



Application for Licence Amendment

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L4404/1991/15
Licence Holder	Harvey Fresh (1994) Ltd
ACN	065 591 219
File Number	DWERVT2474
Premises	Harvey Fresh Dairy and Juice Factories Third Street HARVEY WA 6229 Legal description - Lot 1 on Diagram 4786, Lot 20 and Lot 22 on Plan 2344, Lot 187 and Lot 189 on Plan 202110, Lot 200 on Diagram 66494, Lot 190 on Plan 202110 and Lots 33, 34, 35 and 36 on Plan 205324 and part of Lot 401 on Deposited Plan 52503 with the northern boundary defined by the coordinates in Schedule 1 of the Amended Licence.
Date of Report	6 June 2019
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Table of Contents

1. Definitions of terms and acronyms	1
2. Purpose and scope of assessment	2
2.1 Application details	2
3. Background	2
4. Overview of Premises	5
4.1 Operational aspects	5
4.1.1 Dairy Factory	5
4.1.2 Juice factory	6
4.1.3 Wastewater treatment	6
4.1.4 Treated wastewater disposal	7
4.2 Infrastructure	8
5. Legislative context	9
5.1 Part V of the EP Act	10
6. Monitoring data	14
6.1 Monitoring of treated wastewater quality	14
6.2 Nutrient loading rates	14
6.3 Monitoring of ambient surface water quality	15
6.4 Monitoring of ambient soil quality	16
7. Location and siting	19
7.1 Siting context	19
7.2 Residential and sensitive Premises	19
7.3 Specified ecosystems, groundwater and water sources	20
7.4 Soil type	21
7.5 Meteorology	22
8. Risk assessment	24
8.1 Determination of emission, pathway and receptor	24
8.2 Consequence and likelihood of risk events	28
8.3 Acceptability and treatment of Risk Event	29
8.4 Risk Assessment – Discharge of treated wastewater to land (irrigation) – nutrient loading impact analysis	29
8.5 Risk Assessment – Discharge of treated wastewater to land (irrigation) – hydraulic loading impact analysis	36
8.6 Summary of acceptability and treatment of Risk Events	40
9. Regulatory controls – Amended Licence controls for management of discharge of treated wastewater to land (irrigation)	40
9.1 Existing Licence Conditions	40

9.2 Additional Regulatory Controls (Licence conditions).....	44
10. Transfer to New Format Licence and Notice of Amendment	46
11. Licence Holder’s comments	49
12. Conclusion	49
Appendix 1: Key documents	50
Appendix 2: Summary of applicant’s comments on risk assessment and draft conditions	52

Table 1: Definitions	1
Table 2: Documents and information submitted during the assessment process.....	2
Table 3: Proposed changes to the Prescribed Premises Categories on the Existing Licence...3	3
Table 4: Harvey Fresh Category 17 and 24.....	8
Table 5: Relevant approvals and tenure.....	10
Table 6: Works approval and licence history	10
Table 7: Nutrient loading rates for 2017-2018 reporting period ¹	13
Table 8: Nutrient loading limits (from Condition 2.2.2 of the Existing Licence).....	14
Table 9: Nutrient loading rates (for L1 and L2 as L3 and L4 were not irrigated) ¹	15
Table 10: Receptors and distance from activity boundary	19
Table 11: Environmental values	20
Table 12: Soil and sub-soil characteristics	21
Table 13: Identification of emissions, pathway and receptors during operation	24
Table 14: Risk rating matrix.....	28
Table 15: Risk criteria table.....	28
Table 16: Risk treatment table	29
Table 17: Quality of treated wastewater discharged to irrigation areas.....	30
Table 18: Preliminary assessment of nutrient loading rates at the premises for each irrigation area (L3 – L6)	31
Table 19: Predicted Nutrient Loading	32
Table 20: Nutrient application criteria for treated wastewater	34
Table 21: Licence Holder’s controls for treated wastewater irrigation (from Application)	34
Table 22: Risk assessment summary.....	40
Table 23: January 2019 NIMP – assumptions and current operations.....	41
Table 24: Conditions map	47
Table 25: Summary of Licence Holder comments – meeting between DWER and Licence Holder on 29 May 2019.....	52
Table 26: Summary of Licence Holder comments – Information received via e-mail on 30 May 2019.....	54
Table 27: Summary of Licence Holder comments – comments received via telephone from	

Licence Holder on 4 June 2019.....	56
Figure 1: Current (L1 – L4) and proposed (L5 and L6) irrigation areas (from Application)	4
Figure 2: Wastewater treatment system process.....	8
Figure 3: Treated wastewater quality from August 2014 to March 2019 for TP (primary axis) and TN (secondary axis)	14
Figure 4: Treated wastewater quality from August 2014 to March 2019 for BOD, TSS, EC (primary axis) and TDS (secondary axis)	14
Figure 5: Ambient surface water quality for WQ1 (upstream, solid circles) and WQ2 (downstream, “X”) within the Harvey Main Drain for available results from 2011 to 2018. EC is shown on secondary axis	15
Figure 6: Surface water quality and soil sampling locations.....	16
Figure 7: pH ambient soil quality for S1 to S6 for 2015, 2017 and 2018.	17
Figure 8: EC ambient soil quality for S1 to S6 for 2015, 2017 and 2018.....	17
Figure 9: Total Phosphorus at soil sampling sites S1 to S6 for depths of 0.3 m, 0.5 m and 1 m, sampled on 19 June 2018. (Shown on a logarithmic scale.).....	18
Figure 10: Total Nitrogen at soil sampling sites S1 to S6 for depths of 0.3 m, 0.5 m and 1 m, sampled on 19 June 2018. (Shown on a logarithmic scale.).....	18
Figure 11: Wind direction and strength for 9am at Wokalup (site no. 009642).....	22
Figure 12: Average monthly maximum temperature and average monthly rainfall.....	23

1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Amended Licence	this amended Licence issued under Part V, Division 3 of the EP Act following the finalisation of this amendment.
BOD	Biochemical oxygen demand
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
DAF	dissolved air floatation
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
EPN	Environmental Protection Notice
EPP	<i>Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
Licence Holder	Harvey Fresh (1994) Ltd
m ³	cubic metres
NIMP	Nutrient Irrigation Management Plan
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	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
Primary Activities	as defined in Schedule 2 of the Amended Licence
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
SBR	sequence batch reactor
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
µg/L	micrograms per litre

2. Purpose and scope of assessment

Harvey Fresh (1994) Ltd (Licence Holder) currently operate a milk processing and non-alcoholic beverage manufacturing facility (Harvey Fresh) at Third Street, Harvey under Existing Licence L4404/1991/15.

The Licence Holder submitted an application to amend the Existing Licence (the Application) as follows:

- expand the irrigation area for wastewater disposal;
- remove Category 61 - liquid waste facility from the licence;
- increase the approved premises production capacity for Category 17 - milk processing; and
- decrease the total phosphorus loading limits for irrigation area L4.

Through this Licence amendment, DWER has taken the opportunity to update to the new format licence and decision report with existing conditions being transferred, but not reassessed. Some administrative changes have also been made. A conditions map detailing conditions that have been transferred to the Amended Licence without reassessment is outlined in section 10 and new conditions that have been included on the Amended Licence are detailed in section 9.2

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Application Form (Licence amendment) and attachments (supporting information), L4404, Harvey Fresh, Harvey Fresh (1994) Ltd (11 December 2018)	11 December 2018
Supporting information: E-mail from 360 Environmental to DWER including attachments, Applicant Response – L4404/1991/15 Harvey Fresh (1994) Ltd Harvey Fresh Juice and Dairy Factories – Licence Amendment Application – Response to request for further information, received 11 January 2019	11 January 2019

3. Background

The Licence Holder holds Licence, L4404/1991/15 for milk processing (Category 17), non-alcoholic beverage (juice) manufacturing (Category 24) and liquid waste facility (Category 61) at Harvey Fresh (the Premises) with processing facilities located approximately 1.5 km north of Harvey on the Swan Coastal Plain, approximately 120 km south of Perth.

The Premises covers a number of individual land titles which are physically separated by a gazetted road, but are linked via wastewater disposal infrastructure. The juice factory was established in 1986, followed by the dairy factory in 1989.

The Licence Holder is proposing to increase the production of dairy products at the premises from 165,000 to 180,000 tonnes per annual period to meet market demands. The increase in dairy production will result in additional wastewater requiring disposal.

Liquid waste from the Capel Cheese factory was previously received at the Premises, and treated through the wastewater treatment system; however, the Licence Holder has advised that liquid waste generated off-site is no longer received and therefore are requesting Category 61 to be removed from the Existing Licence.

Wastewater generated from the milk and juice processing facilities is combined and treated through a dissolved air floatation (DAF) clarification system and a dual sequence batch reactor

(SBR) system prior to being discharged to storage ponds and then disposed of via flood irrigation to up to 74 ha of pasture and orange orchard over four irrigation areas (L1, L2, L3 and L4). The Licence Holder has applied to add an additional two irrigation areas totaling 45.83 ha (see Figure 1); L5 being Lot 190 on Plan 202110 and Lots 33, 34, 35 and 36 on Plan 205324; and L6 being part of Lot 401 on Plan 52503.

The Licence Holder has submitted an updated NIMP to include the proposed irrigation areas (L5 and L6) which includes the increase in wastewater generated as a result of increased liquid waste production in Category 17 production. The NIMP has been reviewed, along with the Application supporting information, as part of the risk assessment for this licence amendment.

The Premises is currently subject to conditions of an Environmental Protection Notice (EPN) (see section 5.1.4) which determined that areas L1 (9.45 ha) and L2 (10.56 ha) are unsuitable for irrigation. As such, L1 and L2 have not been reassessed as part of this Licence Amendment; however, Licence conditions will be amended to align the Amended Licence with the current EPN (see section 9.1.2).

It also should be noted that the Licence Holder has stated in the Application that an additional wastewater storage pond is proposed to be constructed on the premises to accommodate for additional wastewater as a result of the proposed increased Category 17 production. However, the Licence Holder has indicated in the Application that they will apply to construct this additional pond through a Works Approval application; therefore the construction of this additional pond has not been assessed through this licence amendment.

The Amended Licence has been issued in a new format with existing conditions being transferred, but not reassessed, to the new format. Therefore, numbering, wording and format of existing conditions may have changed, but the intent remains the same.

Table 3 lists the proposed changes to the prescribed premises categories on the Existing Licence.

Table 3: Proposed changes to the Prescribed Premises Categories on the Existing Licence

Category	Description	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
17	Milk processing: premises on which – (a) milk is separated or evaporated (other than a farm); or (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.	165,000 tonnes per annual period	Not more than 180,000 tonnes of milk processed per annual period.	The Licence Holder has proposed to increase the throughput to not more than 180,000 tonnes per annual period. Additionally, DWER initiated an amendment to change the wording to specify that the throughput for Category 17 is based on the amount of milk processed.
24	Non-alcoholic beverage manufacturing: premises on which a non-alcoholic beverage is manufactured and from which liquid waste is or is to be discharged onto land or into waters.	13,000 kilolitres per annual period	Not more than 13,000 kilolitres of fruit and vegetable juice and concentrate produced per annual period.	DWER initiated amendment to change the wording to specify that the throughput for Category 24 is based on the amount of juice and concentrate produced.
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	1,500 tonnes per annual period	Category to be removed from the Licence.	The Licence Holder has requested to remove Category 61 from the Licence due to liquid waste produced on other premises is no longer being accepted at the Premises.

