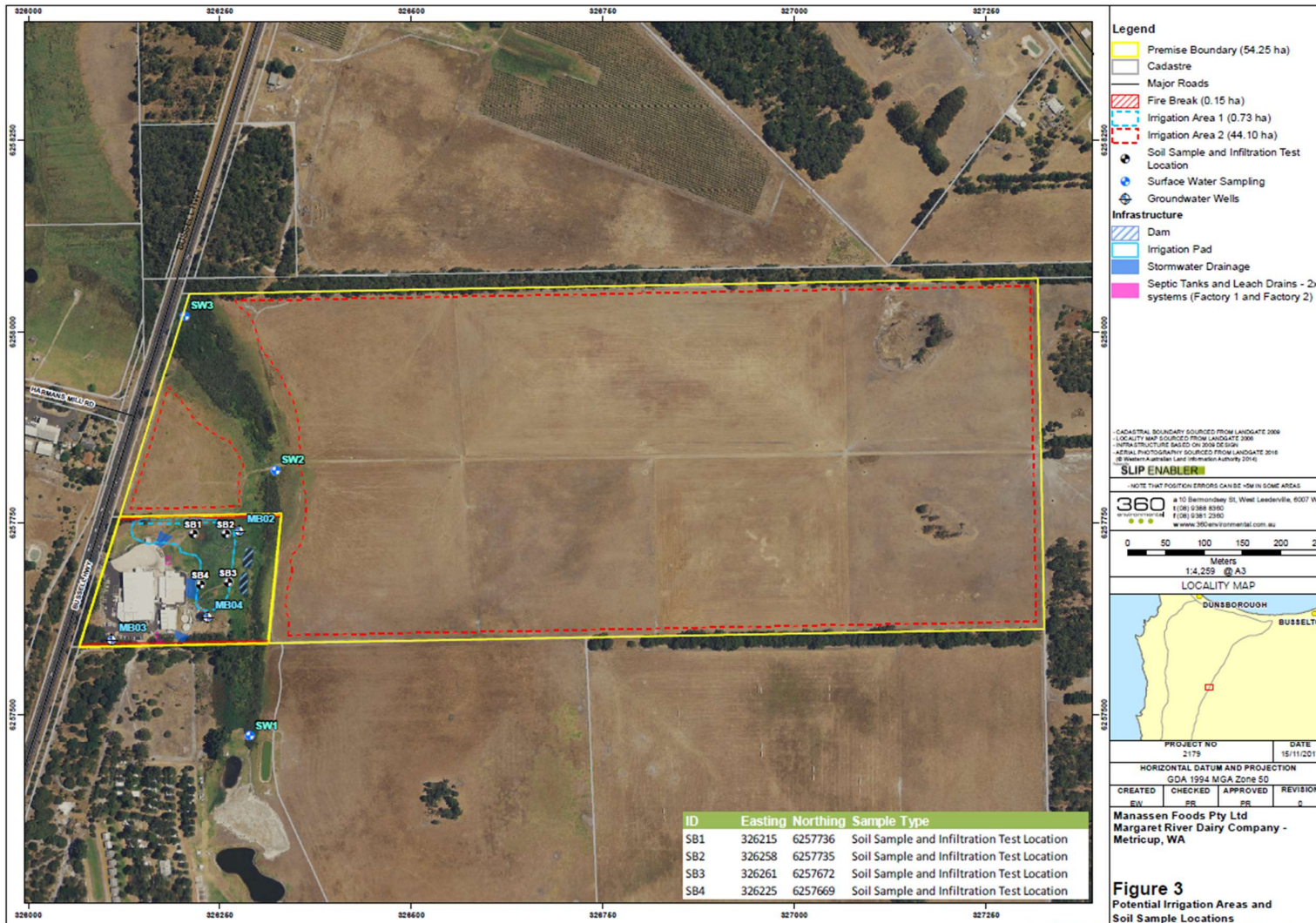


Figure 6: Surface water, groundwater and soil sampling locations (from Application)

Key Findings:

The Delegated Officer has reviewed the existing monitoring bore network and has found:

1. Four bores were originally installed on Lot 108 in 2009 with no records available on key standard installation requirements such as type and size of casing and the slotted interval. Therefore the suitability of the existing bores for sampling and determining groundwater quality cannot be determined.
2. There are no existing bores within Lot 107 to indicate either depth to groundwater or existing groundwater quality across this lot and insufficient seasonal depth and water quality data is available to characterise groundwater within Lot 108. Any future application to expand irrigation areas outside of Lot 108 will need to have a minimum number of established groundwater bores across the site with detailed information on bore lithography to characterise soil and groundwater and assess suitability for the application of treated wastewater to a defined area/s.

Surface water monitoring

Island Brook is an ephemeral creek which generally flows during the higher rainfall months. Surface water monitoring of Island Brook has been infrequent with extended sampling intervals (only two sampling events undertaken between 2009 and June 2016) from three sampling locations - one located upstream (SW1 in Lot 109), one immediately downstream (SW2) within Lot 107 and another further downstream (SW3) at the NW boundary to Lot 107.

The Application included surface water monitoring results from the single sampling event undertaken on 30 June 2016 (Table 7). The grey shaded results indicate test results at levels above the ANZECC Guidelines. No further surface water sampling has been undertaken since June 2016.

Table 7: Surface water quality – single monitoring event from 2016 (from Application)

Parameter	Unit	ANZECC# Guidelines	SW1	SW2	SW3
			30 June 2016	30 June 2016	30 June 2016
Total Nitrogen	mg/L	2	2.9	0.6	1
Total Phosphorus		0.2	0.18	0.18	0.34
Total Suspended Solids		-	231	10	<5
Total Dissolved Solids		-	570	272	348
Biological Oxygen Demand (BOD)		-	2	2	3
Nitrite + Nitrate as N		0.15	0.28	0.2	0.09
Arsenic		0.013	0.004	<0.001	<0.001
Cadmium		0.0002	0.0011	<0.0001	<0.0001
Chromium		0.001	0.033	<0.001	<0.001
Copper		0.0014	0.038	<0.001	<0.001
Lead		0.0034	0.001	<0.001	<0.001
Mercury		0.00006	<0.0001	<0.0001	<0.0001
Nickel		0.011	0.134	0.02	0.001
Zinc		0.008	0.372	0.081	<0.005

Freshwater trigger value for slightly moderated disturbed ecosystems

Key Findings:

The Delegated Officer has reviewed surface water sampling results and has found:

1. In the absence of regular and more frequent sampling, and the inclusion of an Island Brook sampling site within Lot 108, there is insufficient data to assess the impacts on surface water quality from historical irrigation of the site, additional inputs from Lot 108 stormwater discharge and leach drains, or contributions from upstream sources.

Treated wastewater monitoring (irrigation wastewater)

The Application included treated wastewater monitoring results from three sampling events undertaken at the Premises in 2017. Subject to a further information request, treated wastewater test results were provided for all sampling undertaken between January 2017 and January 2018. These treated wastewater test results are presented in Table 8 below and provide a comparison against the design value criteria for the WWTS and the relevant DoH validation monitoring treated wastewater compliance values.

The results for pH and *E.coli* were not provided to allow comparison.

Table 8: Treated wastewater monitoring results (from Application)

Treated Waste Water Quality Parameters								
Date Sampled	Biological Oxygen Demand (BOD), mg/L	Total Dissolved Solids (TDS), mg/L	Total Nitrogen (TKN + NOx), mg/L	Total Phosphorus, mg/L	Total Suspended Solids (TSS), mg/L	pH	<i>E. Coli</i> , cfu/100mL	
03/01/2017	33	2370	25.1	3.35	69	-	-	
16/01/2017	29	2620	19.2	1.95	110	-	-	
20/03/2017	20	2640	12.4	1.96	52	-	-	
01/05/2017	11	2370	7.9	0.84	21	-	-	
19/06/2017	22	2850	8.1	1.08	71	-	-	
03/07/2017	17	3140	8.1	0.71	57	-	-	
22/08/2017	42	2960	25.4	2.04	338	-	-	
03/10/2017	36	3110	14.9	4.31	122	-	-	
17/10/2017	4	2900	7.4	0.09	<5	-	-	
13/11/2017	7	2690	21.3	0.31	11	-	-	
02/01/2018	32	2780	31.1	0.87	67	-	-	
WWTS Design Standards, mg/L	<50	N/A	<20	<10*	<20	6.5 -8.5	N/A	
DoH WWTS validation monitoring / standards for reuse	<20	N/A	<20	<10	<30	6.5 -8.5	<1000cfu/100mL	

* Alternatively the Works Approval Application supporting document for the construction of the WWTS, stated a design capability of achieving <2mg/L for Total Phosphorus in the final treated wastewater.

Indicates exceedance of design value (Works Approval W4904/2011/11 Application supporting document)

Indicates exceedance of DoH validation monitoring requirements WWTS apparatus and reuse approval

- Indicates no results included in the licence application supporting documentation

Key Findings:

The Delegated Officer has reviewed the treated wastewater quality results and has found:

1. The quality of treated wastewater for irrigation to land consistently and significantly exceeds the WWTS design values and DoH validation monitoring requirements with respect to TSS and exceed the DoH validation monitoring requirements for BOD in 64% of samples. Total Nitrogen results have exceeded the WWTS design treatment quality standard (as submitted in the original Works Approval application) in around 22% of samples.
2. The WWTS has at times been operated in excess of its design and treatment capacity of 45kL/day and this may account for its failure to achieve the expected treatment design values.

6. Compliance history

DWER uses a database to record complaints received and non-compliances requiring investigation (Incident and Complaints Management System (ICMS)). A search of ICMS was undertaken on the Applicant and their known association to the Premises. An incident (ICMS 22540) was identified at the Premises on 27 September 2011. A summary of the incident identified is provided below:

Table 9: Summary of incidents

ICMS no.	Date	Incident Description
22540	27/09/2011	The Applicant was found to be irrigating untreated wastewater (food waste) onto land (potential unauthorised discharge). No formal action was taken regarding the incident, other than the Applicant being advised to apply for a licence.

The City of Busselton documented several odour complaints from the caravan park between January 2012 and September 2014. There had been no further odour complaints until one was received in April 2018. Complaints investigations could not establish a definite source of the odour, but noted that it is intermittent in nature.

7. Consultation

DWER publicly advertised the Application in *The West Australian* newspaper and on the DWER website on 5 March 2018.

DWER referred the application on 2 March 2018 to the then title holder of Lot 107, Taunton Farm Caravan Park, Harman's Estate Winery and four rural residential landholders adjacent to Lot 107, all of whom the Delegated Officer considered to have a direct interest in the Application.

Three direct interest stakeholders (rural residents adjacent to Lot 107) provided comments. These are summarised in Table 10 below.

Table 10: Summary of rural residents' comments on the Application

Topic	Summary of comments
Community consultation	No consultation with rural residents adjacent to Lot 107. The Applicant did not correctly identify all relevant rural residences when considering buffer distances in the application.
Noise	Potential noise emissions from irrigation equipment, including operation of pumps is unclear.
	Requested restricted hours of operation for both the milk processing operations and irrigation of treated wastewaters to manage noise impacts.
Odour	Prevailing winds from SSW for much of the year. Several rural residences are in downwind direction with potential for odour impacts from irrigation within Lot 107.
	Noted lack of air emissions / odour testing or modelling to establish baseline levels. Historically unpleasant odour experienced on Bussell Highway driving past the milk processing facility.
Soil and groundwater information – Lot 107	Concern with lack of soil & groundwater information & uncertainty of impacts of nutrients leaching through the soil profile.
	Local landowners have observed impacts from disturbed acid sulphate soils affecting water quality in a spring fed dam immediately adjacent to Lot 107 and paddocks on the eastern boundary to Lot 107 are known to be waterlogged for several months over winter and spring. Contingency measures to address the application of treated wastewater to waterlogged areas considered inadequate.
Lot 107 – treated effluent irrigation management	Considered the 10 metre overspray buffer inadequate & expressed preference to confine irrigation within Lot 107 to the western end.
	Preferred buffer of a minimum of 30 metres for irrigation along northern boundary of Lot 107 to protect vegetation in the road reserve from potential damage from overspray.
	Considered contingency measures identifying actions to be implemented to address identified odour issue/s were inadequate and should include a requirement for irrigation to cease immediately and re-locate where complaints are made and verified implicating irrigation as the problem source.
	A readily accessible complaints phone number required to facilitate prompt and appropriate follow-up of any complaint.

8. Location and siting

8.1 Siting context

The Premises are located in the City of Busselton, situated in the south-west corner of Western Australia, 232 kilometres (km) south of Perth.

The City covers an area of 1,454 km² and is bounded by the Shires of Augusta-Margaret River, Capel, Donnybrook and Nannup.

The Premises are bound by Bussell Highway on the western boundary, with agricultural properties to the north, east, west, and south.

8.2 Residential and sensitive premises

The distances to residential and sensitive receptors are as follows in Table 11 and shown in Figure 7 below.

Table 11: Receptors and distance from activity boundaries

Sensitive Land Uses	Distance from processing facility*	Closest distance to an irrigation area**
Residential Premises (located within Harmans Estate Winery)	150m north, northwest	50m west of Lot 107 boundary on Bussell Highway
Taunton Farm Caravan Park - Holiday homes	190m south	230m south of southern end of Lot 108 irrigation area & 220m south west of SW corner of Lot 107 irrigation area
Winery tastings / cafe: Harmans Estate Winery	165m north, northwest	60 m west of Lot 108 irrigation western boundary
Springwood Homestead (Bed and Breakfast Accommodation) – Lot 120	Greater than 500 metres	100m east of eastern Lot 107 irrigation area boundary
Rural residence within Lot 1	410m south, southeast	410m south, southwest of SW corner of Lot 107 irrigation area
Rural residence within Lot 10	Greater than 500 metres	240m northeast of the north eastern Lot 107 irrigation area boundary
Rural residence within Lot 2731	Greater than 500 metres	310m north of the north eastern Lot 107 irrigation area boundary
Rural residence within Lot 121	Greater than 500 metres	590m east of eastern Lot 107 irrigation area boundary

*Businesses and rural residences or holiday accommodation identified within a 500 metre buffer distance from the MRDC milk processing facility and the existing WWTS located within Lot 108.

** Rural residences and holiday accommodation immediately surrounding all proposed irrigation areas.

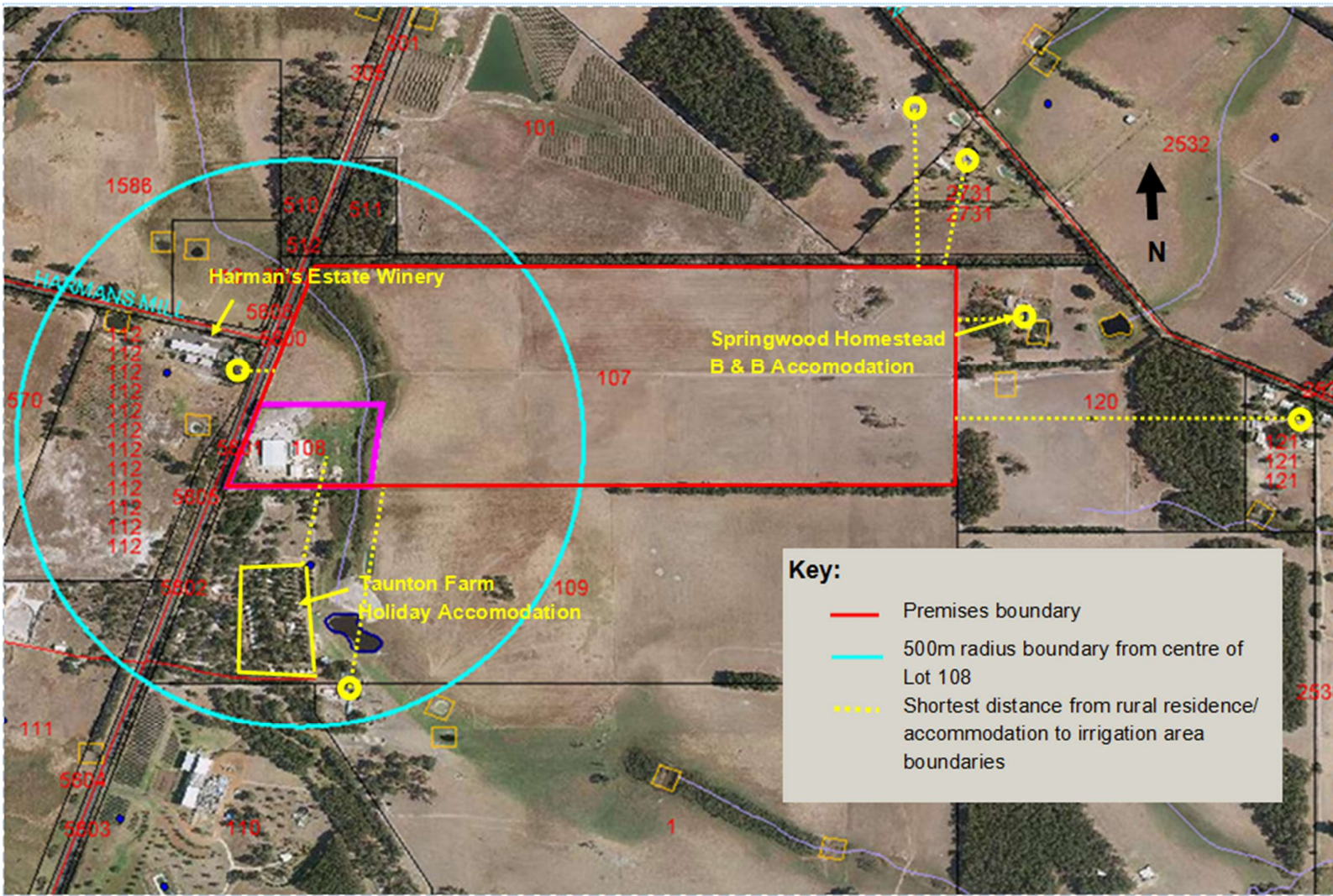


Figure 7: Residential and sensitive receptors in relation to activity boundaries

8.3 Specified ecosystems

The distances to specified ecosystems are shown in Table 12.

Table 12: Specified ecosystems

Specified ecosystems	Distance from the Premises
Geomorphic wetland – Conservation	6.5km north east
Public drinking water source area (PDWSA) Priority 1	13.1km south east
Threatened Ecological Buffer site	Approximately 3,000m to the north east
A priority fauna site	Approximately 1,500m to the east

8.4 Groundwater and water sources

The Premises is located near the western margin of the Perth Basin in close vicinity to the Dunsborough Fault, and is therefore underlain by regionally significant groundwater resources in aquifers in the Leederville Formation and in the Sue Coal Measures. The distances to groundwater and water sources are shown in Table 13.

Table 13: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental Value
Island Brook	Within the boundary of the premises (Approximately 30m buffer to irrigation areas)	A seasonal brook and tributary to Carbanup River
Carbanup River Major, perennial river	3.8km east The Premises is located within the Carbanup River catchment	Drains in a northerly direction and is one of the major natural drainage systems of the Geographe catchment. (Carbanup River Action Plan, Community Environmental Management 2000)
Geographe Catchment Management Area	The Premises is located within the Carbanup River sub-catchment that drains into Geographe Bay	Supports waterways, wetlands, and ecological communities (Geographe Catchment Management Strategy 2008)
Wilyabrup Brook	3.3km south-west	Flows north-west through mostly agricultural land towards the coast and into Wilyabrup Estuary.
Groundwater	Information submitted by the Applicant indicates that groundwater sampling at 3 bores within the site between June and August 2016 showed that the clearance to the maximum groundwater is between zero and 1.45m from the surface level in the eastern section of the irrigation area.	Beneficial use. Groundwater in the area is abstracted for irrigation and domestic purposes. Total dissolved solids (TDS) <500mg/L (GIS data set – Groundwater salinity statewide) Likely to have ecosystem values.
RIWI Act: Groundwater Area –Busselton–Capel Groundwater Area	Within activity boundary	Proclaimed status Groundwater system linked to Busselton-Capel Groundwater Area and managed by DWER.
RIWI Act: Surface Water Areas and irrigation Districts – Geographe Bay Rivers Surface Water Area	Within activity boundary	Proclaimed status
Groundwater bores (based on available GIS dataset WIN Groundwater Sites)	180m south and 220m north-west	Domestic/household use
	850 m downstream of Island Brook (north of the Premises)	Livestock
	2km downstream of Island Brook (north)	Domestic/household use, Livestock

8.5 Other site characteristics

The locations of other receptors are shown in Table 14.

Table 14: Other landscape features, relevant factors or receptors

Other receptors or areas of concern	Location
Abstractor bore Water supply for the Premises, allocation of 20 Megalitres per annum.	North western corner of Lot 108, marked as 'WIN bore', see Figure 1. This is a new abstraction bore drilled and installed to a depth of 45 metres in early 2018.
2 x septic and leach drain systems (for domestic wastewater disposal - toilets and staff kitchen)	Within Lot 108 boundary, see Figure 1.

8.6 Soil type

Regolith mapping undertaken by the Geological Survey of Western Australia (Marnham et al., 2000) indicates that the site is underlain by regolith-landform units that comprise part of the Treeton System. This mapping suggests that many of the soil associations in the area are seasonally waterlogged.

The regolith-landform mapping suggests that although the proposed irrigation areas at the site are located on a well-drained sandy terrace, the Premises immediately abuts a seasonally wet swampy area in a creek line which is probably underlain by a ferruginous hardpan with a low permeability.

DWER's GIS soil database described localised soils that include the Premises as follows:

"Gently undulating terrain of broad shallow valleys and low ridges with moderate amounts of laterite and lateritic (ironstone) gravel: chief soils of the broad shallow valleys".

Basic physical characteristics of the soils within the main Premises lot (Lot 108) were determined previously during the installation of groundwater bores across the site in May 2009. The Applicant reviewed the lithology of soils within Lot 108, sampling from four locations (SB1 to SB4) in March 2017 (see Figure 8 below). Soils were determined to be fine to coarse grained sands with clay content increasing with depth. Clay materials were reached at depths between 0.1m to 0.7m. Additional surface soil sampling and testing was undertaken at three locations within Lot 107 (S1, S2 & S3) in May 2017 (noting the GPS coordinates of sites S2 and S3 have not been provided or mapped).

The soil lithology has been further confirmed through the recent installation of a new abstraction bore in the north-west corner where the soil profile is described as grey soil (presumed sand) at 0 to 1 metres, beige coloured clay from 1 to 6 metres depth, then underlain by variable layers of grey siltstone with or without sand bands present.



Figure 8: Soil sampling locations

Soil samples taken from Lot 108 sampling sites SB1 to SB4 in March 2017 were tested and reported for soil moisture content, Total Kjeldahl Nitrogen (TKN), Total Nitrogen (TN), Total Phosphorus (TP) and the Phosphorus Retention Index (PRI). The depth of soil profile sampled varied from only 15cm at SB1 (where soil moisture was reported as being 40.7%) up to a 100cm profile sampled from SB2. In addition, further surface soil sampling (0-50cm soil profile) was conducted at 3 other sampling locations S1-S3 in May 2017 with these samples tested and assessed for soil moisture content, pH, electrical conductivity, Sodium Adsorption Ratio (SAR), major cations (including the calculation of Effective Cation Exchange Capacity), anions, metals and PRI. Nutrient levels in these samples were not reported. The Applicant assessed that in accordance with the Departments *Water Quality Protection Note No. 22: Irrigation with nutrient rich wastewater* (WQPN 22), the soils are identified to be in Risk Category A.

The Application presented a summary of the PRI test results based on the four soil sampling sites within Lot 108 (see Table 15 below), assessing that the results indicated the soils are 'moderately adsorbing' (Chemistry Centre, 1990)

Table 15: Summary of soil PRI results (from Application)*

Irrigation Area 1, Lot 108	
PRI (mL/g)	1.5 – 9.4
Phosphorus Retention Rating (Chemistry Centre 1990)	Moderately Adsorbing

*Summary from four sites (SB1 to SB4) within Lot 108 only.

Key Findings:

The Delegated Officer has reviewed the information regarding soils and has found:

1. The Applicant's summary of Lot 108 soils as being Moderately Adsorbing is not consistent with the Chemistry Centre 1990 publication (Table 18) which classifies the P-sorbing properties of WA soils as follows:

PRI	<2	2-5	5-20	20-70	>70
Classification	Very weakly adsorbing or desorbing	Weakly adsorbing	Moderately adsorbing	Strongly adsorbing	Very strongly adsorbing

Three of the four soil samples tested have PRI values between -1.5 and 4.4, rated as very weakly or weakly phosphorus adsorbing and only sample SB1 can be rated as moderately adsorbing.

2. Soil characteristics across Lots 107 and Lot 108 have not been sufficiently well sampled or defined to enable assessment of the potential soil impacts from historical wastewater irrigation in Lot 108, nor the suitability of soils within Lot 107 for irrigation with treated wastewater.

8.7 Topography

Within Lot 108, the land slopes slightly from the southwest corner to the northeast corner with contours at between 115 and 105 metres Australian Height Datum (AHD) giving a slope for the site of approximately 5%. Similarly the land within Lot 107 slopes gently from 115m AHD in the eastern half down to 100m AHD along Island Brook.

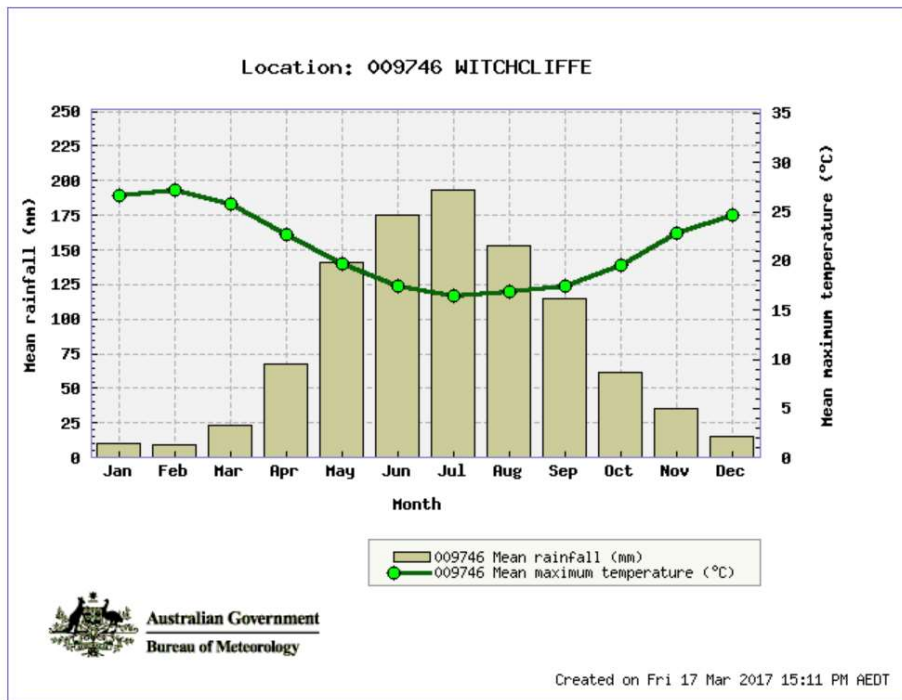
8.8 Meteorology

8.8.1 Regional climatic aspects

The Delegated Officer considered climate types in Australia using the Koeppen system (M. C. Peel et. al) to determine the location of an appropriate bureau station and climate statistics for the Premises. The boundary between a Csa and a Csb climate lies directly over Busselton which is approximately 27km north east of the Premises. Csa and Csb climate types vary, with climate type Csa characterised as a hot Mediterranean-type climate (long hot summers, mild to cool winters and winter rainfall) and Csb, a moderate Mediterranean-type climate with warm dry summers, cool winters, and winter rainfall. Annual evaporation rates are much higher in Csa than Csb climates.