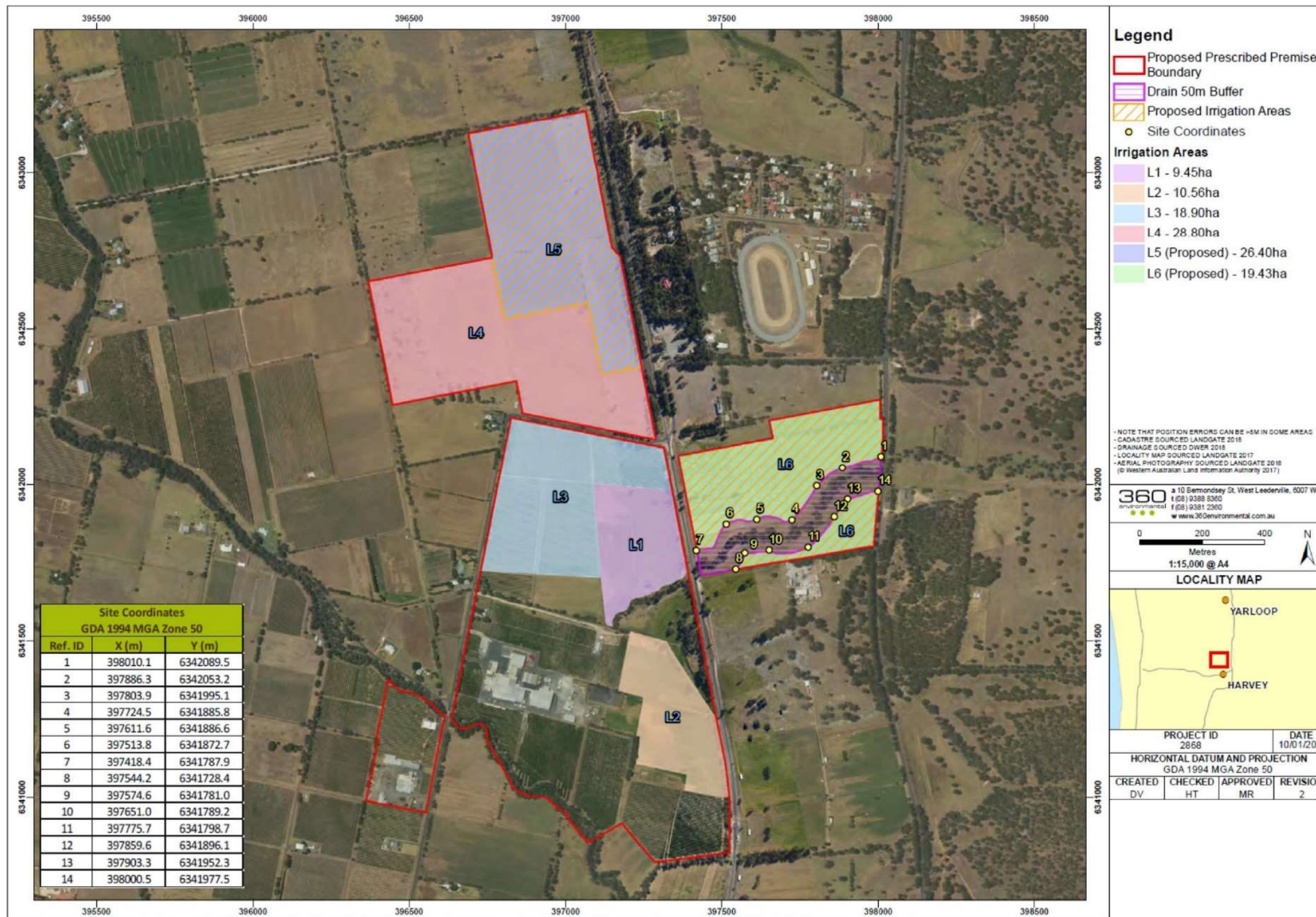


Figure 1: Current (L1 – L4) and proposed (L5 and L6) irrigation areas (from Application)

4. Overview of Premises

4.1 Operational aspects

4.1.1 Dairy Factory

Approximately 70% of Harvey Fresh products are manufactured in the dairy factory, with up to 416 kL per day of milk processed during peak season.

Raw milk is transferred from milk tankers into large insulated vats on a continuous 24/7 basis. Wash down of trucks and tankers is collected in a series of drains and is combined with the dairy wastewater stream.

The raw milk is piped from the insulated vats to pasteurisers to kill any bacteria. For reduced fat milk and skim milk products, cold raw milk is firstly passed through a separator, which regulates the milk fat content, prior to being pasteurised. The excess milk fat is then stored in cream tanks and later packed into cream products.

Harvey Fresh utilise the 'high temperature-short time' pasteurisation process, in which the milk is heated as it flows through the pasteuriser continuously. Whole milk, skim milk and standardised milk are heated to approximately 75°C for 15 seconds, where other milk products (such as long life milk) have different time and temperature requirements. The hot milk passes through a long pipe whose length and diameter is sized so that it takes the liquid 15 seconds to pass from one end to the other. A temperature sensor at the end of the pipe diverts the milk back to the inlet for reprocessing if the temperature has fallen below the required standard.

For flavoured milk products, the ingredients are added into a holding/mixing tank from which it is then drawn on for pasteurisation.

The finalised milk product is then cooled and pumped from the pasteurisers to the bottling room, where it is filled into coated paper cartons or plastic bottles, labelled, sealed, packaged into cardboard boxes or milk crates and stored in large refrigerated rooms, pending shipment.

Long life products are stored at ambient temperature in the warehouse. A range of long-life reconstituted fruit juices are also manufactured in the dairy factory, where water is added to fruit concentrate, pasteurised at high temperatures, bottled, packaged and stored in the same manner as the long life milk products.

Approximately 500 kL/day of water is used in the dairy factory, predominantly through cleaning process equipment and work areas to maintain hygiene standards. The pasteurisers and other automated equipment contain "clean in place" technology, which allows self-cleaning of the interior surface of the machine without disassembly. The automated machines are sterilised at the start of the day using steam, and self-clean once the daily volume of milk has been reached (it takes approximately 7 hours to pasteurise 300 kL of milk). Each pasteuriser holds 0.3 – 0.4 kL of milk at any one time. Once the daily volume of milk has been reached, water is added to push the remaining milk through the system. To maintain product quality, the last 20 seconds of the process (equates to approximately 0.05 – 0.1 kL of milk per pasteuriser, up to 1kL/d in total), will be flushed out of the system. The self-clean system then activates, which involves flushing the system with hot water, followed by flushing with a hot water and caustic solution, and a final flush out with hot water. The floor of the pasteuriser room is also washed frequently. All wastewater is directed to a sump prior to being directed to the wastewater treatment system.

Wastewater is also generated in the bottling rooms, where bottles are washed to remove milk and juice residues after filling and prior to labelling and packaging. Up to 4 kL/hr is used for this activity. Water is also used to cool concentrated juice bottles after bottling, as the filling process is done at high temperature. Mechanical equipment in the bottling room and remaining parts of the dairy factory are also rinsed at the end of a day's production. A foam solution is used to coat

the machines and conveyors and then rinsed off with hot water. All wastewater is directed to a sump prior to being directed to the wastewater treatment system.

4.1.2 Juice factory

The juice factory is located on the west side of Third Street, approximately 270 m SW of the milk processing facility. The juice factory manufactures freshly squeezed orange, apple, lemon and carrot juice and concentrate. Fruit is manually fed into hoppers and a conveyor system, where it is then washed, squeezed in a machine which separates the juice from the solids, and piped to large vats, prior to being bottled, sealed, packaged and stored in refrigerated rooms pending shipment. The solids are removed from the process via augers, which collect in skip bins on the outside of the factory and are sold to farmers to feed stock.

Wastewater generated from the wash down of machinery and the conveyor system is collected in a series of drains and transferred to a common sump on the outside of the factory. This wastewater typically contains residual solids which are screened out prior to the wastewater being pumped across to the dairy factory and into the wastewater treatment plant.

4.1.3 Wastewater treatment

The two primary wastewater streams (the juice factory and the dairy factory) generate a combined current amount of up to 1,000 kL/day of wastewater. The wastewater streams are combined and treated through a multistage treatment process comprising a DAF clarification system and a dual SBR system. Following treatment, wastewater is transferred to a storage pond prior to being disposed of via flood irrigation to approximately 44 ha of pasture and 30 ha of orange orchard (refer to section 4.1.4).

Raw wastewater, typically comprising of milk and juice products, fats, organic solids from juice production, detergents, sanitisers, acidic and caustic cleaning agents, nutrients, dissolved solids (including sodium chloride) and small amounts of lubricants, is collected in one of three, 3.5 kL sump pits located near the milk processing facility. Wastewater from the juice processing facility is also directed to these sumps. The wastewater is then pumped to a rotary drum screen (1.0 mm wedgewire) with solids collected in a bin, located on a hardstand, for disposal. The wastewater is then gravity fed to a 500 kL equalisation tank fitted with a submersible aerator and then sent to the DAF plant that has a capacity of 50 kL/hr. The wastewater is dosed with a coagulant to flocculate the suspended matter. A portion of the wastewater is pumped to a small pressure vessel when compressed air is introduced, with the water then recycled to the front of the process in the form of tiny bubbles which adhere to the suspended matter, causing it to float to the surface and form a froth layer, which is removed by a skimmer. The froth is collected to a corner baffle and moved to the wet sludge tank where it is processed again to make dry sludge.

The froth free wastewater is then adjusted to pH 7.0 and pumped to a dual SBR system with a treatment capacity of 1,200 kL per day. The treatment process includes:

- (a) Fill – the inlet valve opens and the tank is filled, which takes approximately 30 mins. The initial fill is carried out with aeration.
- (b) Aerate – oxygen is added to the liquor by transferring air into fine bubble diffusers fixed to the floor of the tanks. This encourages the multiplication of aerobic bacteria to break down the nutrients and the nitrification process. The cycle runs for approximately 3.5 hours. Where required, excess biomass (activated sludge) is wasted to control the mixed liquor suspended solids to within design loadings.
- (c) Settle – the sludge formed by the aerobic bacteria is allowed to settle and separate from the water phase to form a sludge blanket towards the bottom of the tank. The aerobic bacteria continue to multiply until all the dissolved oxygen is used up, forming anoxic conditions which facilitate de-nitrification. This phase runs for approximately 1 hour, until clear water is on the top 20-30% of the tank contents.

(d) Decant – the clear water is then slowly decanted and transferred to the holding pond.

Alum is also dosed inline to the SBR feed to chemically precipitate phosphorus.

The excess waste activated sludge generated from the SBR system is automatically dosed with a polymer and pumped to a disc thickener to thicken the sludge to 3 – 4% solids. It is then combined with sludge from the DAF and dewatered in an inclined screw press. The dewatered cake is then discharged to a skip bin and removed off-site.

4.1.4 Treated wastewater disposal

Decanted wastewater from the SBR system is diverted either to Pond 1 or to the Winter Dam, prior to disposal via irrigation to the following current irrigation areas:

- L1 - 9.45 ha of pasture
- L2 – 10.56 ha of pasture
- L3 – 18.9 ha of orange orchard; and
- L4 – 28.79 ha of pasture.

The Licence Holder has applied to include the following additional irrigation areas:

- L5 – 26.40 ha of pasture; and
- L6 – 19.43 ha of pasture.

Irrigation occurs via flood irrigation with a pipeline system bordering the periphery of the irrigation area fitted with a series of valves. Selection of the cells and irrigation rate is undertaken manually by an operator, who also manually changes the 2-inch ball valves of the cells to be flooded. Approximately 20 cattle are grazed within the irrigation areas (the paddock grasses are not harvested). During wet periods, irrigation is deferred and effluent is retained within either Pond 1 (capacity of 6,000 kL) or the winter dam (two compartments of 4,000 kL each). This represents about 12 days of holding capacity at normal production rates, based on the ponds being empty. If the ponds are already full, there is no capacity to defer irrigation. Based on little to no winter holding capacity, the Licence Holder has committed to constructing additional storage (through a works approval application) in time for the 2020 winter season.

The Licence Holder has also advised that there is currently no irrigation infrastructure in the orange orchard, L3, and therefore, only limited amounts of treated wastewater has been disposed of to L3. The Licence Holder also advises that there is no intent to irrigate to L3 in the near future, but would like it to remain on the Licence should this position change.

Irrigation of L1 and L2 is restricted under conditions of the current EPN and these areas have not been permitted to receive any wastewater from 5 December 2018.

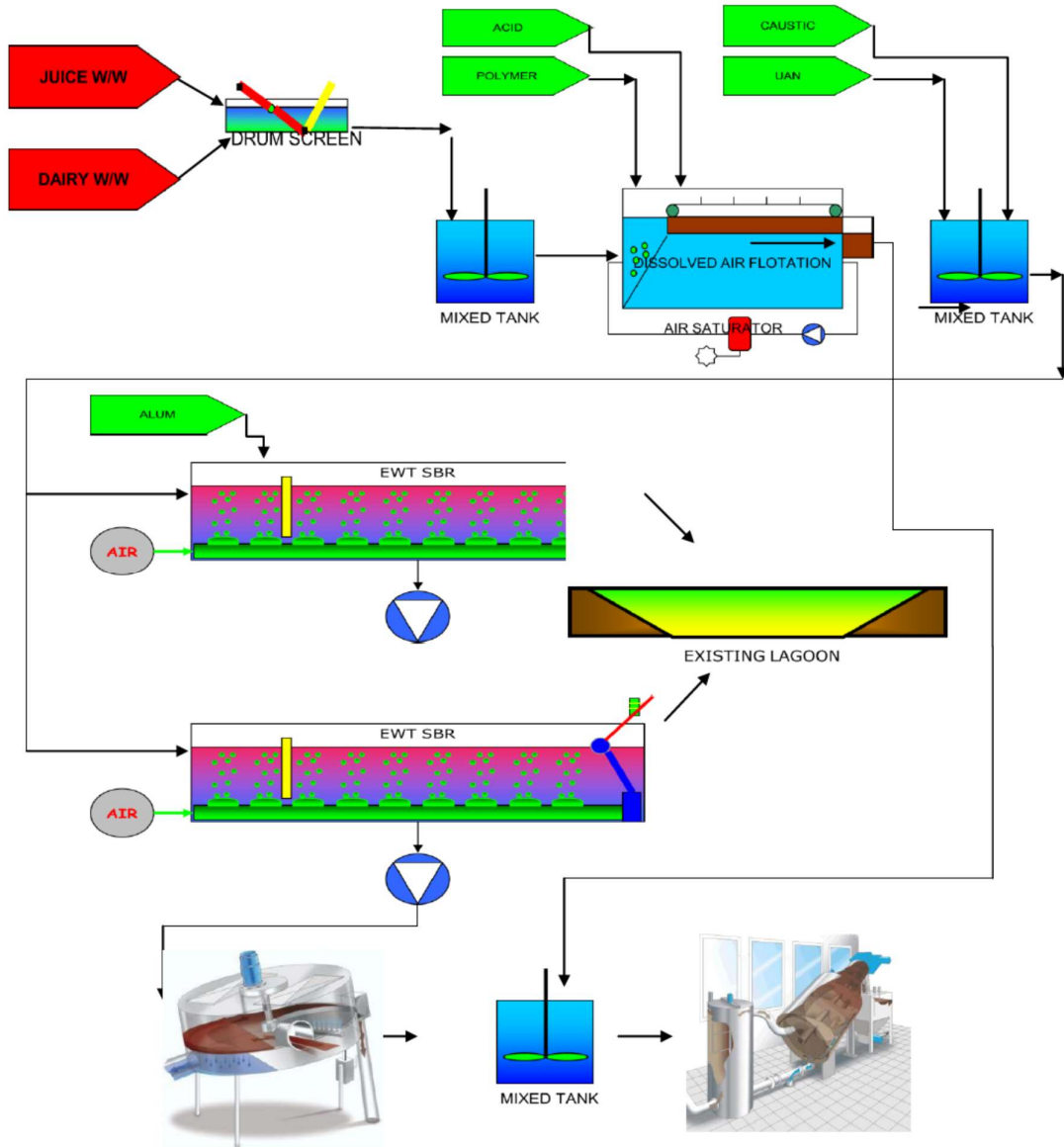


Figure 2: Wastewater treatment system process

4.2 Infrastructure

The Harvey Fresh facility infrastructure, as it relates to Category 17 and 24 activities, is detailed in Table 4 and with reference to the maps within Schedule 1 of the Amended Licence.

Table 4: Harvey Fresh Category 17 and 24

	Infrastructure	Site Plan Reference
Prescribed Activity Category 17		
Raw milk is processed to produce a range of dairy products including, but not limited to, fresh and long life milk, cream, custards and flavoured milks.		
1.	Milk processing facility that includes TTAF 1 and 2 Processors, STH Processor, Spiroflow Processor, SIH Pasteuriser, Thermflow 1 and 2 Pasteurisers and Hipex Pasteuriser.	Site layout map

	Infrastructure	Site Plan Reference
Prescribed Activity Category 24		
Fruit and vegetables are processed to produce a range of fruit and vegetables juices and concentrates, including but not limited to, orange, apple, lemon and carrot.		
2.	Juice processing facility that includes hoppers, conveyors, augers, vats and refrigerated storage rooms.	Site layout map
Wastewater Treatment System Infrastructure		
3.	Three, 3.5 kL concrete sumps (sump pit 1, sump pit 2 and sump pit 3)	Site layout map
4.	Rotary drum screen	not shown on maps
5.	500 kL equalisation tank	EQ tank on site layout map
6.	Dissolved air floatation (DAF) plant with capacity of 50 kL/hr	Site layout map
7.	Dual sequential batch reactor (SBR) system, each with a 1,200 kL capacity	SBR1 and SBR2 on site layout map
8.	Disc thickener and screw press	not shown on maps
9.	Pond 1 (capacity of 6,000 kL)	Site layout map
10.	Winter dam (two compartments of 4,000 kL each; total capacity of 8,000 kL)	Site layout map
11.	Irrigation infrastructure: (a) Irrigation area L1 – 9.45 ha of pasture. No discharge permitted. Paddocks are laser levelled and have 200 mm earthen bund. (b) Irrigation area L2 – 10.56 ha of pasture. No discharge permitted. Paddocks are laser levelled and have a 200 mm earthen bund. (c) Irrigation area L3 – 18.9 ha orange orchard. Paddocks are not laser levelled and do not have an earthen bund. (d) Irrigation area L4 – 28.79 ha of pasture. Paddocks are laser levelled and have a 200 mm earthen bund. (e) Proposed irrigation area L5 – 26.40 ha of pasture. Paddocks are laser levelled and have a 200 mm earthen bund. (f) Proposed irrigation area L6 – 19.43 ha of pasture. Paddocks are laser levelled and have a 200 mm earthen bund.	Irrigation areas L3 – L6 shown on Irrigation Areas map

5. Legislative context

The Application was referred to the Shire of Harvey on 21 January 2019 and internally to DWER's Water Services (South West) on 21 February 2019.

A response was received from Water Services (South West) on 11 March 2019 that included the following comments:

- (a) the water quality data provided, demonstrated that nitrogen and phosphorus were significantly elevated in the Harvey River downstream of the irrigation areas;
- (b) sampling at the Premises has demonstrated that 2018 ANZECC guidelines have been exceeded;
- (c) nitrogen and phosphorus are not being utilised by plant growth and nutrients are moving beyond the root zone and being discharged into the surface drainage networks; and
- (d) there is an emerging trend of increased nitrogen and phosphorus with ongoing contamination into the Harvey River which is located within the Peel Harvey EPP that has set nutrient loading targets. These targets are unlikely to be met by this activity.

Table 5 summarises approvals relevant to the assessment.

Table 5: Relevant approvals and tenure

Legislation	Number	Approval
Local Government Authority – Shire of Harvey – Development approval	Development approval granted on 8 February 2019	For installation of irrigation infrastructure in proposed irrigation areas L5 and L6.
Lease of proposed irrigation area L5	Water Distribution Agreement for part of Lot 192 on deposited plan 202190 being approximately 26 ha. Agreement valid for 12 months commencing on 1 August 2018. Licence Holder has confirmed that lease can be extended beyond July 2019. For the irrigation of treated liquid effluent from the juice and dairy factories.	
Lease of proposed irrigation area L6	Lease for Lot 401192 on Deposited plan 52503, approximately 60 acres (24.28 ha), for 17 months commencing 1 August 2018 and expiring on 31 December 2019. Licence Holder has confirmed that lease can be extended beyond December 2019. For the irrigation of treated liquid effluent from the juice and dairy factories.	

5.1 Part V of the EP Act

5.1.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations. The guidance statements which inform this assessment are listed in Appendix 1.

5.1.2 Works approval and licence history

Table 6 summarises the works approval and licence history for the premises.

Table 6: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
W231	13/12/1988	Works Approval issued for construction of a wastewater system for the dairy factory. Issued to Harvey Fresh Dairies.
L1699	20/12/1989	Initial licence issued to authorise operation of the dairy factory. Two-part licence (EPA and WA conditions). Issued to Harvey Fresh Dairies. Irrigation discharge criteria set for Phosphorus.
W676	22/07/2019	Works approval issued by the EPA requiring modifications to the wastewater treatment system. First instrument issued to Liase Pty Ltd.
L3093	02/09/1991	Licence re-issue
L3093	04/12/1992	Licence amendment to restrict throughput to 20,000 L/day and demonstrate the efficiency of the fat separator unit.
L3093	10/03/1993	Licence amendment following Minister's appeal determination on previous amendment, allowing throughput of 100,000 L/day.
L4404	30/09/1993	Licence re-issue. Addition of category 24. First instrument issued to Harvey Fresh (1994) Ltd and first non-annual licence, issued for 3 years.
L4404/1991/01	12/06/1997	Licence re-issue. Requirement to install a metering device on wastewater outflow.
L4404/1991/02	09/01/1998	Licence re-issue. Issued for one year.
L4404/1991/03	24/11/1998	Licence re-issue.
L4404/1991/04	22/09/1999	Licence re-issue. Addition of category 25.
L4404/1991/05	20/09/2000	Licence re-issue.