The Premises is located in a Csb climate and meteorological data from Bureau of Meteorology (BoM 2016) Witchcliffe WA bureau station No. 009746, located approximately 27.5 km from Metricup, has been used to source data for rainfall, temperature and wind direction and strength.

The average yearly mean rainfall and maximum temperature for the Witchcliffe station is shown below in Figure 9.



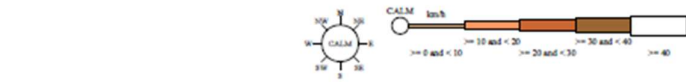
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1999 to 2017	10.0	9.3	23.1	67.1	141.4	174.9	193.3	153.3	114.8	61.9	35.3	14.8	1010.5	17
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean maximum temperature (°C) for years 1999 to 2017	26.6	27.2	25.8	22.6	19.7	17.4	16.4	16.8	17.4	19.6	22.8	24.7	21.4	18

Figure 9: Witchcliffe WA mean rainfall and mean temperature

8.8.2 Wind direction and strength

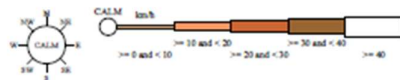
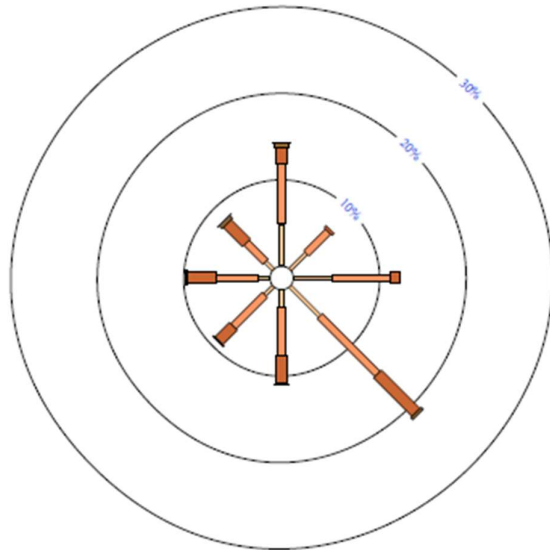
Annual wind roses from BoM 2017 for Witchcliffe WA provide an indication of likely wind direction, strength and frequency for the Premises. The prevailing winds for Witchcliffe are south easterly winds in the morning and southerly winds in the afternoon. Observations taken from the BoM station indicate that wind blows most commonly between 10 and 20km/h in the morning with calm conditions occurring for 6% of the time. Winds between 10 and 20km/h occur most commonly in the afternoon with calm conditions in less than 0.5% of observations (see Figure 10 below).

It is important to note that these wind roses show historical wind speed and wind direction data at the Witchcliffe WA weather station and should not be used to predict future data at the site.



9 am
6509 Total Observations

Calm 7%



3 pm
6557 Total Observations

Calm *

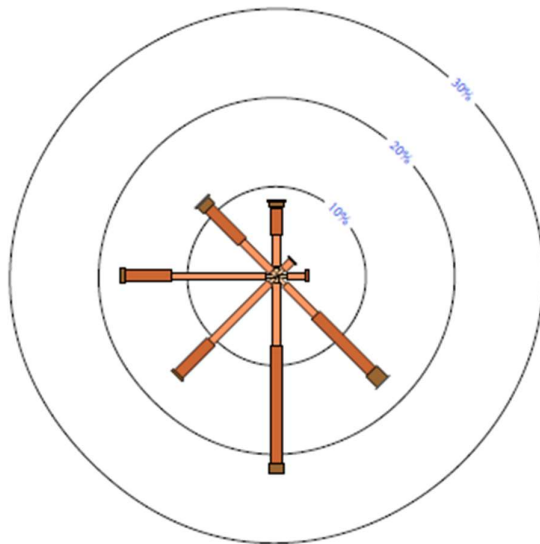


Figure 10: 9am and 3pm wind roses for Witchcliffe WA (BoM 1999 – 2017)

9. Risk assessment

9.1 Confirmation of potential impacts

Identification of key potential emissions, pathways, receptors and confirmation of potential impacts are set out below in Table 16. Table 16 also identifies which potential emissions will be progressed to a full risk assessment. Some potential emissions/impacts may not receive a full risk assessment where a potential receptor or pathway cannot be identified or where the emission/impacts are regulated under a Ministerial Statement.

Table 16: Identification of key emissions during operation

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
Source (see Section 4.1 for infrastructure references)	Milk receipt/storage	Vehicle movements – milk delivery and product dispatch	Noise	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts causing nuisance	Yes	See Section 9.4
		Filling / emptying milk tankers and storage silos	Spills and leaks	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.9
			Wastewater from tanker and storage silo cleaning operations	Groundwater bores used for domestic/household use - 180m and 220m				
			Stormwater and contaminated surface runoff or wash waters (hydrocarbons/milk) to land	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface	Soil, direct discharge and overland flows			

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
	Milk processing	Milk heat treatment and preparation, processing, packaging and storage of dairy products	Leaks and spills of waste from storage, process and handling areas	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface Groundwater bores used for domestic/household use - 180m and 220m	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.9
			Odour	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts causing nuisance	No	The Delegated Officer considers that odour should not be a part of normal milk processing operations. Potential sources of odour from operations including waste handling and WWTS have been considered below.
			Noise	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts	Yes	See Section 9.4
			Stormwater and contaminated surface runoff or wash waters (hydrocarbons/milk) to land	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface Groundwater bores used for domestic/household use/livestock - 180m, 220m, 800m and 2km	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.9

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
Treatment / Storage/ Handling of waste	WWTS to treat wastewater	Noise	Closest to WWTS and irrigation area within Lot 108 are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts	Yes	See Section 9.4	
		Odour					Other rural residences and holiday accommodation lie within 100m of Lot 107 irrigation	See Section 9.5
		Breach of containment causing solid/liquid waste discharge to land	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface Neighbouring properties Groundwater bores used for domestic/household use/livestock - 180m, 220m, 800m and 2km	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.9	
	Storage of sludge/solids generated from WWTS and Storage of sludge/solids, milk waste and whey generated from milk processing	Breach of containment causing sludge/solids and whey discharge to land	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface Groundwater bores used for domestic/household use/livestock - 180m, 220m, 800m and 2km	Soil, direct discharge and overland flows	Alteration to soil and/or vegetation condition Nutrient impacts potential algal blooms in surface water Groundwater contamination Affect ecosystem health	Yes	See Section 9.9	
		Odour	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts causing nuisance	Yes	See Section 9.5	

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
	Waste disposal	Onsite disposal of treated wastewater via irrigation	Effluent to land with excessive contaminants	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.6
				General public	Direct contact	Adverse health impacts	No	The Delegated Officer considers that there is adequate separation between the public access areas and the irrigation area to avoid any direct contact.
			Effluent to land with excessive hydraulic loading	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See Section 9.8
			Noise generated from operation of pump/s and irrigation equipment	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m. Closest residential and holiday accommodation 100 m from Lot 107	Air / wind dispersion	Amenity impacts causing nuisance	No	The Delegated Officer considers that noise generated by equipment used for irrigation will meet the requirements of the EP Noise Regulations given the separation distances to sensitive receptors
			Odour	Closest are holiday homes at approximately 190m and residential and commercial premises at 150m	Air / wind dispersion	Amenity impacts causing nuisance	Yes	See Section 9.5

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
	Storage of chemicals	Storage of chemicals and hazardous materials	Breach of containment causing hydrocarbon, cleaning chemicals discharge to land	Surface water (Island Brook) – 40m Groundwater - Highest seasonal groundwater is located at surface Groundwater bores used for domestic/household use/livestock - 180m, 220m, 800m and 2km Soil	Soil, direct discharge and overland flows	Surface water and groundwater contamination Affect ecosystem health	Yes	See section 9.9

9.2 Risk criteria

During the assessment the risk criteria in Table 17 below will be applied to determine a risk rating.

Table 17: Risk Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the risk / opportunity occurring.		The following criteria has been used to determine the consequences of a risk occurring:		
		Environment	Public Health* and Amenity (such as air and water quality, noise, and odour)	
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> on-site impacts: catastrophic off-site impacts local scale: high level or above off-site impacts wider scale: mid level or above Mid to long term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> on-site impacts: high level off-site impacts local scale: mid level off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> on-site impacts: mid level off-site impacts local scale: low level off-site impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> on-site impacts: low level off-site impacts local scale: minimal off-site impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> on-site impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's, *Health Risk Assessment (Scoping) Guidelines* "on-site" means within the prescribed premises boundary.

9.3 Risk treatment

DWER will treat risks in accordance with the Risk Treatment Matrix in Table 18 below:

Table 18: Risk Treatment

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk event will not be tolerated. DWER may refuse application.
High	Acceptable subject to multiple regulatory controls.	Risk event will be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled	Risk event is acceptable and will generally not be subject to regulatory controls.

9.4 Risk assessment - noise emissions from normal operations

9.4.1 Description of risk event

Noise emissions generated from milk processing activities, on-site vehicle movements, wastewater treatment and irrigation operations (pumps) causing environmental nuisance at sensitive receptors, including rural residences.

9.4.2 Identification and general characterisation of emission

Noise emissions include continuous noise sources and intermittent operational noise sources. These include internal and external equipment and plant, such as boilers, refrigeration units and pumps, noise from the operation of milk tankers and transport vehicles on-site and noise generated by the refrigeration compressors on vehicles. Pumps and aeration equipment in the WWTS and pumps used by the irrigation system can also contribute to noise emissions. Noise from vehicles on the public road and noise from visitors to the retail outlet are not considered by this assessment.

Milk deliveries occur between 6am - 6pm Monday to Friday and 6am to 1pm Saturday to Sunday. Weekday truck movements average around 8 trucks per day, with 2 milk truck deliveries occurring each Saturday and Sunday. Other than refrigeration units on trucks, all other cold storage/refrigeration is housed within the enclosed dairy processing buildings. The aeration unit/s in the main treatment tank are operated continuously. Operation of pumps related to the transfer of wastewater is intermittent.

9.4.3 Description of potential adverse impacts from the emission

Noise emissions could lead to negative impacts on the quality of life of people located in residences and nearby holiday accommodation. Annoyance or discomfort experienced may vary depending on the frequency, type, timing and duration of noise emissions.

9.4.4 Criteria for assessment

The *Environmental Protection (Noise) Regulations 1997* (Noise Regulations), are applicable for the operation of the Premises.

The Applicant is required to comply with the assigned levels specified in regulation 8 that specify the sound level allowable at a receiver (sensitive receptor).

9.4.5 Applicant controls

The Applicant’s controls to reduce and manage noise emissions as outlined in the Application, are set out in Table 19 below.

Table 19: Applicant controls for noise emissions (from Application)

Control	Description
Infrastructure	All transport vehicles will be fitted with mufflers
Procedures/ management	Milk deliveries will only occur between 6am - 6pm Monday to Friday and 6am to 1pm Saturday to Sunday
	Ensure all equipment is appropriately fitted, maintained or substituted with noise reduction devices if necessary, to comply with current legislation and best practise standards
	Inspection of noise control equipment* or plant and equipment
	Undertake noise assessment**
	Complaints management

Note * Examples of noise control equipment currently in use were not specified

** No further detail provided on noise assessment to be undertaken or the timing thereof

9.4.6 Consequence

Based upon the distances to the closest sensitive receptors, the Delegated Officer has determined that the impact of noise emissions on amenity could lead to low-level amenity impacts. Therefore, the Delegated Officer considers the consequence to be **Minor**.

9.4.7 Likelihood of risk event

Considering the Applicant proposed controls, distance to receptors (from Lot 108) and that there are no reported records of noise complaints the Delegated Officer considers that the likelihood of noise emissions occurring and impacting upon sensitive land uses would likely not occur in most circumstances and is therefore **Unlikely**.

9.4.8 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of noise emission impacts on sensitive receptors during operation is **Medium**.

9.5 Risk assessment – odour emissions from normal operations

9.5.1 Description of risk event

Odour emissions during normal operations causing a nuisance that impacts on the amenity and lifestyle of receptors.

9.5.2 Identification and general characterisation of emission

Odour sources during normal operations are likely to be associated with the routine operation of the WWTS, irrigation of wastewater to land and solid and liquid waste handling and storage.

Odour may be generated as a result of irrigating treated milk processing wastewater onto land during and after irrigation. Odour can also be generated from the treatment and storage of wastewater and the handling and storage of milk by-products (whey) and sludge waste.

9.5.3 Description of potential adverse impacts from the emission

Impact on receptors from an odour can include annoyance potentially leading to stress and loss of amenity. Exposure to repeated odour events can create a nuisance effect.

9.5.4 Criteria for assessment

There are no set threshold or concentration criteria for odour assessment. The general provisions of the EP Act make it an offence to cause or allow unreasonable emissions which includes emissions of odour that unreasonably interfere with the health, welfare, convenience, comfort or amenity of any person.

BOD levels in treated wastewater irrigated to land provide an indicator of the effective removal of fats and solids from the waste. WQPN 22 applies a BOD loading limit of less than 30kg/ha/day (or less than 150mg/L) to avoid foul odours from wastewaters containing volatile (degradable) organic matter. Overloading organic matter in the soil through irrigation, can result in the clogging of soil pores, favouring anaerobic conditions that may result in odour production. High levels of suspended solids in treated wastewater applied to land can also contribute to the clogging of soil pores. Excessive irrigation resulting in surface ponding can also contribute to anaerobic conditions and odour.

9.5.5 Applicant controls

The Applicant's controls to reduce and manage odour emissions are set out in Table 20 below.