Instrument	Issued	Nature and extent of works approval, licence or amendment
L4404/1991/06	09/10/2002	Licence re-issue.
L4404/1991/07	30/09/2003	Licence re-issue. Addition of irrigation discharge criteria for nitrogen.
L4404/1991/08	24/09/2004	Licence re-issue. Requirement to submit a Nutrient Irrigation Management Plan. Issued for 2 years.
L4404/1991/09	21/09/2006	Licence re-issue. Extension for submission of NIMP.
L4404/1991/10	25/10/2007	Licence re-issue. Category 25 removed due to throughput below the required threshold. Further extension of NIMP submission. Requirement to install appropriate metering devices on wastewater outflow.
L4404/1991/11	25/09/2009	Licence re-issue. Addition of category 25 due to throughput above the required threshold. Addition of AACR. Further extension of NIMP submission.
L4404/1991/12	24/09/2009	Licence re-issue.
L4404/1991/13	24/09/2010	Licence re-issue.
L4404/1991/14	29/09/2011	Licence re-issue. Review undertaken of Premises and EAR prepared. Licence issued in Welker style format.
L4404/1991/15	27/09/2012	Licence re-issue. Includes operation of new wastewater system and conversion to new format.
L4404/1991/15	03/05/2013	Licence amendment to convert to REFIRE format.
L4404/1991/15	29/10/2015	Licence amendment to include Category 61, remove Category 25, amend phosphorus loading limit for orange orchard and remove annual wastewater monitoring requirements.
L4404/1991/15	29/04/2016	Notice of Amendment to extend expiry date of licence. Expiry extended from 30/09/2017 to 30/09/2031.
L4404/1991/15	dd/mm/yyyy	Licence amendment to increase production throughput for Category 17, increase the irrigation area, remove category 61 from the licence, decrease total phosphorus loading limit for irrigation area L4

5.1.3 Complaints and incidents history

Within the last 3 years there have been three complaints and three incidents reported to DWER.

Two complaints were received in April 2017 (ICMS 44703 and ICMS 44670) regarding odour. ICMS 44703 was unsubstantiated and has been closed. ICMS 44670 was found to be odour caused by power outage and oxygen dosing equipment malfunction. The equipment was repaired and a back-up system installed to prevent future incidents. The complaint has been closed by DWER and no further action taken.

A complaint received in June 2018 (ICMS 50322), regarding a discharge to a drain, was unsubstantiated and has been closed.

The following incidents have been reported to DWER in the last 3 years:

- (a) ICMS 45114 – May 2017 - failure of two pumps caused water and milk solution to overflow to surface water. Incident is currently open for investigation with DWER.
- (b) ICMS 49075 – April 2018 – silo manhole door seal failed releasing milk onto the ground where it entered stormwater drains adjacent to the factory. Milk was recovered and incident has been closed.
- (c) ICMS 51274 – September 2018 – milk spill that entered stormwater drains. Milk was recovered and incident has been allocated for closure.

5.1.4 Environmental Protection Notice

An EPN was served on the Licence Holder in March 2009 that required the inadequacy of the wastewater treatment system to be addressed. The wastewater treatment system was upgraded and the EPN revoked in October 2013.

An environmental compliance inspection conducted on 21 September 2017 and subsequent compliance activities determined that the Licence Holder was non-compliant with a number of licence conditions relating to the discharge of nutrient rich wastewater (ICMS 49673). The discharges were determined to exceed authorised discharge limits for an extended period of time. It is understood that the emission areas receiving effluent have become nutrient saturated and the exporting of nutrients from the emission areas to the environment and the associated area of the *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* is taking place. The export of nutrients was believed to be impacting the Peel Harvey system causing pollution.

An EPN, reference number DWERDG672/18, was served on the Licence Holder and owners of the Premises on 5 December 2018. The purpose of the EPN is to prevent further use of nutrient saturated emission areas (irrigation areas L1 and L2), determine the impact of nutrient rich discharges on the Harvey River system, determine the capability of emission areas to retain discharged nutrients and minimise further export of nutrients from the wastewater storage pond to the Harvey River system.

Conditions of the EPN include, but are not limited to:

- (a) cease all discharge of wastewater to irrigation areas L1 and L2;
- (b) ensure the discharge of wastewater only takes place to emission area L3 and L4;
- (c) monitoring of ambient surface water quality on a monthly basis; and
- (d) take and analyse soil samples in irrigation areas L1 and L2, and L3 and L4.

The EPN will most likely be amended such that section (b) above will allow the discharge of wastewaters only to emission areas L3 and L4 unless additional discharge areas are approved under Part V Division 3 of the *Environmental Protection Act 1986*.

5.1.5 Annual Environmental Reports and Annual Audit Compliance Reports

DWER received the 2016-2017 Annual Environmental Report (AER) on 29 September 2017, after the due date of 28 August 2018. Data contained within the AER was used to support the risk assessment for the above mentioned EPN and indicates that there were a number of potential compliance matters as detailed below:

- (a) A total of 16,224 kL of fruit and vegetable juice and concentrate was produced which exceeds the licence capacity of 13,000 kL per annual period.
- (b) The quality of the treated wastewater discharged to land was not sampled during August 2016, January or February 2017 and no flow data was recorded for May to July 2017 as required by the Licence. The results for pH, total dissolved solids (TDS), biochemical oxygen demand (BOD) and electrical conductivity (EC) are similar to previous years; however, both total suspended solids (TSS) and total nitrogen (TN) spike in April 2017 and a higher than recent years from May to July 2017; and total phosphorus (TP) spiked in November 2016 with the other samples showing higher results than recent years.
- (c) No ambient surface water sampling was undertaken during the reporting period as required by the Licence.
- (d) Nutrient loading rates were reported to be 140 kg/ha/yr for TN, 84 kg/ha/yr for TP and 1.9 kg/ha/day for BOD. However, following discussions with the Licence Holder (and as reported in the 2017-2018 amended AER), it was determined that treated wastewater has not been irrigated to area L4 since 2012 and irrigation infrastructure has not been installed in L3 indicating that all treated wastewater has been discharged to areas L1 and L2. DWER recalculated the loading rates to be 545 kg/ha/yr for TN and 327 kg/ha/yr

for TP which exceed the Existing Licence nutrient loading limits of 250 kg/ha/yr for TN and 9 kg/ha/yr for TP for areas L1 and L2.

DWER received the 2017-2018 AER on 24 August 2018 with an amended version received on 7 September 2018. DWER has reviewed the amended AER and notes the following:

- (a) Information provided in Table 1 of the AER shows that an average of 720 kL/day of treated wastewater was discharged onto grassed paddock areas L1 and L2 (approximately 20 ha) from August 2017 to May 2018. Approximately 750 kL/day was irrigated to area L3 (18.9 ha orange orchard) in June 2018 and area L4 (28.79 ha grassed paddock) in June and July 2018.
- (b) Monitoring data indicates that the quality of treated wastewater has increased for BOD, TN, TSS and slightly increased for TP compared to previous years (Figure 3 and Figure 4). TP, TDS and TN showed a spike in November and December 2017 with the results approximately 3 times higher when compared to the sampling results in the remainder of the reporting period (Figure 3 and Figure 4).
- (c) Surface water monitoring conducted in the Harvey Main Drain shows higher results for organic carbon, EC, TN and TP at WQ2 (downstream of the Premises) compared to WQ1 (upstream of the premises). Organic carbon, EC and TN results have increased at both WQ1 and WQ2 from 2013 to 2018. See section 6.3.
- (d) The results for pH for ambient soil quality (see section 6.4) has increased (become more alkaline) at all sites, except S3 where it decreased slightly, between 2015 and 2018. The results for EC show that soil sampling sites S2, S3 and S6 decreased while S1, S4 and S5 increased between 2015 and 2018.
- (e) Nutrient loading rates were exceeded for both TN and TP in irrigation areas L1 and L2 (Table 7).

Table 7: Nutrient loading rates for 2017-2018 reporting period¹

Irrigation Area	L1	L2	L3	L4	Existing Licence Limits
TN (kg/ha/yr)	785	872	51	50	250 kg/ha/yr
TP (kg/ha/yr)	297	330	12	12	9 kg/ha/yr for L1 and L2 30 kg/ha/yr for L3 and L4
BOD (kg/ha/day) ²	8	9	22	4.5	30 kg/ha/day

¹ Table has been taken from Table D of the 2017-2018 AER

² BOD has been calculated by DWER based on the information supplied by the Applicant.

6. Monitoring data

6.1 Monitoring of treated wastewater quality

The Existing Licence requires the Licence Holder to monitor the quality of treated wastewater for volumetric flow rate, pH, TDS, TSS, BOD, TN, TP and EC on a monthly basis. Figure 3 and Figure 4 show the available results of treated wastewater quality monitoring from August 2014 to March 2019.

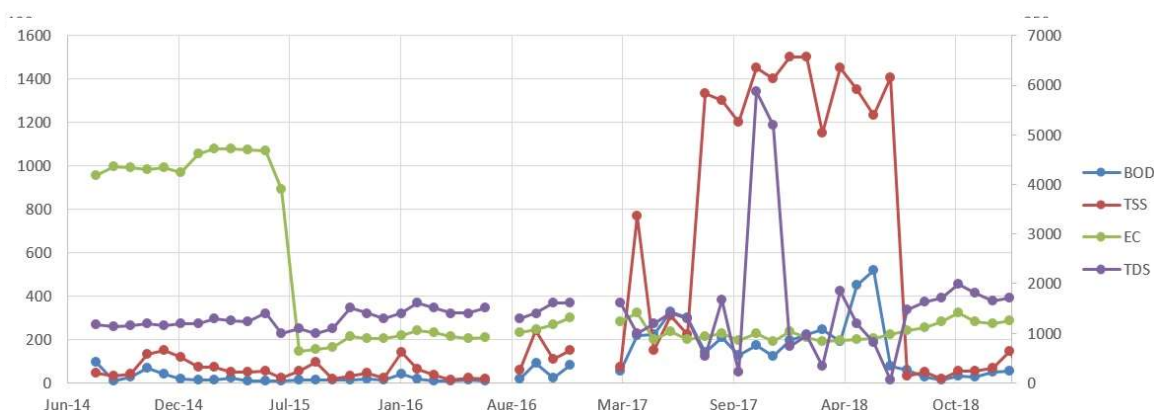


Figure 4: Treated wastewater quality from August 2014 to March 2019 for BOD, TSS, EC (primary axis) and TDS (secondary axis)

Between August 2015 and February 2019 pH showed a stable trend ranging between 6.9 and 8.6, with an average of 7.5. DWER has received the results of one sampling event in March 2019 that shows pH at 5.23. All other parameters, show a stable trend until approximately October 2016 when all parameters, except EC, show varied results. It is noted that from August 2018 to March 2019, all parameters appear to be fairly consistent and lower (except for TDS and EC) than monitoring between December 2016 and July 2018.

6.2 Nutrient loading rates

The Existing Licence requires the Licence Holder to ensure that emissions to land do not exceed the following nutrient loading limits:

Table 8: Nutrient loading limits (from Condition 2.2.2 of the Existing Licence)

Irrigation area	TN	TP	BOD
L1	250 kg/ha/yr	9 kg/ha/yr	30 kg/ha/day
L2			
L3		30 kg/ha/yr ¹	
L4			

¹ Amended in October 2015 from 9kg/ha/yr as the Licence Holder indicated that L3 and L4 were an orange orchard and therefore can support a higher nutrient loading compared to pasture.

As part of the review for the EPN (see sections 5.1.4 and 5.1.5), DWER was advised that all wastewater had been irrigated to areas L1 and L2 only. Therefore, DWER calculated the nutrient loading rates for L1 and L2 between 2011 and 2017 based on the actual area irrigated (see Table 9). Table 7 in section 5.1.5 show nutrient loading rates for the 2017-2018 period.

Calculations show that nutrient loading rate limits were exceeded at L1 and L2 in 2011-2012, 2016-2017 and 2017-2018 for TN and from 2011 to 2018 for TP. BOD has been below 30 kg/ha/day from 2012-2018.

Table 9: Nutrient loading rates (for L1 and L2 as L3 and L4 were not irrigated)¹

Parameter	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
TN (kg/ha/yr)	2114	148	112	163	175	545
TP (kg/ha/yr)	794	93	74	136	151	327

¹ as calculated by DWER as part of review for EPN

6.3 Monitoring of ambient surface water quality

The Existing Licence requires the Licence Holder to monitor ambient surface water quality at two locations, WQ1 and WQ2, within the Harvey Main Drain on a six monthly basis (see Figure 6 for locations). Monitoring has been required by the Existing Licence since October 2011; however, sampling was not carried out during the 2012-2013, 2015-2016 and 2016-2017 reporting periods. Figure 5 shows the available results between 2011 and 2018. It is noted that data is limited due to sampling not being carried out as required by the Licence and may not provide an accurate representation of water quality trends for analysis.

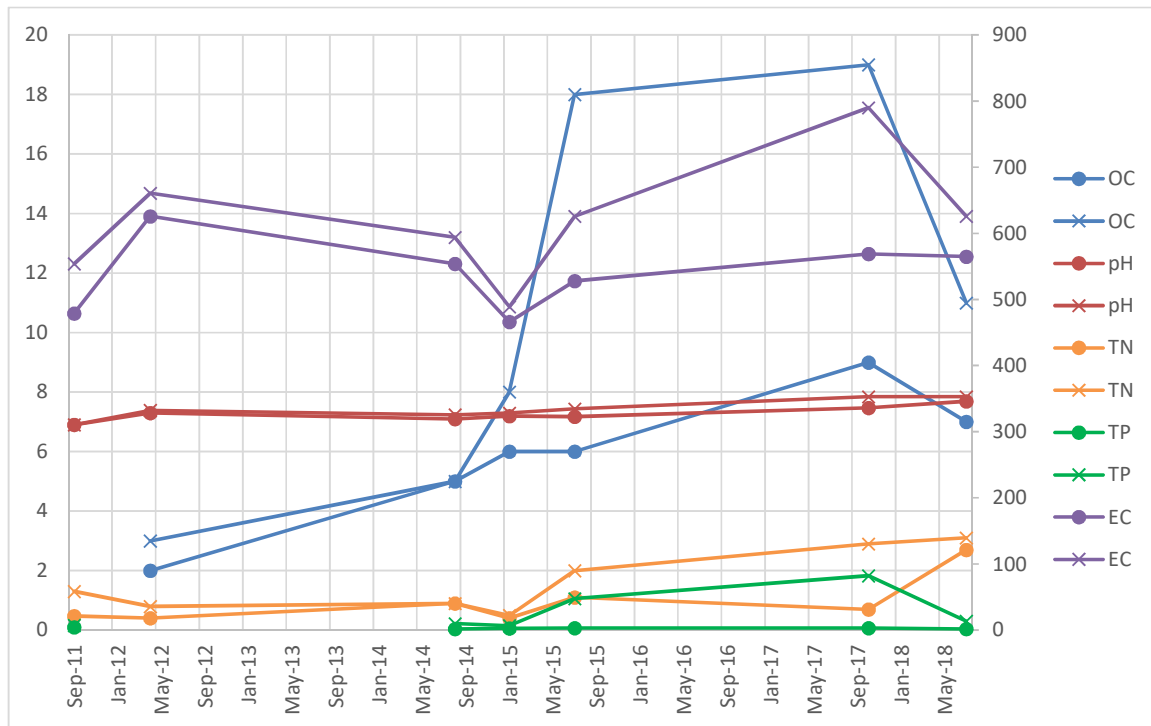


Figure 5: Ambient surface water quality for WQ1 (upstream, solid circles) and WQ2 (downstream, "X") within the Harvey Main Drain for available results from 2011 to 2018. EC is shown on secondary axis.

Available results show that WQ2 results are the same or higher for all parameters with July 2015 and October 2017 results showing the largest difference. It is noted that drainage lines that pass through irrigation areas L1 and L2 connect to the Harvey Main Drain within the vicinity of WQ1; therefore, WQ1 may already be contaminated from irrigation onsite and therefore monitoring at WQ1 and WQ2 may not reflect actual impact from irrigation occurring onsite.

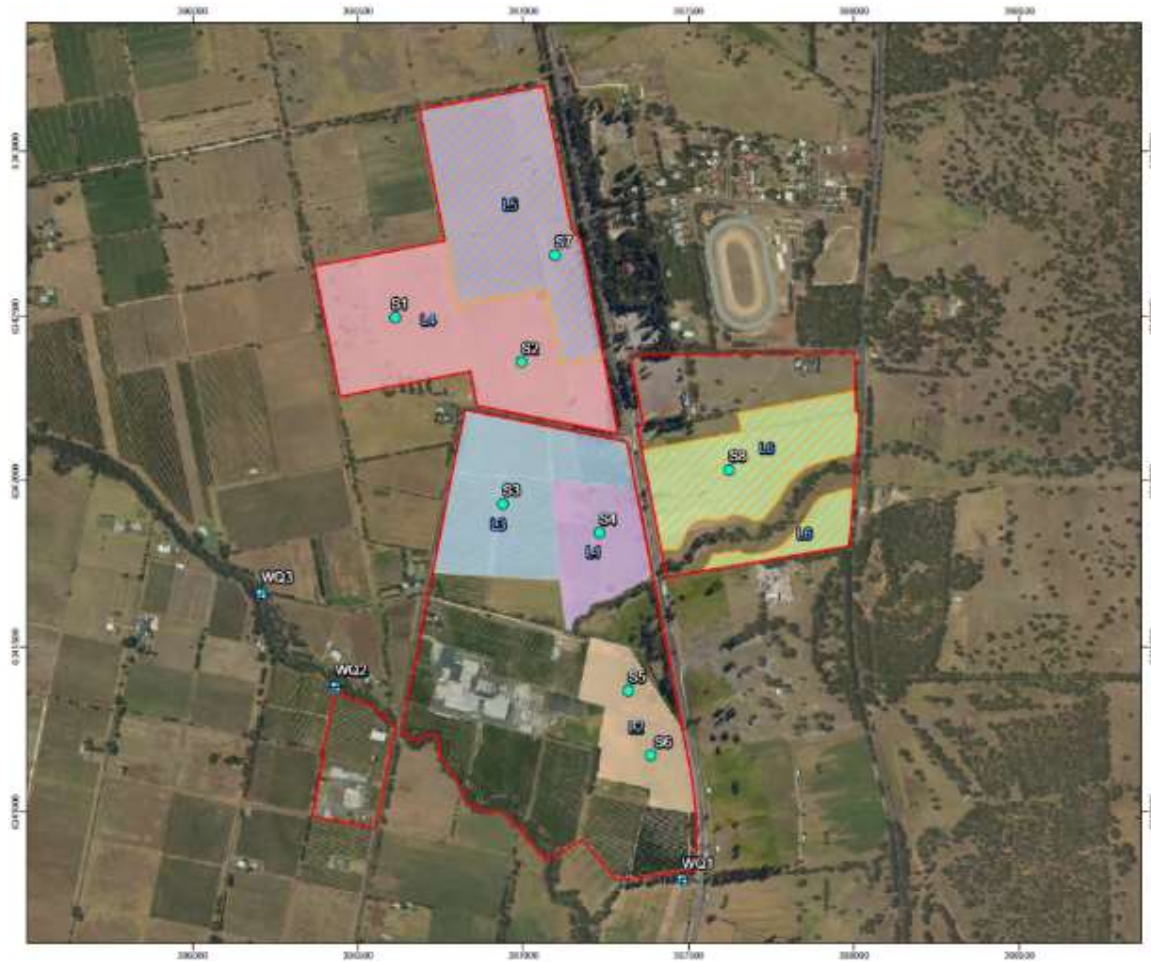


Figure 6: Surface water quality and soil sampling locations

Note that sampling locations required in the Existing Licence include WQ1 and WQ2 (surface water quality) and S1 to S6 (soil sampling).

6.4 Monitoring of ambient soil quality

The Existing Licence requires the Licence Holder to monitor pH and EC at six locations (S1 – S6, see Figure 6) across the irrigation area on an annual basis. In June 2018 soil sampling was conducted at 0.3 m, 0.5 m and 1 m below ground level at these six sites with the samples being additionally analysed for filterable reactive P, P sorption capacity, NO_x-N, Total Kjeldahl Nitrogen, Total Phosphorus, Total Nitrogen, Calcium, Potassium, Magnesium and Sodium.

Figure 7 and Figure 8 show ambient soil quality for pH and EC respectively at sites S1 to S6.

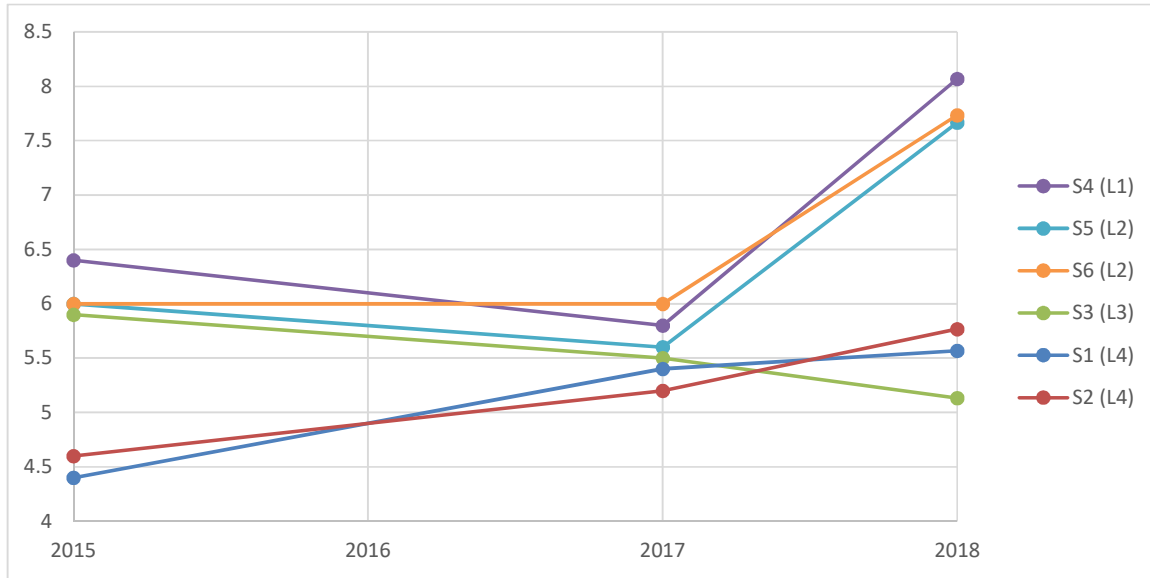


Figure 7: pH ambient soil quality for S1 to S6 for 2015, 2017 and 2018.