Table 20: Applicant controls for odour (from Application)

Control	Description
Procedures / management	Whey storage in an enclosed tank prior to disposal or reuse for ricotta products.
	Solids and sludge removed from WWTS on a weekly basis and placed in enclosed holding tanks before disposal off site
	All biosolid waste is collected by a waste contractor weekly and disposed of at a licenced waste facility
	Irrigation areas will be managed to ensure no excessive ponding of water occurs ¹
	Complaints management, including verification through odour monitoring where necessary

Control	Description
Infrastructure	<p>Ensure sufficient treatment of wastewater in WWTS to meet the following design criteria prior to irrigation to land:</p> <ol style="list-style-type: none"> 1. BOD <50 mg/L; and 2. Suspended Solids (SS) <20 mg/L²

Note 1: No detail was provided as to how irrigation will be managed to avoid ponding given the limited storage capacity to hold wastewater during high rainfall periods and waterlogged conditions.

2: No detail was provided on how the SS levels will be achieved given that the results in 2017 reached a level of up to 338mg/L and the January 2018 result was 67mg/L.

9.5.6 Consequence

Based upon consideration of the location of the Premises, the applicants proposed controls and general hazard characterisation, odour emissions could have a low-level impact to amenity of nearby rural residences and holiday accommodation. Therefore, the Delegated Officer considers the consequence to be **Minor**.

9.5.7 Likelihood of risk event

Considering the WWTS components, the quality of treated wastewater irrigated, local wind conditions, distance to receptors and the history of odour complaints mid-level impacts to amenity could occur at some time. Therefore the Delegated Officer considers the likelihood of odour emissions causing a nuisance to be **Possible**.

9.5.8 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of odour emission impacts on the amenity of sensitive receptors during normal operation is **Medium**.

9.6 Risk assessment - odour emissions from abnormal operations

Abnormal operations represent scenarios such as a power failure impacting on the operation of aeration units or pumps resulting in a failure of WWTS infrastructure to contain or effectively treat wastewater (potentially including irrigation infrastructure), or similarly the occurrence of a major milk spill outside of containment. Spills or discharges of chemicals, milk/milk products and wastewater or waste products could lead to short term pooling of waste, or failures in the WWTS, that may generate odour causing a nuisance that impacts on the amenity and lifestyle of receptors.

9.6.1 Consequence

Based upon consideration of the location of the Premises, the location of proposed irrigation areas, the applicants proposed controls and general hazard characterisation, odour emissions resulting from abnormal operations could have low-level off-site impacts to amenity of nearby rural residences and holiday accommodation. Therefore, the Delegated Officer considers the consequence to be **Moderate**.

9.6.2 Likelihood of risk event

Considering the Premises product and waste storage infrastructure, transfer operations, volumes of materials handled, the WWTS (which includes a large open treatment tank), and infrastructure to convey treated wastewater for irrigation the risk of odour being generated as a result of abnormal operating conditions could occur at some time. Therefore the Delegated

Officer considers the likelihood of odour emissions causing a nuisance as a result of abnormal operating conditions to be **Possible**.

9.6.3 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of odour emission impacts on the amenity of sensitive receptors during abnormal operation is **Medium**.

9.7 Risk assessment – discharge of treated effluent to land (irrigation) – nutrient and salt loading impact analysis

9.7.1 Description of risk event

Discharge of treated wastewater with high levels of nutrients and salts to land causing soil degradation, surface water and groundwater contamination and affecting ecosystem health.

9.7.2 Identification and general characterisation of emission

Up to 13,000kL of wastewater will be generated annually for treatment and disposal to land by irrigation, based on current production Monday to Friday, 260 days of the year. Currently up to 50kL per day of treated wastewater is irrigated to a 0.73ha grassed area within Lot 108. Future irrigation is proposed to include application of treated wastewater spread over a maximum area of 44.1ha of pastured land within the adjacent lot (Lot 107).

Wastewaters from dairy processing plants are characterised by high chemical oxygen demand (COD), BOD, nutrients, organic content and sodium content from cleaning products (New Zealand Dairy Research Institute).

The Application states that treated wastewater (effluent) discharged to irrigation areas will meet the design water quality values shown in column 2 of Table 21 below. Reported results for treated effluent samples taken from January 2017 to January 2018 (summarised in column 3) note significant concentrations for some parameters in excess of the original design standards.

Table 21: Effluent quality to be discharged to irrigation area (from Application)

Parameters (including units)	WWTS design effluent quality values provided by Applicant	Range of WWTS effluent treatment results January 2017 – January 2018
Biochemical Oxygen Demand (mg/L)	<50	4 - 42
Total Suspended Solids (mg/L)	<20	<5 - 338
Total Nitrogen (mg/L)	<20	7.4 – 31.1
Total Phosphorus (mg/L)	<2	0.09 – 4.31
pH	6.5-8.5	-*
E.coli (cfu/100mL)	<1000	-*

* No data provided by Applicant

Whilst the original WWTS design values did not include a standard for Total Dissolved Solids (TDS) the Applicant noted that TDS levels range from approximately 2600mg/L to 3360mg/L in the treated effluent. By comparison, the current TDS levels of bore water extracted for use in dairy production is around 640mg/L.

Weekly treated wastewater volume data for the milk processing facility in 2017 shows that the

average weekly production of wastewater for treatment has exceeded the proposed upper limit of 50kL/day for 15 weeks of the year, with consistently higher wastewater production levels reported from around mid-September through to mid-December 2017. The original WWTS system design, as approved for construction under Works Approval (W4904/2011/1), was based on a maximum throughput of 45kL/day to achieve specified treated wastewater quality standards. The capacity of the WWTS to adequately treat up to 50kL/day prior to irrigation has not been determined. The NIMP submitted by the Applicant, *Margaret River Dairy Company: Nutrient and Irrigation Management Plan 2017* has been reviewed, along with the Application supporting information, as part of the risk assessment for irrigation of treated wastewater to land.

The Applicant assessed that a minimum irrigation area of 2.9 hectares would be required to achieve full plant uptake of the nutrient loading (N & P) applied, based on the following assumptions:

- 250 average working days per annum and 50kl/day of wastewater generated;
- Annual ryegrass (*Lolium rigidum*) as the primary vegetation for N & P uptake;
- Average biomass yield for annual ryegrass of 6,683.8kg/ha containing an average of 1.81% N and 0.13% P; and
- Treated wastewater quality of 20mg/L N and 2mg/L P

Since the minimum area of land required for irrigation of the wastewater exceeds the existing area irrigated within Lot 108 (0.73ha), MRDC had proposed to irrigate the majority of the treated wastewater on to the adjacent privately owned lot (Lot 107). However, approval for irrigation to the adjacent lot has not been agreed to by the current landowner, nor has approval been granted by the City of Busselton or DoH for irrigation to Lot 107. The potential for interaction of effluent with groundwater in Lot 107 is unknown due to a lack of information on groundwater depth, though with respect to land elevation and slope the Applicant has estimated that groundwater could be as shallow as 2-3 metres below ground level within Lot 107. Local knowledge indicates that substantial waterlogging occurs within the NE section of Lot 107 and persists well into the spring.

Based on limited soil sampling and testing within Lot 108 the soils have a weak to moderate capacity to adsorb phosphorus. Soil characteristics across Lot 108 have not been sufficiently well sampled or defined to enable assessment of the impacts from historical wastewater irrigation in Lot 108.

The characteristics of soils within Lot 107 where extensive new areas for irrigation are proposed, have not been sampled and described. Any future licence amendment application proposing to irrigate into new areas must include baseline soil survey information representative of the total area proposed, to include the range of soil types and any changes through the soil profile, and characterising the physical and chemical characteristics sufficiently to allow the assessment of the suitability of the identified area/s for irrigation. DWER considers that the Department of Environment and Conservation NSW 2004, 'Environmental guidelines, use of effluent by irrigation' provide appropriate guidelines on site selection including soil properties and assessing suitability for irrigation of effluent.

9.7.3 Description of potential adverse impacts from the emission

The discharge of wastewater (treated or untreated) to land through irrigation has the potential to contaminate surrounding land and adversely impact upon soils, groundwater and surface water.

The irrigation area within Lot 108 is likely to have an interaction with groundwater and Island Brook, noting that the highest seasonal surficial groundwater level is right at the surface in the NE corner and is at around 1.0m below ground level in the SE of Lot 108.

A minimum 30m separation distance between the irrigation area and Island Brook is proposed.

Given the characteristics of soils within Lot 108 (as detailed in section 8.6), under conditions where an excessive amount of wastewater was applied to such a small area, there is a risk that leachate from the irrigation area would discharge to Island Brook and for nutrients to be transported in surface drainage during the winter months. Salt levels in the treated wastewater are approximately 4-5 times the concentration of the abstracted bore water used in the production process. Elevated levels of salts in irrigated wastewater are also likely to be discharged by groundwater flow to Island Brook. This could seasonally increase the salinity of pools of standing water that may occur within Island Brook.

Island Brook is located in the Geographe catchment and makes up part of the hydrology of the Carburnup River sub catchment flowing into Geographe Bay. Geographe Bay has water, land and social values and is managed under the Geographe Catchment Management Strategy 2008. The two closest groundwater bores used for domestic/household use are located 180m south and 220m north-west. Two groundwater bores listed for livestock purposes are located approximately 850 m and 2 km downstream of Island Brook.

9.7.4 Criteria for assessment

The nutrient application criteria to control eutrophication risk set out in WQPN 22 are considered appropriate assessment criteria to determine loading limits for nitrogen and phosphorus when irrigating effluent to land (refer to Table 22 below). Australia and New Zealand (ANZECC) Guidelines for Fresh and Marine Water Quality (2000) are considered appropriate to assess potential impacts on groundwater or surface water quality.

Table 22: Nutrient application criteria for treated wastewater

Parameters	WQPN 22 nutrient application loading rate
Biochemical Oxygen Demand	30 kg/ha/day
Total Suspended Solids	NA
Total Nitrogen	140 kg/ha/year
Total Phosphorus	10 kg/ha/year

9.7.5 Applicant controls

The Applicant's controls to manage treated wastewater (TWW) irrigation are set out in Table 23 below.

Table 23: Applicant controls for treated wastewater irrigation (from Application)

Control	Description
Siting	Minimum 30m setback from Island Brook
Engineering	Treated wastewater will be stored in a plastic lined 430kL zincalume tank prior to irrigation
	Mobile, low pressure (10-90 PSI), self-propelled irrigator with an auto shut-off valve and stopping blocks used to control irrigation runs
	Irrigation of up to 50kL per day of treated wastewater applied to either 0.73ha within Lot 108 or up to 44.1ha within Lot 107 for up to 260 days per year*
	Wastewater will be treated to the following standards prior to discharge:** <ul style="list-style-type: none"> • Biological Oxygen Demand (BOD) – 50mg/L; • Total Nitrogen (TN) – 20mg/L; • Total Phosphorus (TP) – 2mg/L as P; and • pH – 6.5 – 8.5
Procedures / Management	Irrigation system will be regularly maintained to ensure the internal hydraulic balance of the system is not compromised
	Boundary setback of 10 metres to all irrigation areas to allow for potential spray drift
	Irrigation will not take place immediately before, during or immediately after rain events
	Irrigation rate designed to match irrigation requirements/area to achieve no runoff – TWW applied at 3-6mm/hour, based on using a 100m cable run, 20 metre spray width, covering 0.3ha per 100m run
	Irrigation will not occur on land that is waterlogged
	Vegetation cover will be maintained on all irrigation areas to ensure no soil erosion occurs
	Vegetation in Lot 108 will be harvested at least every 12 months. Volume/weight of each crop harvested to be recorded
	Vegetation in irrigation areas within Lot 107 will be periodically grazed by sheep
	No irrigation will occur over leach drains and all surface stormwater runoff from the carpark will be diverted away from the irrigation area within Lot 108
	Onsite Weather Station (rain gauge) – daily rainfall, assessed weekly by irrigation operator
	Monthly monitoring of treated wastewater quality for the following parameters: BOD, pH, TN, TP (Reactive P), chlorine, <i>E. coli</i>
	Existing surface water sampling locations (3 sites) will be monitored monthly for up to twelve months for pH, electrical conductivity (EC), BOD, Ammonia –N, Nitrate-N, TP and TN
	Soils in irrigation areas will be assessed at a minimum every five years for: pH, EC, Sodium absorption ratio (SAR), major ions, cation exchange capacity (CEC), total metals, TN TP, PRI

Note *: DWER notes that whilst the Applicant has proposed irrigation of up to 50kL/day, the WWTS has only been designed and authorised for construction on the basis of receiving up to 45kL/day of wastewater for treatment.

**.: the Applicant has not committed to a treated effluent quality standard for TSS, nor regular TWW monitoring for TSS.

9.7.6 Key findings

The Delegated Officer has reviewed the information regarding the nutrient and salt loading from wastewater discharges to land and has found:

1. There is a significant difference in the quality of treated wastewater as recorded for 2017 compared to the WWTS design specifications indicating inadequate treatment and reduction in BOD, TN and TSS. This may be related to overloading of the treatment system beyond the design maximum throughput of 45kL/day, as well as a possible consequence of not installing all the components, including the filtration unit, as originally proposed.
2. There is a risk that elevated salt levels, particularly sodium, could impact negatively on predicted yields of Annual Ryegrass (*Lolium rigidum*) and therefore nutrient uptake and removal.

9.7.7 Consequence

Based on the treated wastewater quality and volume to be directed to the irrigation area, nearby abstraction of groundwater for domestic and stock water uses, and the hydrological values of Island Brook, the Delegated Officer has determined that the discharge of wastewater with excess nutrients and salts could result in eutrophication of surface water, contamination of groundwater, and impacts on groundwater users in the area and have negative impacts on soil structure. Therefore, the Delegated Officer considers the consequence to be **Moderate**.

9.7.8 Likelihood of consequence

Based upon the irrigation area available, irrigation history, close proximity to receptors, soil type, and current water quality and volume from the WWTS, the Delegated Officer has determined that the likelihood of off-site impacts on a local scale will probably occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be **Likely**.

9.7.9 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of treated wastewater irrigation on sensitive receptors during operation is **High**.

9.8 Risk assessment – discharge of treated effluent to land (irrigation) – hydraulic loading impact analysis

9.8.1 Description of risk event

Application of water in excess of the soil absorptive capacity, evaporation or plant transpiration capacity will result in infiltration of treated wastewater past the crop root zone into groundwater and/or waterlogging and overland flow of treated wastewater into Island Brook or vegetated buffers causing surface water and groundwater contamination and affecting ecosystem health.