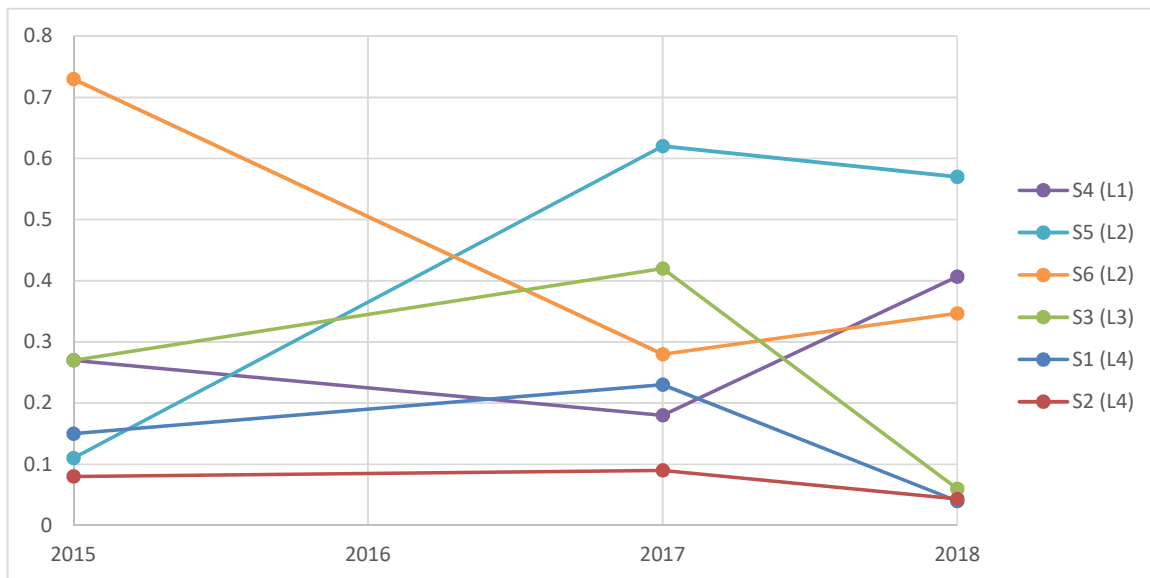


Figure 8: EC ambient soil quality for S1 to S6 for 2015, 2017 and 2018.

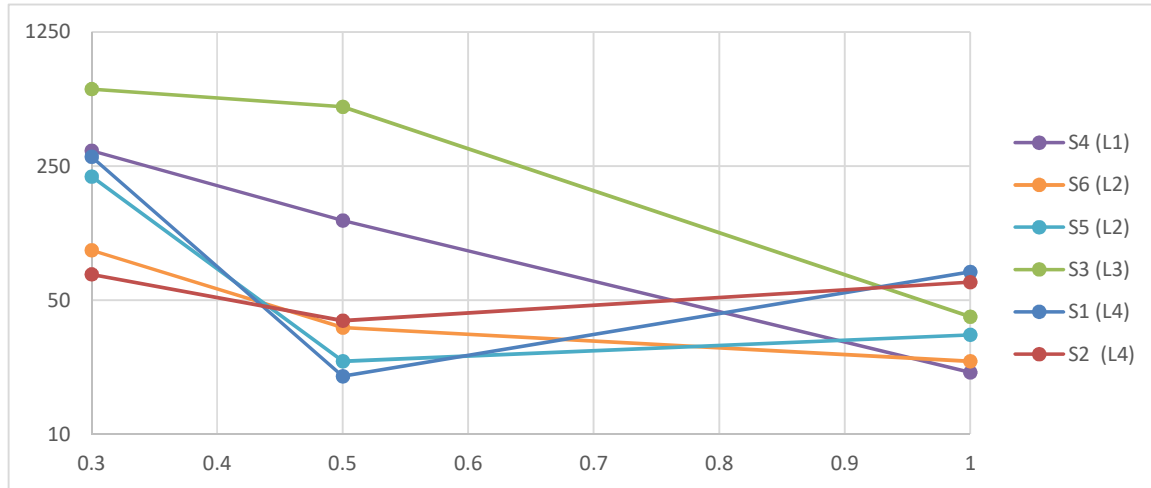


Figure 9: Total Phosphorus at soil sampling sites S1 to S6 for depths of 0.3 m, 0.5 m and 1 m, sampled on 19 June 2018. (Shown on a logarithmic scale.)

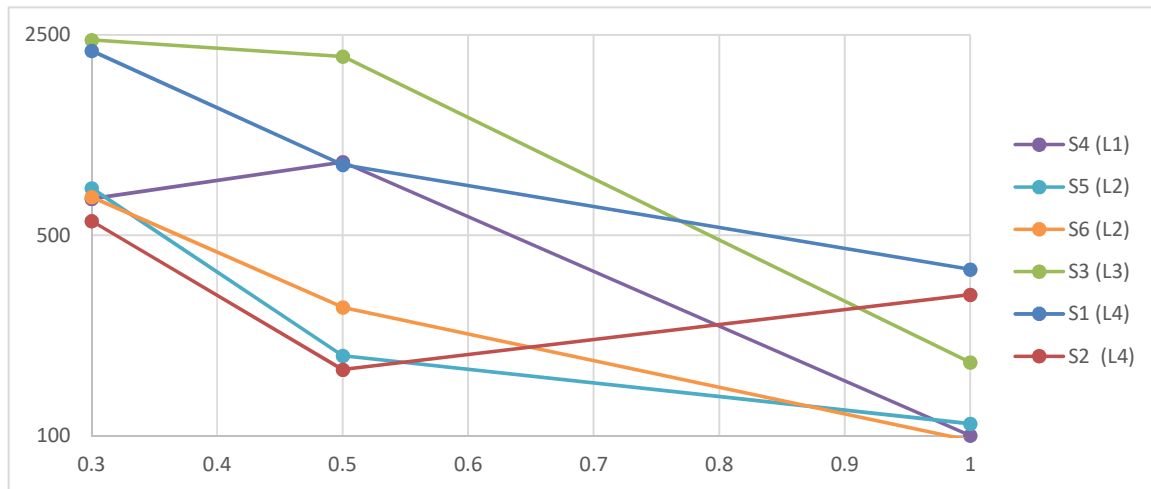


Figure 10: Total Nitrogen at soil sampling sites S1 to S6 for depths of 0.3 m, 0.5 m and 1 m, sampled on 19 June 2018. (Shown on a logarithmic scale.)

The soil sampling results in June 2018 show that TP and TN decreases with increasing depth except for sites S2 (L4) for both TP and TN, and S1(L2) and S1(L4) for TP which increased from 0.5 to 1 m depths. All sampling sites showed decreased amounts of TP and TN at 0.5 m depth compared to 0.3 m except for TN at S4 (L1) which increased.

It should be noted that sampling at S3 (L3) showed significantly higher results, compared to other sampling sites, for TP and TN, particularly at depths 0.3 and 0.5 m. Sampling at S1 (L4) also showed significantly higher results, compared to other sampling sites, for TN at 0.3 m depth; and sampling at S4 (L1) showed higher results at 0.5 m depth for TN than sampling at S2, S5 and S6.

The Licence Holder has provided phosphorus retention index (PRI) results from sampling in 2009 within the Application. The Licence Holder has stated that surface soils have a PRI of 60 to 1,900, mid-soils have a PRI of 40 to 230 and lower soils have a PRI of 50 to 1,500; which indicates that the soils have a large capacity for soil phosphorus sorption.

The Licence Holder has indicated in the application that soil samples were taken at additional locations, S7 and S8, in June 2018; however, the results of the soil sampling at these locations was not included in the application.

<p>Key findings:</p> <ol style="list-style-type: none"> 1. Monitoring has not been completed on a consistent basis with many required samples over the last 5 years not being taken. 2. Nutrient loading rates for TN have been up to 8 times higher than the limits specified in the Existing Licence and were double the specified limits in the 2016-2017 period. 3. Nutrient loading rates for TP have been up to 88 times higher than the limits specified in the Existing Licence with the majority of the loading rates being 10 to 30 times higher. 4. Treated wastewater quality appears to be inconsistent from January 2017 to January 2019 when compared to results from August 2014 to December 2016. It is noted that from August 2018 to March 2019, parameters appear to be consistent and lower (except TDS and EC) than previous results. 5. WQ2 (downstream) surface water quality results are generally higher than WQ1 (upstream) surface water quality results, with the most significant differences occurring in 2017. However, drainage lines that pass through irrigation areas L1 and L2 connect to the Harvey Main Drain within the vicinity of WQ1 and therefore monitoring at WQ1 and WQ2 may not reflect actual impact from irrigation occurring onsite. 6. Soil sampling results show that TP and TN are significantly higher in S3 (L3) than the other sampling locations. TN results for S3 at 0.3 m are up to 4 times higher and at 0.5 m up to 12 times higher than the other sampling locations. TP results for S3 at 0.3 m are up to 9 times higher and at 0.5 m up to 21 times higher than the other sampling locations.
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7. Location and siting

7.1 Siting context

The Premises is located on the Swan Coastal Plain approximately 1.5 km north of the Harvey townsite and 140 km south of Perth. The land is zoned as intensive farming under the Shire of Harvey’s Town Planning Scheme No. 1 (District Scheme) and includes restricted use area 5 (fruit juice extraction business) and restricted use area 9 (milk processing plant). The surrounding land is zoned as intensive farming, special residential, recreation and general farming and includes land uses such as stock grazing, farm stay accommodation, fruit trees, viticulture and intensive horticulture.

7.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 10.

Table 10: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Residential premises (zoned as intensive farming)	Approximately six residential premises located within 600 m S of the premises boundary (the closest being 118 m). Approximately four residential premises located between 600 to 720 m S or SE of the premises boundary.