9.8.2 Identification and general characterisation of emission

Common contaminants in wastewaters from dairy processing plants include high COD, BOD, nutrients, organic content and sodium content from cleaning products (New Zealand Dairy Research Institute).

The WWTS has a total volumetric holding capacity of approximately 270kL and will be required to treat up to 50kL per day of wastewater (from production and cleaning activities) five days per week, prior to irrigation on either the 0.73 ha area within Lot 108 or otherwise

proposed for application to defined irrigation areas within Lot 107 (up to a maximum of 44.1ha).

Irrigation will occur Monday to Friday totalling approximately 250kL per week up to a maximum of 13,000kL per year (noting however that in 2017 the 250kL per week estimate was exceeded on 15 occasions).

The existing Lot 108 irrigation area has a slope of approximately 5% towards Island Brook, located approximately 30m further east of the eastern boundary of the irrigation area.

Up to a total of 44.1ha has been identified for irrigation within Lot 107, some of this immediately adjacent to Island Brook. The water balance provided in the Application estimated that:

- 6.6ha is required to manage the application of treated wastewater in the wettest month (July);
- Maximum storage of 235kL (based on the size of the aeration treatment tank) would require 33.3ha of additional irrigation area; and
- A worst case scenario where the storage tank had to be emptied in July (from full) concurrently with the maximum daily irrigation volume (50kL), would require 39.9ha.

9.8.3 Description of potential adverse impacts from the emission

The operation of irrigation schemes above the capability of a site (irrigation in excess of hydraulic loading rates and irrigating during periods where rainfall meets the needs of the vegetation) can cause hydraulic loading to the extent that local water tables rise. Waterlogging of soils can occur, along with the transfer of contaminants to groundwater through leaching and excess runoff flowing into surface water. Contaminated runoff into adjacent vegetated buffers could adversely affect plant health.

9.8.4 Criteria for assessment

The Delegated Officer has had regard to Australian Standard AS 1547:2000 *On-site Domestic Wastewater Management* and NSW EPA 1998. These guidelines are considered appropriate and present a conservative approach to water balance calculations.

9.8.5 Applicant controls

The Applicant's controls to manage irrigation, including hydraulic loading, are as set out previously in Table 23 above.

9.8.6 Key findings

The Delegated Officer has reviewed the information regarding treated wastewater discharges to land from the Premises and has found:

1. The combined rate of treated wastewater irrigation, rainfall, and stormwater runoff to the existing Lot 108 irrigation area exceeds the hydraulic outputs (evapotranspiration and percolation) throughout each month of the year. Treated wastewater applied to this small area may infiltrate past the root zone into groundwater from March to November.
2. Groundwater beneath the site may become contaminated by elevated concentrations of nitrogen compounds and salts which could be discharged as base flow into Island Brook that abuts Lot 108 and sections of the proposed Lot 107 irrigation areas.
3. Stormwater inputs from paved/hardstand areas and bunded containment areas to the Lot 108 irrigation area were not considered in the Applicant's water balance for the irrigation area.

4. There is currently no capacity to store treated wastewater (other than in the 10,000L final tank) prior to irrigation. The Applicant has acknowledged that the 430kL storage tank referred to in the Application has not yet been installed. The main aerobic treatment tank is not considered to count as storage.

9.8.7 Consequence

Given the known shallow depth to groundwater within Lot 108 and the potential for leachate to be discharged to groundwater and the adjacent Island Brook, the Delegated Officer has determined that excess runoff and potential pollution of groundwater and surface water could occur on a scale that includes on and off-site impacts at a mid and low level respectively. Therefore, the Delegated Officer considers the consequence to be **Moderate**.

9.8.8 Likelihood of consequence

Based upon the limited irrigation area available, climate data, the amount and quality of wastewater for disposal and compliance history detailed in section 6, the Delegated Officer has determined that the likelihood of on and off-site impacts at a mid and low level could be expected to occur at some time. Therefore, the Delegated Officer considers the consequence to be **Likely**.

9.8.9 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of an excess hydraulic loading of treated wastewater on sensitive receptors during operation is **High**.

9.9 Risk assessment – discharges to land due to failure of containment and spills

9.9.1 Description of risk event

Failure of containment and transfer infrastructure associated with milk storage and processing, waste treatment and waste and chemical storage resulting in spills or discharges causing soil, surface water and groundwater contamination and affecting ecosystem health.

9.9.2 Identification and general characterisation of emission

Spills and discharges from operations may include milk, wastewater containing milk, milk products, chemicals and waste products including whey and sludges. These may come from a number of sources including milk unloading, tanker wash down, equipment and pipeline cleaning, product changeover, milk processing, and wastewater treatment and irrigation. Milk receipt and storage presents a reasonably foreseeable risk event of spillages and/or failure of a milk storage silo (14,000L) or interconnecting pipes causing the release of milk into the environment including surface water, land and infiltration to groundwater.

The associated storage of waste and treatment and storage of wastewater from milk processing, presents the risk that waste material (including whey and sludge) and wastewater, could enter the environment in the event of failure of tanks or pipelines.

Hazardous substances stored on site include:

Diesel (boiler fuel) - above ground storage tank.

Chemicals – liquid chlorine-sodium hypochlorite (200L), acid based cleaning materials (1,000L) and alkali based cleaning materials (1,000L).

Milk and milk products – 3 x milk silos, total storage capacity of 28,000L (Up to

10,000L of milk delivered daily) and approximately 180 tonnes of product stored prior to dispatch.

Wastewater and waste products – Sludge, whey, and wastewater (treated to various levels).

As indicated in Figure 1, stormwater runoff from paved/hardstand areas and bunding containment areas, drains and discharges within the Premises boundary. The land naturally slopes from the south-west corner to the northeast corner of Lot 108, with stormwater drainage discharging onto the irrigation area.

9.9.3 Description of potential adverse impacts from the emission

Spills or discharges of chemicals, milk/milk products and wastewater/waste products could lead to contamination of soil, groundwater and surface water.

Wastewater containing milk or milk products has a high BOD concentration with the potential to impact on ecosystem health (Dairy Processing NWQS 1999).

Rainfall may come into contact with wastes and spills of hazardous materials (including milk), causing runoff and overland flow of contaminated stormwater. Stormwater runoff may have elevated nitrogen and phosphorus concentrations, high BOD and low pH. Contaminated stormwater may cause on and off-site impacts including eutrophication and degradation of Island Brook and contamination of groundwater beneath the Premises.

9.9.4 Criteria for assessment

The ANZECC guidelines are considered appropriate assessment criteria to assess the potential impact on groundwater or surface water quality.

9.9.5 Applicant controls

The Applicant's controls for spills or leaks of material and the management of hazardous substances are set out in Table 24 below.

Table 24: Applicant controls for spills (from Application)

Control	Description
Infrastructure	Milk unloading area, contoured towards an open drain 200mm x 200mm x 7m long (0.28m ³ capacity). Drain connected to a collection sump that can direct spillage to the WWTS via a gravity feed system.
	Milk silos are contained in a concrete bunded area, 4m x 200mm x 12m long (9.6m ³ capacity) The bunded area drains to effluent. It has an additional ability to drain to the environment to allow for the release of captured rainwater as required (manually operated plug in bunding wall).
	Whey storage tanks are contained in a concrete bunded area 2.4 m x 200mm x 30 m long (14.4m ³ capacity). This area drains to effluent. It has an additional ability to drain to environment to allow for the release of captured rainwater as required.
	Bunding installed around storage of on-site processing plant and equipment cleaning and sterilisation chemicals, oils and lubricants.
	Stormwater drains take discharges from feet of downpipes, subsoil drain outlets, surface water drainage sumps and channel drains and discharge into the Shire's main via an existing stormwater pit.
	Boiler fuel (diesel) is stored in a tank in a bunded areas that will hold 110% of the storage tank capacity.
Procedures /	All environmentally hazardous substances are stored in accordance with statutory requirements. In cases where no requirements are legislated,

Control	Description
management	hazardous substances are stored in low permeability banded areas that hold 110% of the volume being stored or 25% of any interconnected tanks.
	Spills of environmentally hazardous substances contained and cleaned up using appropriate techniques such as absorbent material. All high-risk spillage areas have a readily accessible supply of absorbent material and emergency spill response kits.
	Ensure that environmentally hazardous substance storage vessels are sealed and any spillage contained when being transported around site.
	Contain, and appropriately treat, contaminated or potentially contaminated stormwater that collects in storage bunds, prior to release to the environment.
	All drains, valves or discharge points associated with containment facilities are secured at all times and only appropriately trained or authorised personnel are able to open and release the contents.
	A system will be developed and implemented to manage the use of environmentally hazardous substances and controlled waste onsite. This system will include a register of substances, procedures for use, storage, transport and disposal and associated emergency response issues.*
	Monitoring of spills through the site incident tracking system and follow-up inspections.
	Waste consisting of whey and sludge is stored in fully enclosed tanks, collected by a waste contractor weekly and disposed of at a licenced waste facility.
	The storage, transport and disposal of environmentally hazardous substances and controlled waste will be included in the site environmental awareness program.*

* DWER notes future tense wording regarding these procedures suggest they are yet to be applied by the Applicant

9.9.6 Consequence

The Delegated Officer considers that failure of containment and transfer infrastructure could result in significant spills that may lead to off-site impacts. The Delegated Officer has had regard to the fact that spills may occur over a limited period of time, but the amount and the concentrations of milk or other substances may have a significant pollution load. Therefore, the consequence is **Major**.

9.9.7 Likelihood of consequence

Based upon the identified measures and infrastructure to prevent and manage spills of milk and milk products and other substances, the volume and number of milk deliveries received at the Premises, volumes of wastewater for treatment, distance to Island Brook, and the shallow depth to groundwater, the Delegated Officer has determined that the likelihood of off-site impacts on a local scale at a mid-level and exceedance of specific consequence criteria could occur at some time. Therefore, the Delegated Officer considers the consequence to be **Possible**.

9.9.8 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 17) and determined that the overall rating for the risk of adversely affecting groundwater and surface water during operation is **High**.

9.10 Summary of risk assessment and acceptability

A summary of the risk assessment and the acceptability of the risks with treatments are set out in Table 25 below. Controls are described further in section 10.

Table 25: Risk assessment summary

	Emission		Pathway and Receptor	Proponent controls	Impact	Risk Rating	Acceptability with treatment (conditions on instrument)
	Type	Source					
1.	Noise	Vehicle movements – milk delivery and product dispatch, milk processing, treatment of wastewater	Air/ wind dispersion Receptor: residential receptors	Infrastructure controls (plant and equipment) Management controls	Amenity	Medium	Risk event is tolerable and is subject to proponent controls and requirements of the EP Noise Regulations
2.	Odour - normal and abnormal operating conditions	Treatment / Storage/ Handling of waste	Air/ wind dispersion Receptor: residential receptors	Infrastructure controls Management controls	Amenity	Medium	Risk event is tolerable and is subject to proponent controls and some regulatory controls
3.	Discharges (of contaminant rich wastewater) to land via irrigation	Onsite disposal of treated wastewater	Seepage through soil and overland run-off Receptor: Groundwater, surface water	Siting Engineering controls	Surface water and groundwater contamination Affect ecosystem health	High	Risk event is tolerable subject to proponent controls and multiple regulatory controls, including strict limit on volumes and timeframes when irrigation can occur
4.	Discharges of (up to 13,000kL /annum) treated wastewater to land via irrigation (Hydraulic loading)			Management controls (NIMP, offsite disposal of whey and sludge)		High	
5.	Discharges, spills, leaks and overflows, contaminated stormwater	Processing and storage areas	Direct from infrastructure Receptor: Groundwater, surface water	Siting Engineering controls Management controls	Surface water and groundwater contamination Affect ecosystem health	High	Risk event is tolerable and subject to proponent controls and multiple regulatory controls

10. Determined regulatory controls

A summary of the risks with corresponding controls are set out in Table 26 below. The risks are set out in the assessment in section 9 and the controls are detailed in this section. Controls will form the basis of conditions in the Licence set out in Attachment 1.

Table 26: Summary of regulatory controls to be applied

		1.1 Operation and maintenance of infrastructure and equipment	1.1 additional controls regarding irrigation and wastewater	10.3 Emission limits – Discharges to land	10.3 Authorised Works	10.5 Monitoring and reporting
	1. Odour from disposal of wastewater and sludge/solid waste storage and handling	•	•	•		•
	2. Discharges to land (contaminates)	•	•	•	•	•
	3. Discharges to land (hydraulic loading)	•	•	•	•	•
	4. Risk to groundwater and surface water (containment failures and spills)	•	•	•	•	•

10.1 Operation and maintenance of infrastructure and equipment

10.1.1 Controls for odour

Infrastructure / equipment	Operation and maintenance details
WWTS	The WWTS must: <ul style="list-style-type: none"> • Accept and treat no more than 45kL per day of wastewater; • Treat wastewater to a BOD concentration of < 50mg/L. • Maintain a volumetric flowmeter at the outflow of the treated wastewater storage tank capable of measuring the volume of treated wastewater discharged via irrigation; and/or tankered for off-site disposal
Storage tanks for sludge waste, whey and other putrescible material	<ul style="list-style-type: none"> • Sludge waste, whey and other putrescible material must be kept in enclosed, leak-proof containers/tanks that: <ol style="list-style-type: none"> (a) Must be kept closed when putrescible material is being held in them; and (b) Removed from the Premises within 7 days of generation.

Note: Requirements are mostly derived from the Application.

Grounds: Given that the WWTS includes a large uncovered aeration tank as part of the treatment process and treated wastewater will be discharged to land through the irrigation system, or stored on site prior to removal off site, appropriate treatment of the wastewater and management of the transfer systems and storage is a key element in managing odour. Storage requirements and time frames for storing wastes have been included along with specific performance of the WWTS.