Sensitive Land Uses	Distance from Prescribed Activity
	Approximately four residential premises located within 450 m E of the premises boundary (the closest being 50 m south of the proposed irrigation area). Approximately five residential premises located within 800 m W of the premises boundary (the closest being 50 m).
Residential premises (zoned as special residential)	Approximately ten residential premises located within 600 m of the premises boundary (and within 300 m of the proposed irrigation area).
Industry	Cement works located approximately 320 m E of premises boundary and 40 m south of proposed irrigation area.
Residential area	Residential area located approximately 800 m and 1,000 m south of existing premises boundary and current irrigation area respectively.

7.3 Specified ecosystems, groundwater and water sources

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 11. Table 11 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting*.

Table 11: Environmental values

Specified ecosystems	Distance from the Premises
Geomorphic Wetlands – Swan Coastal Plain (management)	Premises, including proposed irrigation areas, located within: Swan Coastal Plain – Semeniuk, Palusplain (seasonally waterlogged) multiple use wetland.
<i>Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992 (EPP)</i>	Premises (including proposed irrigation areas) are entirely within the EPP with the Premises being identified in the <i>Hydrological and Nutrient Modelling of the Peel Harvey Catchment – Water Science Technical Series Report</i> and the <i>Agriculture Futures: Potential rural land uses on the Palusplain</i> as being in a high risk nutrient export area requiring a significant phosphorus load reduction. (DWER, 2019). River health surveys carried out by Aquatic Science Branch of DWER showed that the Harvey River downstream of the Premises has significantly degraded water quality and ecological condition compared to upstream.
Threatened Ecological Communities and Priority Ecological Communities	The proposed irrigation area, L6, is located within the buffer area of the Federal Government Threatened Ecological Community <i>Banksia Woodlands of the Swan Coastal Plain</i> (BanksiaWld09222), BanksiaWld09217, BanksiaWld09218 and BanksiaWld09228 with numerous other Banksia Woodland areas located within a 1 km radius.
Parks and Wildlife Managed Lands and Waters	State forest located 2.7 km E of existing premises boundary (2.2 km E of proposed irrigation area L6)
Biological component	Distance from the Premises
Threatened/Priority Flora	<i>Caladenia uliginosa subsp. patulens</i> located 760 m E and 1.9 km SE of existing premises boundary
Threatened/Priority Fauna	Numerous fauna: water rat, quenda, western brush wallaby, brushtail possum and chuditch sighted within premises boundary.

	<p>South-western brush-tailed phascogale sighted 780 m WNW of premises boundary.</p> <p>Carter's freshwater mussel sighted 630 m SW of premises boundary.</p> <p>Red tail black cockatoo sighted 600 m E of premises boundary and 30 m from proposed irrigation area L6.</p>
Surface water	<p>The Premises is located the Harvey Irrigation District proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act).</p> <p>The Harvey Dam is located 2.4 km SE of the premises boundary.</p> <p>The Harvey Main Drain is located immediately south of the premises boundary, approximately 170 m S of L2 and 520 m S of L3. The Harvey Main Drain is a modified section of the Harvey River which was then re-named as a drain.</p> <p>A minor, non-perennial watercourse is located through proposed irrigation area L6 and immediately south of existing irrigation area L1. It drains into an existing agricultural drain that flows E to W through the premises.</p> <p>Existing agricultural drainage networks are located adjacent and through the Premises, immediately north of existing irrigation area L2 and immediately south of irrigation area L1, 70 m south of irrigation area L3, immediately west of irrigation area L4, immediately north of proposed irrigation area L5 and immediately southeast of proposed irrigation area L6. These drainage networks flow to the Harvey River Main Drain discharging into the Harvey Estuary approximately 40 km downstream.</p> <p>DWER Water Services advice states that there is connectivity between the perched and seasonal groundwater and the Harvey River drainage network, and as such, any nutrient leaching from groundwater or surface flows can directly impact on the quality of the Harvey River (Harvey Estuary).</p>
Groundwater	<p>The South West Coastal Groundwater Area, proclaimed under the RIWI Act, is located 7 km west of the premises.</p> <p>The Licence Holder does not have any groundwater bores on the Premises; however there are approximately 50 groundwater bores within a 3 km radius, most of which are for production purposes associated with livestock and domestic requirements.</p> <p>The nearest licence to take groundwater is located approximately 7 km NW of the premises boundary and proposed irrigation area L5.</p> <p>Groundwater monitoring bores, owned by DWER and located 150 m west and 400 m north of the existing irrigation areas (within 600 m of the proposed irrigation area L5), shows the maximum groundwater table to be approximately 2 to 3 m below ground level.</p> <p>The Perth Groundwater Map shows that the groundwater salinity at the premises ranges from 250 mg/L within irrigation areas L2 and L6, which are located adjacent to a minor watercourse; to 1,500 mg/L within irrigation area L3, located in the NW corner of the premises, which is considered fresh to brackish.</p>

7.4 Soil type

Table 12 details soil types and characteristics relevant to the assessment.

Table 12: Soil and sub-soil characteristics

Soil and sub-soil characteristics	Description
Soil type classification	<p>The Licence Holder has provided, with their application, a NIMP that includes information on soil type of the Premises. The site is located on the Pinjarra Plain landform which is described as "flat and generally poorly drained alluvial plain". The site is overlain by loamy sands of the Bassendean Sands complex followed by heavy clay of brown/grey colour at a depth of approximately 2 m.</p> <p>The soils statewide map show that the soils at the premises are sandy acidic yellow mottled</p>

Soil and sub-soil characteristics	Description
	<p>soils some of which contain ironstone gravel and some in deeper varieties.</p> <p>A Soil Sampling Program report (May 2019) provided by the Licence Holder shows that:</p> <ul style="list-style-type: none"> - the duplex clay layer was encountered at 10 cm bgl for irrigation area L3; - the duplex clay layer was encountered between 30 – 50 cm bgl over the western and central areas of L4 with deep (>1 m) sand encountered on the eastern side; - deep (>1 m) sand was found on the eastern side of L5; however, expert hydrogeological advice from within DWER suggests that the western and central areas of L5 would be similar to that of L4; and - the duplex clay layer was encountered between 10 – 30 cm bgl for irrigation area L6. <p>As a result of the above new-found hydrogeological advice, the Delegated Officer has determined that the soil conditions over L5 may not be as suitable for irrigation as initially thought. For this reason a requirement for additional monitoring bores for monitoring irrigation impacts to L5 have been added to the licence (condition 2 Table 3) and justifies surface water monitoring of the L5 drain and soil sampling.</p>
Acid sulfate soil risk	Moderate to low acid sulfate soil disturbance risk (<3 m from surface)

7.5 Meteorology

The region experiences cool, wet winters and warm to hot, dry summers. The nearest Bureau of Meteorology site is Wokalup (site number 009642), located approximately 8 km south of the Premises.

7.5.1 Wind direction and strength

Figure 11 shows the wind direction and strength for 9am at Wokalup.

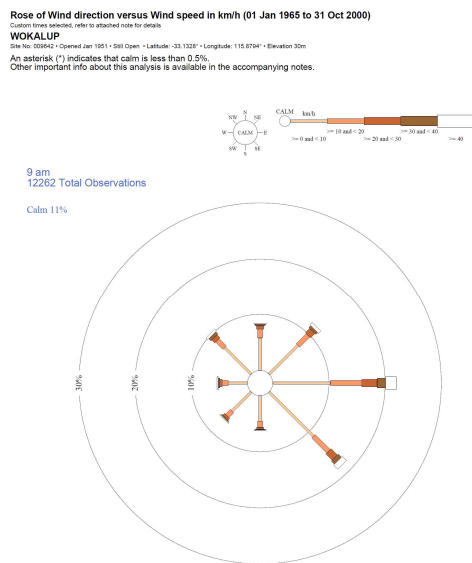


Figure 11: Wind direction and strength for 9am at Wokalup (site no. 009642).

It is important to note that the wind rose (shown in Figure 11) show historical wind speed and wind direction data (1 January 1965 to 31 October 2000) for Wokalup weather station and should not be used to predict future data.

7.5.2 Rainfall and temperature

Figure 12 shows the average monthly maximum temperature and the average monthly rainfall for Wokalup and is based on data from 1951 to 2019.

Average minimum temperatures range between 7.9°C and 16.1°C while the average maximum temperatures range between 16.7°C and 31°C. The total annual average rainfall is 962 mm.

Rainfall exceeds pan evaporation for 4 months of the year (May to August).

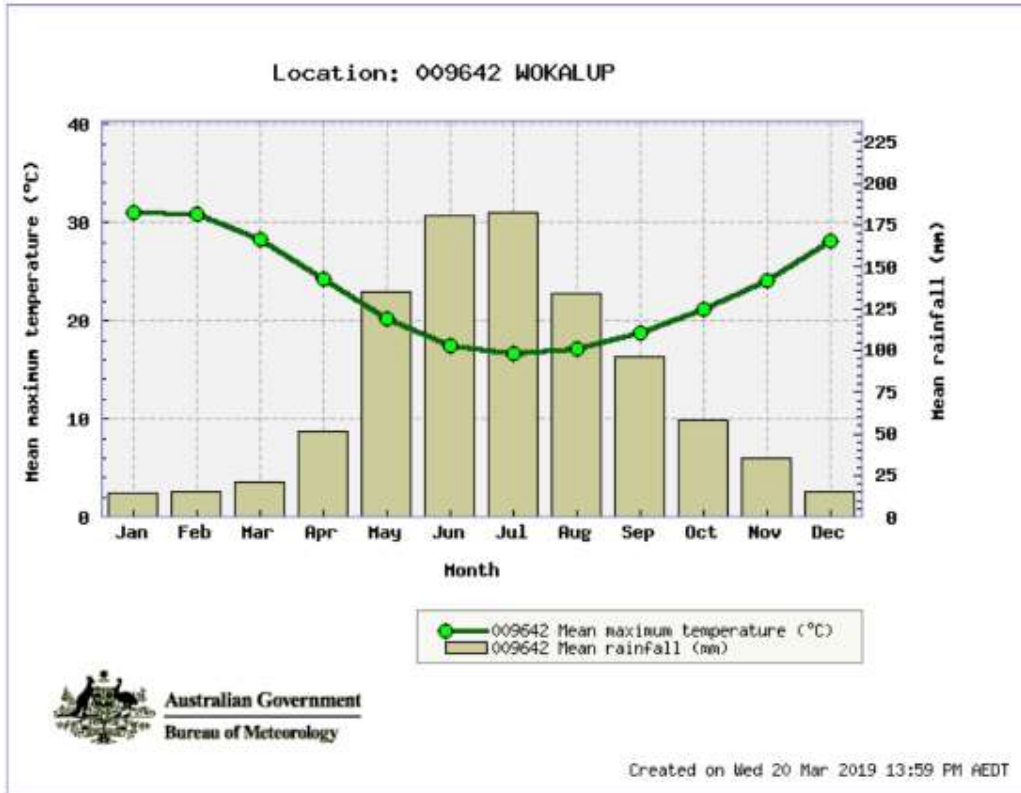


Figure 12: Average monthly maximum temperature and average monthly rainfall

8. Risk assessment

8.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 13.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 13 below.