The Works Approval (W4904/2011/1) gave approval for the construction of the WWTS based on a maximum input of 45kL/day design wastewater treatment capacity. Similarly the Applicant's submission to the City of Busselton and DoH for approval to treat and use the wastewater is based on this same maximum daily input of 45kL (during production days of Monday to Friday).

10.1.2 Controls for discharges to land – Infrastructure maintenance and other operational requirements

Site infrastructure and equipment	Operational requirements
<p>Raw milk handling and storage areas consisting of 3 x milk silos; and milk processing wastes and dairy product handling and storage areas consisting of: 1 x sludge holding tank 2 x whey storage tanks and 1 x flow meter measuring water use</p>	<ul style="list-style-type: none"> • The loading and unloading of raw milk, dairy products and waste materials must be carried out in a bunded concrete hardstand containment area draining to the WWTS • Pressure sensors must be installed and maintained on milk silos to prevent overflow • All transfers of milk into and out of silos must be monitored by staff • Valves, pumps, pipelines and other fittings must be maintained and inspected by staff during each milk transfer to check for rupture or leaks • All drains, valves or discharge points associated with a bunded containment area must be secured at all times when not in use • Spill kits appropriate for milk, dairy products and waste materials must be kept in appropriate locations to contain any spills • Any spills must be immediately recovered • All waste material holding tanks located in the bunded area must be fully sealed and enclosed • All sludge, whey and other putrescible material from milk processing must be removed from the Premises weekly for disposal at an authorised facility • The flow meter measuring the daily volume of water used in dairy production and cleaning must be maintained and calibrated annually
<p>Wastewater treatment system (WWTS) consisting of: Inlet point with grease trap; pre-treatment holding tanks; clarifier tanks (x4) main aeration tank, sludge holding tank; dosing system pumps, overflow tank, irrigation/polish tank (10kL), treated effluent storage tank (430kL) and 1 x flow meter</p>	<ul style="list-style-type: none"> • All wastewater from milk processing operations is to be directed to the WWTS. • Accept no more than 45kL per production day of wastewater • Must have enclosed and fully sealed sludge and polishing tanks • The high level alarm on the final treated wastewater storage tank (once installed) must be operated and maintained such that the alarm is triggered when the contents are at 95% of volume • A sampling point at the outlet of the final treated wastewater storage tank must be operated and maintained to allow for periodic sampling • All tanks must be maintained to ensure leaks or overtopping do not occur • All valves, pumps, pipelines and other fittings must be maintained and routinely inspected to check for rupture or leaks • Subject to the completion of works specifying the extension to the existing WWTS hardstand and installation of bunding, all WWTS infrastructure is to be located on a bunded hardstand • Must have a volumetric flowmeter installed and maintained to allow the volume of treated wastewater discharged for irrigation or off-site disposal to be automatically captured and recorded on a daily basis • All flow meters must be calibrated annually
<p>Irrigation area (L1) and irrigation system infrastructure consisting of: travelling self-propelled irrigator, flexible irrigation line connecting irrigator to irrigation pipeline, irrigation pipelines and pump/s connecting to the final treated wastewater storage tank</p>	<ul style="list-style-type: none"> • Irrigation system valves, pumps, pipelines and other fittings must be maintained and inspected for rupture or leaks on a daily basis when irrigating • Spray irrigator to be maintained to ensure no blockages to allow even and effective spray production and ensure mobility, stopping and cut-off mechanisms are functioning as per equipment design • Spray irrigator operated to deliver treated wastewater at a rate of 3-6mm/hour with a spray radius of 20 metres • Records must be kept of all maintenance conducted and results of all routine irrigation system equipment and infrastructure inspections • Fence to exclude stock and public access to irrigation area L1

Note: Requirements are derived in part from the Application and CEO requirements. Further requirements regarding irrigation and wastewater are presented in Section 10.2.

Grounds: The Delegated Officer considers that the operation, management, and maintenance controls of infrastructure are necessary to minimise the contamination risks to soil, groundwater and surface water.

The spill containment systems in place for the milk unloading area, milk silos, and whey storage tanks are limited. The capacity of the drains and bunds around these areas are significantly less than the maximum volume held in a single tank/container. The WWTS does not have a spill containment system.

The Premises have a number of areas where spills could occur during the transfer of material from one container/tank to another, with a significant risk around the unloading and storage of milk. Given this, and either the absence of containment or only low volume capacity containment systems, the contents of spills and leaks from the Premises would have the opportunity to directly enter the environment. The Delegated Officer considers that any spilt milk, other wastes and wastewater, must be captured and contained to prevent entry to the environment. The Premises is located in an area with a minimal distance and direct pathway to sensitive receptors. The Applicant has not demonstrated that in the event of failure of a milk storage silo or a WWTS tank, that the facility has sufficient capacity to contain the volume of milk or wastewater released or how such an event would be managed. The requirement to ensure that the loading and unloading of materials is carried out in a bunded containment area has been added to the licence.

The Applicant's proposed controls to have spill kits available, remove waste from holding tanks off site and have authorised personnel controlling drains, valves and discharge points have been included as part of the controls. In addition the Delegated Officer has added controls requiring bunding, containment, hardstand surfaces, alarm systems on select equipment and staff monitoring at milk transfer points.

These controls are consistent with the Dairy Processing NWQS 1999 with respect to having bunds installed where spillage of effluent or milk and product may occur, directing this drainage to the effluent treatment system and having effective alarm systems in place to detect malfunction. The monitoring of milk receipt and infrastructure involved in the transfer has been included to prevent and reduce milk and product losses.

The Delegated Officer notes that further detail on irrigation controls are provided in Section 10.2 below and are significantly influenced by the reduced area currently available for wastewater irrigation (ie within a portion of Lot 108 only), not the extensive irrigation area originally proposed in the Application.

10.2 Additional controls regarding irrigation and wastewater

The Licence requires that the following additional operational and management controls are applied to the irrigation of treated wastewater:

10.2.1 Irrigation area

- The location and size of the irrigation area in Lot 108 is specified.
- Irrigation of treated wastewater must not exceed specified TN and TP loading limits and BOD concentration and loading limits (see further discussion below).
- Treated wastewater must be evenly distributed over the defined irrigation area in accordance with defined irrigation timeframes and volumetric limits.
- Vegetation cover must be maintained in the irrigation area at all times.
- Wastewater disposal via irrigation must not occur on land that is waterlogged.
- Daily monitoring and recording of rainfall, as captured in the on-site rain gauge, is required.
- No irrigation generated runoff, spray drift or discharge occurs beyond the boundary of the Premises.
- No soil erosion occurs.
- No public access to wastewater or the irrigation area.
- Treated wastewater must not be irrigated over the leach drains or areas subject to stormwater drainage discharge within Lot 108.
- Wastewater volumes discharged to irrigation must be monitored and recorded daily when discharging.

10.2.2 Restrictions on irrigation volume and months where irrigation can occur

The Licence limits the application of effluent within the defined irrigation area (L1) to a maximum of 30kL/day and restricts irrigation to the months of November, December, January February and March each year.

Note: Requirements are derived in part from the Application and CEO requirements.

Grounds: The Delegated Officer has considered the hydraulic loading of the irrigation scheme and the nutrient mass balance to assess the proposed wastewater application rate, areas available for irrigation (now restricted to Lot 108 only) and the risk of nutrients being leached to surface and groundwater.

The site soils (having high hydraulic conductivity), the quality and beneficial uses of groundwater in the area and proximity of receptors (surface and groundwater) have been taken into account to determine the extent to which leachate from wastewater irrigation may affect the environment.

The Delegated Officer assessed the water balance of the irrigation scheme using the spreadsheet-based “Nominated Area” approach (refer to Appendix 6 of NSW EPA, 1998) which assesses precipitation, applied wastewater, evapotranspiration and percolation. The Delegated Officer applied the varying monthly crop factors supplied by the Applicant (varying from 0.4 up to 0.7) in determining the rate of evapotranspiration for vegetation. The spreadsheet used the monthly pan evaporation rate for the Margaret River weather station and median (50th percentile) monthly rainfall for Witchcliffe WA.

The Applicant’s and DWER’s water balance assessment (see DWER assessment in Appendix 3), determined that the application of up to 50kL of wastewater to the existing 0.73ha irrigation

area within Lot 108, results in a positive water balance for each month of the year, meaning there is excess water being applied to the irrigation area and therefore, infiltration (percolation) of water to groundwater or surface runoff from the site will be possible. Based on the water balance assessment, hydraulic loading limits have determined that only a portion of the weekly total of treated wastewater produced can be disposed of by irrigation (up to 30kL/day) to the Lot 108 irrigation area (L1). Disposal of this volume over the summer months of December, January and February should prevent leaching of nutrients through the soil profile. The potential to further irrigate up to 30kL/day in the months either side (ie November and March) has been allowed for, subject to strict monitoring of daily rainfall at the site and other relevant key irrigation controls such as soil moisture levels, to determine the suitability of the irrigation area to receive irrigation in these months.

The Applicant's nutrient mass balance assessed the minimum irrigation area required for the uptake of nitrogen and phosphorus by Annual Ryegrass (*Lolium rigidum*) on the site to be 2.9ha. This nutrient mass balance has been used to justify that all of the nutrients in the wastewater will be taken up by the ryegrass and that there will be no net loss of nitrogen and phosphorus to the environment. The Delegated Officer considers this unlikely to be the case because of the following:

- (i) **Seasonal variations in ryegrass growth rates** – the annualised nutrient mass balance does not take into account the fact that the growth rate of perennial ryegrass in southern parts of Australia is much lower in winter months due to low temperatures and the shorter days than at other times of the year.
- (ii) **Underlying assumptions in the nutrient balance** – In assessing the irrigation area required for full uptake of N & P by ryegrass it was noted that in order to fully utilise the phosphorus, the ideal concentration for Total N would theoretically need to be 28mg/L (rather than the assumed TWW level of 20mg/L). However, the Applicant noted in the NIMP that N & P requirements of the crop will be met by irrigation and no additional routine fertilisation was expected to be required. The assessment assumes that the ryegrass has sufficient access to necessary micronutrients and that the availability of nutrients is the only limiting factor. In the absence of any historical information on grazing and fertilisation practices, and limited information on the current nutrient and salt levels in the surface soils, potential factors inhibiting ryegrass nutrient uptake, such as soil salinity, are not clear.

The Delegated Officer notes that as part of the draft review process, the Applicant requested approval not to disturb and remove the existing groundcover vegetation within the Lot 108 irrigation area and replace it with Annual Ryegrass. The existing groundcover vegetation in Lot 108 consists primarily of Kikuyu grass (*Pennisetum clandestinum*) and various other annual and perennial species. Therefore the nutrient uptake modelling presented in the Application, which is based on nutrient uptake by Annual Ryegrass, cannot be directly applied to the Lot 108 irrigation area.

In order to operate a sustainable irrigation scheme at the Premises with a low risk of seepage nutrient loss and soil salinity impacts, restriction of the amount of wastewater applied, separation from stormwater discharge areas and restricted times of the year for wastewater application are necessary. Due to current wastewater production levels, the size of the irrigation area and the necessary limitations on irrigation volumes and their timing for application, a significant portion of all wastewater generated at the Premises will have to be temporarily stored prior to off-site disposal.

10.2.3 Treated wastewater emissions to land limits

The Licence Holder is required to meet annual concentration limits for BOD levels in treated wastewater discharged to the irrigation area, in addition to meeting the following nutrient loading limits for total annual discharge and a daily loading limit for BOD applied to the defined

irrigation area:

- BOD <50mg/L and <30kg/ha/day;
- Total (Inorganic) Nitrogen as N < 140kg/ha/yr; and
- Total (Reactive) Phosphorus as P < 10kg/ha/yr;

Note: Applicant derived controls, including TWW design standards and application of loading rates according to assessed soil risk category and associated nutrient loading rates as specified in WQPN 22.

10.3 Authorised Works

10.3.1 Groundwater monitoring bores

Three new monitoring bores must be installed within Lot 108 within 90 days of the Licence issue date and sited in accordance with the DoW Water Quality Protection Note 30 *Groundwater Monitoring Bores* (DoW 2009).

The new groundwater monitoring bores must be installed to meet the requirements of *Minimum Construction Requirements for Water Bores in Australia* (AIH 2012) including the recording and submission of bore logs.

The new groundwater monitoring bores must:

- Be sited as follows:
 - i. Up hydraulic gradient, on the western portion of the Lot 108 boundary;
 - ii. Down hydraulic gradient (replacement for existing bore MB02) ; and
 - iii. Down hydraulic gradient, in between the irrigation area and the boundary of Island Brook.
- Have screened intervals that extend 3 to 6 metres below the water table; and
- Be surveyed to allow the ground level (to Australian Height Datum) to be accurately determined.

Note: CEO requirement considering internal DWER technical advice.

Grounds: The requirement to install new groundwater monitoring bores is necessary to establish and monitor the potential input of nutrients and contaminants from the irrigation area to groundwater and to provide reliable information about groundwater depth and movement under the irrigation area. Conditions require that the bores are appropriately installed and sited. Map 3 (attached in the Licence) indicates broadly the areas where the groundwater monitoring bores must be sited.

Internal DWER advice noted that the risk of contamination of groundwater exists for the superficial aquifer as *'there is the potential for shallow subsurface flow, which would follow the topography and flow towards Island Brook'* and that *'there is a high chance that seasonal loss of nutrients will occur'*. Positioning bores between the existing irrigation area and Island Brook will enable the monitoring of the depth to groundwater and subsurface flow towards the Brook. It will also allow detection of contaminants from the irrigation areas present in subsurface flow to the Brook.

10.3.2 WWTs and irrigation area works

The Licence requires other works to be conducted including the installation of a large tank for the temporary storage of final treated wastewater and associated extension and upgrades to the hardstand area where the tank is to be located. Other minor works relate to pipelines and/or hydrants to allow for transfer of wastewater from storage to the spray irrigator and appropriate control of irrigation runs.

Note: Requirements are derived largely from the Application and CEO requirements based on Applicant inferred upgrades or installation.

10.4 Monitoring and reporting

10.4.1 Treated wastewater monitoring

The Licence Holder is required to carry out treated wastewater monitoring at the Premises for the following parameters on a monthly basis:

- Volumetric flow rate
- Volume of wastewater discharged (to irrigation or otherwise for off-site disposal)
- pH
- TN
- TP
- TDS
- TSS
- BOD – 5 day
- Residual chlorine

Note: Requirements are derived in part from the Application and CEO requirements.

Grounds: The Applicant committed to monthly monitoring for biological oxygen demand, inorganic nitrogen, total phosphorus, pH and residual chlorine. The condition requires monthly monitoring to include suspended solids and total dissolved solids. CEO requirements have included continuous monitoring of incoming volumes of wastewater entering the WWTS, as well as monitoring and reporting the volume of wastewater discharged on a daily basis when discharging to irrigation or disposing of temporarily stored treated wastewater off-site. A standard CEO requirement for sampling methods is included.

The Delegated Officer considers that irrigation of treated wastewater on the site may impact soil structure, groundwater and surface water quality if discharge to land is not strictly controlled. The main factors affecting environmental impacts are considered to be the volume of wastewater discharged, the quality of the treated wastewater (particularly nutrient and salt concentrations), and soil characteristics of the irrigation area. Monitoring parameters, together with annual reporting, will allow hydraulic loading and concentration and loading limits to be observed. Appropriate quality control of the sampling and analysis undertaken is important to ensure the integrity of data obtained and therefore conditions for sampling to be carried out in accordance with Australian Standards and tested by a NATA accredited laboratory have been included.

10.4.2 Groundwater monitoring

The Licence Holder is required to carry out groundwater monitoring of the three new bores, commencing within 30 days of their installation, for the following parameters:

- Standing water level
- pH
- Total nitrogen
- Total phosphorus
- Reactive phosphorus
- Ammonium-nitrogen
- Nitrate-nitrogen
- Total dissolved solids (TDS)
- Biological Oxygen Demand (BOD)
- Electrical Conductivity (EC)
- Major ions: sodium, potassium, magnesium, chloride, sulphate and bicarbonate

Note: Requirements are derived in part from the Application and CEO requirements which specify parameters, frequency and sampling conditions.

Grounds: The Delegated Officer considers that irrigation of treated wastewater on the site may impact groundwater and surface water quality if discharge to land is not conducted in a controlled manner. Evidence to date suggests that soils within Lot 108 remain waterlogged for extensive periods and the seasonal high superficial groundwater levels are at or very near the surface. Monthly monitoring of standing water levels is required for the first two years, reducing to quarterly in the third year, to establish a clear understanding of seasonal groundwater depth fluctuations from bores that have been installed and established to required construction and screening interval standards. Quarterly monitoring of key groundwater parameters will allow seasonal changes to ground water quality to be identified and allow comparison against a suitably sited up gradient bore (MB05) and the two down gradient bores. Monitoring results will be used to assess the effects of wastewater irrigation on the groundwater and whether additional controls need to be implemented. DWER may review the appropriateness and adequacy of the licence controls based on the review of the monitoring data, including requirements for monitoring frequency and parameters tested. Appropriate quality control of the sampling and analysis undertaken is an important aspect and conditions for sampling to be carried out in accordance with Australian Standards and tested by a NATA accredited laboratory have been included.

10.4.3 Soil monitoring

The Licence requires initial sampling from the top layers of the soil profile (0-10cm and 10-40cm) at the established four soil sample locations and a new soil sampling reference point (SB5) to confirm the current status of soil physical and chemical characteristics. These sites and sections of the soil profile are to be re-sampled every two years.

Note: In part from the Application with additional CEO requirements.

Grounds: The results of soil samples taken in March 2017 at four locations within Lot 108 (SB1 to SB4) are presented in the Application. The Applicant proposed future soil sampling to be undertaken once every five years for the following parameters: pH, EC, sodium absorption ratio (SAR), major ions, cation exchange capacity, total metals, TN, TP and PRI. The soil profile depths for the samples taken in March 2017 varied from 15cm at site SB1 to a 1 metre sample depth reported for site SB2.

The Premises has been operational for over 20 years with a combination of stormwater runoff, inputs from septic systems/leach drains and irrigated effluent (100% of all effluent produced) contributing salts, nutrients, metals and other inputs over a very small land area which the Delegated Officer expects will already have impacted on soil conditions across the site to some degree. There is currently no soil sample data from a point or area of the site that has not been either irrigated with effluent or otherwise potentially impacted by stormwater runoff and septic wastes to provide a comparison with soil conditions in sites SB1 to SB4.

Routine sampling and testing of the required sections of the soil profile, along with the periodic in-situ testing of hydraulic conductivity, will provide results that can be compared with standard reference tables for irrigated effluent, to consider and assess the ongoing suitability or otherwise of the soils to receive the effluent and determine any future potential limitations on quantity and quality of applied effluent. Soils need to be sampled across the same sections of the soil profile for each sampling event to allow for review of any variability in soil conditions across the irrigation area and between each sampling event.

10.4.4 Monitoring reports

Soil reporting requirements are specified in a separate Licence condition to follow periodic and less frequent soil sampling requirements. Other requirements for reporting routine monitoring (ie groundwater and treated wastewater quality) are detailed under Annual Environmental Report requirements. Data is required to be presented in tabular and in some cases graphical format using appropriate scales and be supported by information that considers operations on site and possible influences on the results.

Note: CEO requirements for monitoring reports.

Grounds: The Delegated Officer considers that clear presentation of data in monitoring reports is essential in the assessment of the effectiveness of controls to protect the environment and to demonstrate compliance with any limits.

11. Appropriateness of Licence conditions

The conditions in the Issued Licence in Attachment 1 have been determined in accordance with DWER's *Guidance Statement on Setting Conditions* and in consideration of *Guidance Statement Land Use Planning*.

DWER's *Guidance Statement on Licence Duration* has been applied and the Issued Licence expires in 20 years from date of issue.

DWER notes that it may review the appropriateness and adequacy of controls at any time, and that following a review, DWER may initiate amendments to the licence under the EP Act.

12. Applicant's comments

The applicant was provided with the draft decision report and draft issued licence on 16 August 2018. The Applicant provided further information as requested and comments on the draft documents on 7 September 2018. The Applicant was provided a further draft of the updated instrument on 13 September 2018. A summary of the Applicants comments provided on 7 September 2018 and the Delegated Officer's considerations is provided in Appendix 4.

13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this decision report (summarised in Appendix 1).

Caron Goodbourn
A/Manager, Process Industries
Regulatory Services

Delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key Documents

	Document Title	In text reference	Availability
1	ANZECC & ARMCANZ (2000) <i>Australian Water Quality Guidelines for Fresh and Marine Water Quality</i> – slightly disturbed ecosystems	ANZECC	accessed at www.environment.gov.au
2	Bureau of Meteorology - Climate data online.	BOM 2017	accessed at www.bom.gov.au
3	<i>Dairy processing plants, Water quality protection note 12, Department of Water November 2012</i>	DoW 2012	accessed at www.dwer.wa.gov.au
4	<i>Effluent Management Guidelines for Dairy Processing in Australia</i> , National Water Quality Strategy June 1999	Dairy Processing NWQS 1999	accessed at https://www.environment.gov.au
5	Environmental Issues In Dairy Processing (J. W. Barnett, S. L. Robertson and J. M. Russell, Environment Portfolio, New Zealand Dairy Research Institute)	New Zealand Dairy Research Institute	accessed at http://friendsofmahaulepu.org/new-zealand-dairy-farm-information/
6	<i>Environmental Guidelines for the Dairy Processing Industry</i> , Environmental Protection Authority, State Government of Victoria, June 1997	Dairy Processing EPA 1997	accessed at www.epa.vic.gov.au
7	<i>National Water Quality Management Strategy, Australian Guidelines for Sewerage Systems – Effluent Management</i> (Agriculture and Resource Management Council of Australia and New Zealand Australian and New Zealand Environment and Conservation Council, 1997	NWQMS 1997	accessed at www.environment.gov.au
8	Marnham, J.R., Hall, G.J. and Langford, R.L., 2000. Regolith-Landform Resources of the Cowaramup-Mentelle 1:50 000 Sheet. Geological Survey of Western Australia Record No 2000/18.	Marnham et al., 2000	accessed at www.dmp.wa.gov.au .
9	M. C. Peel, B. L. Finlayson, T. A. McMahon <i>Updated world map of the Koppen-Geiger climate classification October 2007</i>	M. C. Peel. et, al	accessed at https://hal.archives-ouvertes.fr/hal-00305098/document
10	Perennial ryegrass management VI. Management of P, K and S	Dairy Australia	accessed at www.dairyaustralia.com.au
11	NSW EPA, 1998. Environment & Health Protection Guidelines: On-site Sewage Management for Single Households.	NSW EPA 1998	accessed at https://www.olg.nsw.gov.au
12	Department of Environment and Conservation (NSW) – Environmental Guidelines – Use of Effluent by Irrigation. October 2004	Department of Environment and Conservation (NSW)	accessed at https://www.environment.nsw.gov.au/resources/water/effguide.pdf
13	Geographe Catchment Council Geographe Catchment Management Strategy 2008	Geographe Catchment Management Strategy 2008	accessed at https://geocatch.asn.au

	Document Title	In text reference	Availability
14	Work Approval W4904/2011/1 – Compliance reporting submitted by the Applicant on 4 August 2016	W4904/2011/1	DWER records
15	Licence application - Margaret River Dairy Company Pty Ltd – November 2017		
16	Licence Application Environmental Supporting Document. Prepared for Margaret River Dairy Company. November 2017		
17	Margaret River Dairy Company: Nutrient and Irrigation Management Plan 2017		
18	DWER further information requests – Applicant responses – 30 January to 11 May 2018		
19	Email correspondence from Applicant to DWER – Confirming change of ownership of Lot 107 - 9 July 2018		
Other documents			
	Document Title	Availability	
1	DWER <i>Guidance Statement: Regulatory principles</i>	accessed at http://www.dwer.wa.gov.au	
2	DWER <i>Guidance Statement: Setting conditions</i>		
3	DWER <i>Guidance Statement: Land Use Planning</i>		
4	DWER <i>Guidance Statement: Licence duration</i>		
5	DWER: <i>Guidance Statement: Decision Making</i>		
6	DWER <i>Guidance Statement: Risk Assessment</i>		

Appendix 2: DoH Correspondence regarding approval for the MRDC WWTS



Government of **Western Australia**
Department of **Health**

Your Ref:
Our Ref: EHB 02700
Enquiries: Clemencia Rodriguez

Andrew Mortlock
AQUASOL Water Treatment Solutions
PO Box 98 Scarborough WA 6922
82-84 Beringarra Ave Malaga WA 6090

RE: Margaret River Dairy Co Upgrade Recycling Scheme for irrigation.

Dear Mr Mortlock,

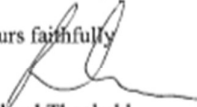
The Department of Health (DoH) considers the use of recycled water quality for "irrigation with enhanced restricted access and application" to present a low exposure risk level based on the "Draft Guidelines for the Use of Recycled Water in Western Australia 2009".

DoH provides an "approval in principle" for the above mentioned project subject to the following conditions:

- Final approval is subject to the submission to the DoH of results from six consecutive samples taken from the sampling points presented in the attached Water Quality Sampling Program.
- Water quality analysis shall demonstrate an *E.coli* count of <1000 cfu/100mL and a free chlorine residual between 0.2 to 2 mg/L. If one or more of the samples exceed the above mentioned *E.coli* count a re-sampling scheme of six consecutive samples shall be conducted until all samples comply.
- Submission of the Recycled Water Quality Management Plan by the Scheme Manager before approval to use the recycled water
- Once approved DoH will require ongoing monitoring and reporting in accordance with the *Australian Guidelines for Water Recycling Managing Health and Environmental risk (Phase 1) 2006* and the operational monitoring program.

I trust this information is of assistance to you. Please do not hesitate to contact me if you require any further clarification or contact Clemencia Rodriguez on 9388 4812 if you would like to discuss the above further.

Yours faithfully


Richard Theobald
MANAGER WATER UNIT
ENVIRONMENTAL HEALTH DIRECTORATE
PUBLIC HEALTH DIVISION
15 September 2010

cc Dean Guja, Senior Environmental Health Officer Shire of Busselton

S:\EHD\Water Unit\RECYCLING\Schemes\EHB-02700 Margaret River Dairy Co - Busselton\EHB-02700 Margaret River Dairy Co Approval in principle .doc
All Correspondence: PO Box 8172 Perth Business Centre Western Australia 6849
Grace Vaughan House 227 Stubbs Terrace Shenton Park WA 6008
Telephone (08) 9388 4999 Fax (08) 9388 4955
wa.gov.au
ABN 28 684 750 332



Delivering a Healthy WA

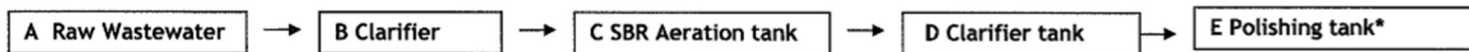


AQUASOL Water Quality Sampling Program

Margaret River Dairy Co Wastewater Recycling Scheme

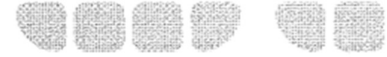
Validation Process Onsite Wastewater Treatment Facility

The sampling points (in bold) are based on information provided in the application



Exposure Risk Level	Potential End Uses	Validation Monitoring Frequency Duration 6 Weeks						
		Parameter	Product Water Compliance Value	A	B	C	D	E
Low	End uses with a low level of human contact, including: - Residential dual reticulation (sub-surface for fruit trees); - Urban irrigation with enhanced restricted access and application irrigation***; - Agriculture irrigation; non-edible crops.	E.coli	< 1000 cfu/100 mL	Weekly	Not required	Not required	Not required	Weekly
		BOD	< 20 mg/L	Not required	Not required	Weekly	Not required	Weekly
		SS	< 30 mg/L	Not required	Not required	Not required	Not required	Weekly
		pH	6.5 -8.5	Not required	Not required	Weekly in aerobic tank	Not required	Continuous online
		Disinfection	Cl: 0.2-2.0 mg/L	NA	NA	NA	NA	Continuous online
		TP	<10 mg/L	Weekly	Not required	Not required	Weekly	Weekly
		TN	<20 mg/L	Weekly	Not required	Weekly	Not required	Weekly
		Chloride	NA	Weekly	Not required		Not required	Weekly
		Grease and oils	NA	Weekly	Not required	Weekly	Not required	Weekly
		TDS	NA	Weekly	Not required	Not required	Not required	Continuous online
Sodium	NA	Weekly	Not required	Not required	Not required	Weekly		

*** Note: After media filter and a minimum contact time of 30 minutes after chlorination. Sampling in the treated effluent tank (point E) must not be undertaken before this period.**



Continual Operational Monitoring

Exposure Risk Level	Potential End Uses	Continual Monitoring Frequency		
		Parameter	Effluent Compliance Value	E
Low	End uses with a low level of human contact, including: - Residential dual reticulation (sub-surface for fruit trees); - Urban irrigation with enhanced restricted access and application irrigation***; - Agriculture irrigation; non-edible crops.	E.coli	< 1000 cfu/100 mL	Monthly
		SS	< 30 mg/L	Monthly
		pH	6.5 -8.5	Continuous online
		Disinfection	Cl: 0.2-2.0 mg/L residual	Continuous online
		TP		Quarterly
		TN		Quarterly

Recycled water for surface irrigation Low Exposure Risk Level.

Margaret River Dairy Co Camp recycled waste reuse scheme (45 Kilolitres/day)

- Tank 1: Holding tank (anaerobic treatment)
- First Clarifier
- Biological Aeration (aerobic treatment)
- Tank 2: Second Clarifier
- Tank 3: Filtration in the polishing tank and chlorination

Tables derived from:

Chapter 5 Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1); and Chapter 7 Interim Guidelines for the Management of Private Recycled Water Schemes.

Appendix 3: DWER Water Balance Assessment applied to irrigation area within Lot 108

Monthly Water Balance for Margaret River Dairy Company Calculated Using NSW EPA 1998 Environment & Health Protection Guidelines: On-site Sewage Management for Single Households (Appendix 6: Table 1 Nominated Area Method)															
Precipitation data from Witchcliffe weather station (9746) 27.5km south of premises															
Wastewater flow rate (l/month)	Q	900,000													
Design percolation rate (mm/week)	R	5													
Irrigation area (m ²)	L	7,300													
Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days in month	D			31	28	31	30	31	30	31	31	30	31	30	31
Precipitation (mean) (mm/month)			mm/month	10.7	8.9	26.7	63.9	140	170.8	197.3	156.1	115.1	61.7	34	17.8
Evaporation (Margaret River, Ag) (mm/month)	E		mm/month	159	157	69	57	53	47	49	49	53	77	129	171
Crop factor (as provided by Applicant)	C			0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7
Precipitation (median, 50th percentile) (mm/month)	P	P	mm/month	5.8	6.8	26.4	52.8	123.4	159.1	201.8	161.2	119.2	52.6	32.6	11.8
Effluent irrigation	W	W	mm/month	123.3	123.3	123.3	123.3	123.3	123.3	123.3	123.3	123.3	123.3	123.3	123.3
Total input (mm/month)		P+W	mm/month	129.1	130.1	149.7	176.1	246.7	282.4	325.1	284.5	242.5	175.9	155.9	135.1
Evapotranspiration (2)	ET	ET(2)	mm/month	111.3	109.9	48.3	34.2	26.5	21.15	19.6	22.05	29.15	50.05	90.3	119.7
Percolation	B	B	mm/month	22.1	20.0	22.1	21.4	22.1	21.4	22.1	22.1	21.4	22.1	21.4	22.1
Total output (2)		ET(2)+B	mm/month	133.4	129.9	70.4	55.6	48.6	42.6	41.7	44.2	50.6	72.2	111.7	141.8
Storage (2)	S	(P+W)-(ET(2)+B)	mm/month	-4.4	0.2	79.2	120.5	198.0	239.8	283.3	240.3	191.9	103.7	44.2	-6.8
Cummulative storage (2)	M		mm	0	0	0	0	123.3	246.6	369.9	493.2	616.4	0	0	0
Maximum cummulative storage V = 616mm															
No irrigation May to September as rainfall exceeds evapotranspiration Total storage required May to September (VxL/1000)- 4,497m ³															
NOTE: NSW EPA Appendix 6															
Using this theoretical water balance method, the storage can sometimes 'include' some of the rainfall portion of the water balance, depending on the climate. The actual storage should be limited to storing only the wastewater portion of the inputs (that is, if a month appears to have a storage greater than the amount of wastewater generated during that month, then the actual storage should only consider the wastewater portion, or S equals W).															

Appendix 4: Summary of Applicant's Comments on Risk Assessment and Draft Conditions*

* Note: Conditions numbers referenced here have altered slightly in the final Issued Licence

DWER requirement	DWER specifications	Timing	MRDC Response	Delegated Officer Response
Licence Condition 2, Table 3: Wastewater Treatment System (WWTS)	1. Enclosed 430kL lined zincalume tank for the storage of treated effluent.	Within 45 days of the issue date of the Licence	MRDC seeks 120 days from the issue of the licence to allow for suitable access following wet conditions. Details area a storage tank of 430kL. The tank will not be enclosed and will be open (for safety and to avoid confined spaces) and will be on an earthen bund.	The Delegated Officer (DO) will allow an extension of the timeframe for completion of the storage tank installation to 120 days, noting that the risk assessment has determined that irrigation cannot occur within Lot 108 between the months of April to October. The DO notes, that other than in the case of building pond systems for wastewater storage, tanks used for the storage of final treated wastewater are usually fully enclosed tanks. A large open tank would be both taking in and evaporating off treated water, which has not been factored in to wastewater treatment volumes or quality. The DO accepts that the tank can be installed on a bunded and compacted gravel/clay surface, subject to achieving a minimum permeability standard of 1×10^{-9} m/s to mitigate the risk of contamination of soil and groundwater in the event of spills or overflows.
Licence Condition 2, Table 3: On-site rain gauge	Installed within the area defined in Map 3 in Schedule 1	Within 45 days of the issue date of the Licence	The site has a rain gauge installed adjacent to the WWTS. This is currently monitored. Please confirm the need to change the location as it is a break with historic data collection.	Existing rain gauge in its' current location is acceptable for continuation of monitoring and recording daily rainfall. Works condition changed and Map 3 in Licence corrected to show location of existing rain gauge.
Licence Condition 2, Table 3: Irrigation area L1	Irrigation system installed over the 0.73 hectare(ha) irrigation area (L1) within Lot 108 as follows: <ul style="list-style-type: none"> Installation of 50mm PVC pipeline with outlet hydrants installed at intervals along the main distribution line, required for connection to the mobile spray irrigator to facilitate controlled irrigation runs in the defined irrigation area; and Removal of the existing 	Within 45 days of the issue date of the Licence and prior to the commencement of irrigation	MRDC seeks 90 days from the issue of the licence to allow for suitable access following wet conditions to install the 50mm PVC pipeline will transfer irrigation water from the tank to the site. Irrigation will be by sprinkler system within a defined area. The removal of existing kikuyu grass and other annual plant	The DO will extend the requirement for minor modifications to the irrigation pipeline infrastructure within Lot 108 to be completed within 90 days of the issue date of the Licence. DO agrees that the use of chemicals and potential other mechanical disturbances to the existing groundcover plants currently present within the irrigation area, presents the risk of contamination of the soil, groundwater and the nearby Island Brook and soil erosion and will therefore allow irrigation to occur without a change to the existing vegetation cover.

DWER requirement	DWER specifications	Timing	MRDC Response	Delegated Officer Response
	kikuyu grass and other annual plant species present within the irrigation area, to be replaced by the planting and establishment of Annual Ryegrass – <i>Lolium rigidum</i>) over the irrigation area.		species present would require considerable chemicals, potential earthworks and arguably unnecessary disturbance. MRDC requests to keep the natural groundcovers that have grown and established over time.	In accepting this request the DO notes that the Applicants' nutrient uptake estimates were based on nutrient data for the Annual Ryegrass species (<i>Lolium rigidum</i>), not the kikuyu and range of other groundcovers present within the Lot 108 irrigation area. Crucial to the management of nutrient inputs to this very small irrigation area is the complete collection and removal of all mown / 'harvested' growth from this area. Whilst the Licence does not stipulate any requirements to undertake plant tissue testing, representative plant tissue sub-sampling from each harvest and testing for nutrients and metals would provide data to allow for estimations of nutrient uptake and removal.
Licence Condition 2, Table 3: Groundwater monitoring bores	Three new groundwater monitoring bores installed to meet the requirements of <i>Minimum Construction Requirements for Water Bores in Australia</i> (AIH 2012) at the following locations:	Within 60 days of the issue date of the Licence.	MRDC seeks 90 days from the issue date of the Licence and subject to access to land and access.	The DO accepts the requested extension to the timeframe for installation of the new bores to 90 days.
Licence Condition 7: Operational Controls	The Licence Holder must ensure all milk deliveries and product dispatch only occurs within working hours (6am – 6pm, Monday to Friday) or from 6am to 1pm Saturday to Sunday.		The MRDC is located on Bussell Highway (State Route 10) which is classified as a major road. MRDC propose that milk delivery times and product dispatch are not unnecessarily constrained.	The hours of operation was an applicant derived noise control. As no noise complaints have been received the DO agrees to remove this condition and manage noise emissions under the provisions of the Noise Regulations. If noise complaints are received, the DO will revisit operating hours as a regulatory control.
Licence Condition 8: Authorised discharge of treated wastewater via irrigation	Irrigation via a travelling spray irrigator applied at a rate of not more than of 30kL per day and only during the months of November, December, January, February and March in accordance with conditions 9, 10 and 11.		Irrigation via a travelling spray irrigator applied at a rate of not more than of 50kL per day over summer. Piezometers and monitoring of soil moisture in the irrigation area will occur between April and October. Irrigation will occur in accordance with conditions 9, 10 and 11.	The DO does not agree with increasing the irrigation rate for the reasons as outlined in sections 9.7 and 9.8 of this Decision Report. The DO also notes that the approved treatment capacity of the WWTP is up to 45kL/day and this capacity cannot be increased without design modifications being made to the plant. The DO notes that the risk assessment for irrigation to land was determined as high risk for the small irrigation area within Lot 108, with limitations required and imposed, based on the water balance (hydraulic loading) assessment.

DWER requirement	DWER specifications	Timing	MRDC Response	Delegated Officer Response
				Should the Applicant wish to install piezometers to allow for in-situ monitoring of soil moisture conditions to justify suitable soil moisture limits for irrigation during the wet winter months (outside of November to March) then this proposal will need to be applied for through a Licence Amendment application. This should include a detailed plan on where piezometers are to be installed, the proposed monitoring program for the piezometers including defining the triggers or limits that will be applied to determine under what conditions irrigation could occur over irrigation area L1.
Condition 10	(h) vegetation in the irrigation area is harvested at least every 12 months		Confirmed. Vegetation to be slashed/mowed subject to growing conditions.	The DO notes that the definition of 'harvested' in the Licence has been modified to remove the reference to Annual Ryegrass and to ensure that the process is understood to include the complete and immediate removal of all mown or slashed vegetation as a means of exporting nutrients from the irrigation area.
Schedule 1 Maps Map 2	1. Flowmeter measuring inflow volumes of wastewater entering the treatment system (M1) (to be installed under Works); and 2. Flow meter monitoring treated wastewater going to irrigation (M2)		Flow meters measuring inflow volumes of <ul style="list-style-type: none"> •Wastewater entering the treatment system (M1) and •Monitoring treated wastewater going to irrigation (M2) Will be located on inflow and outlet of new tank	The DO agrees with the proposed location for M2. However, the purpose of the first flow meter (M1) is to get an accurate continuous flow measurement of all untreated wastewater entering the WWTS. This is to determine that the maximum daily design capacity of the WWTP is not being exceeded. The approved design capacity of the WWTP is not more than 45kL/day. See section 5.2.2 and Appendix C of this report. The DO has determined that accurate metering of all water input sources to the dairy processing facility will be accepted as a surrogate for directly measuring input flows to the WWTS. Since the Applicant identified on 17/09/2018, the existence and location of the flow meter monitoring all potable water going from the storage tanks (inclusive of all bore water) into the dairy processing facility, this has been integrated into the Licence as Monitoring Point M1.
Decision Report Table 4 Irrigation System.	Applicant to note that in the absence of required approvals to irrigate to Lot 107, the points of clarification below should be considered in any future Licence Amendment application proposing		Lot 107 is currently being pursued as an option for irrigation	The DO confirms the requirement to submit a Licence Amendment application for any proposal to irrigate outside of Lot 108 to be accompanied by suitably detailed equipment and infrastructure descriptions, site layout plans and timeframes for installation.

DWER requirement	DWER specifications	Timing	MRDC Response	Delegated Officer Response
	<p>to irrigate to Lot 107 or potentially any other lot not owned by MRDC):</p> <ul style="list-style-type: none"> • confirm if a second irrigator is to be purchased and used solely for irrigation within Lot 107; • advise if any new additional pump/s are required or if planning to re-configure location of flow meter/pump and or irrigation piping to account for installation of the new large storage tank and allowing for transfer to the new pipelines to convey TWW to Lot 107; and <p>Confirm with a suitable site plan and description the irrigation pipeline layout, materials/size of piping and system to allow for the spray irrigator to be set up to complete set runs across the respective irrigation areas (both Lot 108 and Lot 107).</p>			
Decision Report 5.1.2	The Applicant confirmed on 9 July 2018 that DoH approval of the WWTS was still outstanding, with the required validation water quality program currently in progress. (Applicant to provide an update on the status of the validation process as at time of draft review)		The validation water quality monitoring program is progressing and a summary of the data is provided in Attachment 3. Treatment plant is progressing towards meeting the required criteria.	The DO notes the update provided.

Attachment 1: Issued Licence L9116/2018/1