Table 13: Identification of emissions, pathway and receptors during operation

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
Category 17 (milk processing)	Increased efficiency in milk processing operations resulting in an increased amount of milk products produced	Increase in volume of wastewater produced therefore, increase in amount of wastewater irrigated to land	Surface water: existing agricultural drainage network located around and through the Premises with a minor, non-perennial watercourse located within proposed irrigation area L6 and the Harvey Main Drain located immediately south of the Premises.	Direct discharge to land. Discharge to existing drainage network from overland flows.	Surface contamination affecting ecosystem health	Yes	See sections 8.4 and 8.5 of this Decision Report.
			Depth to groundwater is approximately 2 – 3 m below ground level.	Infiltration to groundwater			

Risk Events					Continue to detailed risk assessment	Reasoning			
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 17 (milk processing) and Category 24 (non-alcoholic beverage manufacturing)	Onsite disposal of treated wastewater via irrigation to areas L3 – L6, 93.5 ha area (including proposed L5 and L6 irrigation areas)	Wastewater to land with excessive contaminants	Surface water: existing agricultural drainage network located around and through the Premises with a minor, non-perennial watercourse located within proposed irrigation area L6.	Direct discharge to land. Discharge to existing drainage network from overland flows.	Surface water contamination affecting ecosystem health	Yes	See section 8.4 of this Decision Report for detailed risk assessment.		
			Depth to groundwater is approximately 2 – 3 m below ground level.	Infiltration to groundwater	Groundwater contamination affecting ecosystem health				
		Wastewater to land with excessive hydraulic loading	Surface water: existing agricultural drainage network located around and through the Premises with a minor, non-perennial watercourse located within proposed irrigation area L6.	Direct discharge to land. Discharge to existing drainage network from overland flows.	Surface water contamination affecting ecosystem health			Yes	See section 8.5 of this Decision Report for detailed risk assessment .
			Depth to groundwater is approximately 2 – 3 m below ground level.	Infiltration to groundwater	Groundwater contamination affecting ecosystem health				

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
		Odour	More than 15 residential premises (rural) located approximately 50 m to 800 m from the premises boundary and irrigation areas (including the proposed irrigation areas)	Air / wind dispersion	Potential amenity impacts	No	<p>The Delegated Officer considers that the separation distance between the source and potential receptors is sufficient noting that fugitive odour from irrigation of the treated wastewater on the existing 67.7 and additional 45.83 hectares is expected to be insignificant compared to the treatment of wastewater in the onsite wastewater treatment system.</p> <p>There have been no complaints received by DWER in relation to odour from the irrigation of treated wastewater in at least the last 3 years.</p> <p>No further assessment required.</p>
	Decrease the loading limit for Total Phosphorus for Irrigation Area L4 from 30 kg/ha/yr to 9 kg/ha/yr.	N/A	N/A	N/A	N/A	N/A	<p>The Licence was amended in October 2015 to increase the nutrient loading rate limits for the orange orchard irrigation areas, L3 and L4 from 9 kg/ha/yr to 30 kg/ha/yr. However, the Licence Holder has advised DWER that only L3 is an orange orchard and L4 has remained as pasture. Therefore, the Licence Holder is requesting that the nutrient loading rate limits applicable to irrigation area L4 return to the previous limit of 9 kg/ha/yr.</p> <p>As irrigation area L4 is not intended to be an orange orchard, the Delegated Officer has determined that the nutrient loading rate limit for L4 will return to 9 kg/ha/yr.</p> <p>No further assessment required.</p>

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Category 61	Removal of Category 61 as liquid waste is no longer received at the Premises	N/A	N/A	N/A	N/A	N/A	<p>Harvey Fresh was previously receiving wastewater from the Capel Cheese Factory for treatment. As the Capel Cheese Factory has now closed, the Licence Holder would like to remove Category 61 from the Licence as no further liquid waste will be received at the Premises.</p> <p>Category 61 and associated conditions 1.3.2 (and Table 1.3.1) and 1.3.3 (and Table 1.3.2) will be removed from the Licence. Condition 4.2.1 will be updated to remove the reference to Table 1.3.1.</p>

8.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 14 below.

Table 14: Risk rating matrix

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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 15 below.

Table 15: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event 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"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite 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"> onsite impacts: high level offsite impacts local scale: mid-level offsite 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"> onsite impacts: mid-level offsite impacts local scale: low level offsite 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"> onsite impacts: low level offsite impacts local scale: minimal offsite 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"> onsite 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*.

"onsite" means within the Prescribed Premises boundary.

8.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 16 below:

Table 16: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may 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.

8.4 Risk Assessment – Discharge of treated wastewater to land (irrigation) – nutrient loading impact analysis

8.4.1 Description of risk event

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

8.4.2 Identification and general characterisation of emission

Between August 2014 and July 2018, an average of 313,380 kL per annual period of treated wastewater was disposed of to land by irrigation (areas L1, L2, L3 and L4), based on a current production of up to 165,000 tonnes per annual period for Category 17, and up to 13,000 kL per annual period for Category 24. Up to 960 kL/day (350 ML/year) of treated wastewater has been irrigated over the past five years. The Licence Holder is proposing to irrigate an additional two areas, L5 (26.40 ha) and L6 (19.43 ha) and increase production for category 17, which will increase the amount of wastewater generated and subsequently require disposal.

Approximately 360 kL and 318 kL of liquid waste was received in 2016-2017 and 2017-2018 reporting periods respectively under Category 61; however, it is noted that the Licence Holder has advised that this liquid waste will no longer be received at the Premises. As the amounts received are minimal compared to the amount of wastewater generated at the premises (approximately 1%), it is expected that there will be negligible difference to the volume of wastewater treated at the Premises.

Wastewaters from milk and juice processing facilities are characterised by high concentrations of organic matter (expressed as COD or BOD), nutrients (particularly nitrogen and phosphorus), fats, oils and grease, total dissolved solids (Dairy Australia, 2017), and cleaning agents (from Application).

Treated wastewater is currently irrigated from either Pond 1 or the Winter Dam to the irrigation areas. The Licence Holder currently monitors treated wastewater quality at one of three locations, depending if the treated wastewater is being sourced from the WWTP, Pond 1 or the Winter Dam for irrigation. Treated wastewater is usually sourced from either Pond 1 or the Winter Dam rather than straight from the WWTP.

The Licence Holder has provided information in the Application that suggests that treated

wastewater will only be discharged from Pond 1 or the Winter Dam to the Irrigation Areas where the water quality criteria specified in the NIMP (as shown in the “Harvey Fresh NIMP” column of Table 17) is met. Water quality results from March 2017 to March 2019 suggest that this criteria is not being met (Table 17); however, it is noted that some results have been below target criteria.

Relevant common levels of concern have been included in the below table for comparison to current treated wastewater quality.

Table 17: Quality of treated wastewater discharged to irrigation areas

Parameters	Units	Harvey Fresh NIMP	Range and Average (in brackets) of WWTP effluent treatment results (March 2017 to July 2018)	Range and Average (in brackets) of WWTP effluent treatment results (August 2018 to March 2019)	Common levels of concern ¹
Total Nitrogen	mg/L	< 5 mg/L	16 – 238 (74)	14 – 33 (21)	125
Total Phosphorus	mg/L	< 3 mg/L	9 – 97 (30)	1 – 7 (4)	12
Biochemical oxygen demand (BOD)	mg/L	< 20 mg/L	52 – 519 (222)	13 – 59 (34)	-
Total suspended solids	mg/L	20 mg/L	72 – 1,500 (1,047)	10 – 147 (54)	-
pH	-	-	6.9 – 7.8 (7.2)	5.2 – 8.6 (7.8)	-
Total Dissolved Solids	mg/L	-	54 – 5,880 (1,527)	1,473 – 1,985 (1,736)	-
Electrical conductivity	mg/L	-	189 – 321 (220)	241 - 320 (277)	-

Note 1: Maximum short term trigger value guideline for irrigation water, taken from Table 4.2.11 from ANZECC & ARMCANZ.

The area of land required for vegetation to accommodate the applied nutrients without seepage to groundwater (assuming that irrigation is only taking place under conditions where there is no rainfall) can be determined by calculating nutrient loading rates for the premises. A preliminary assessment of nutrient loading rates at the premises can be determined as follows (NSW EPA, 1998):

$$A = \frac{C \times Q}{L_x}$$

Where

A	=	land area (m ²)
C	=	concentration of nutrient or BOD (mg/L)
Q	=	treated wastewater flow rate (L/d)
L _x	=	critical loading rate of nutrient or BOD (mg/m ² /d)

Based on:

- 2017-2018 average treated wastewater quality (see Table 17);
- maximum irrigation rate of 350 ML/year (based on actual data from the past 5 years and

- used to represent worst case scenario); and
- critical loading rates of 36 mg/m²/day for nitrogen and 4 mg/m²/day for phosphorus (NSW EPA, 1998);

the land area required to sustainably manage the nitrogen application rate would be 197 ha and 719 ha to manage the phosphorus application rate.

The Licence Holder has indicated that they will increase the irrigation rate up to 1,100 kL/day (401.5 ML/year) to accommodate the 9% increase in production. Therefore, the above preliminary assessment of nutrient loading rates at the premises was recalculated using this increased amount.

Based on:

- 2017-2018 average treated wastewater quality (see Table 17);
- maximum irrigation rate of 401.5 ML/year (based on an estimated 1,100 kL/day stated in the Application); and
- critical loading rates of 36 mg/m²/day for nitrogen and 4 mg/m²/day for phosphorus (NSW EPA, 1998);

the land area required to sustainably manage the nitrogen and phosphorus application rate would be 226 ha and 825 ha respectively. It is noted that treated wastewater quality has improved since August 2018 (Table 17); however, using the above calculation, the land area required to sustainably manage the nitrogen and phosphorus application rate would be 64 and 110 ha respectively. The Delegated Officer notes that there is currently only 95 ha of land available for irrigation (see Table 18) and additional land suitable for irrigation needs to be found before the next winter season.

The Delegated Officer notes that if the Licence Holder were able to achieve the wastewater quality of 5 mg/L of TN and 3 mg/L of TP (as committed to in the NIMP), then irrigating at 1,100 kL/day would require 15.5 ha and 82.5 ha of land to manage the nitrogen and phosphorus application rates respectively.

It should also be noted that while the above calculations shows that the existing irrigation area (L3-L6) totalling 93.5 ha is not a large enough to manage the nutrient application rates, it is only an estimate and does not accurately represent what may occur onsite; however, it does give an indication that there may be overloading of nutrients at the premises.

The above calculations consider the application of nutrients across all irrigation areas (L3 – L6) as a single receiving area. Table 18 shows a preliminary assessment of nutrient loading rates for each irrigation area if it is assumed that the current volume (350 ML/year) and quality (average of 74 mg/L for TN and 30 mg/L for TP) of wastewater will continue to be irrigated and that the volume of wastewater will be distributed evenly between the irrigation areas. Note that this is theoretical, and calculated by DWER, as the Licence Holder has not indicated the volume of treated wastewater that will be irrigated to each individual area.

Table 18: Preliminary assessment of nutrient loading rates at the premises for each irrigation area (L3 – L6)

	Type of vegetation	Estimated volume of wastewater to be irrigated ¹ (L/day)	Irrigation Area (ha)	Land area (ha) required to sustainably manage nutrient application rate ²	
				For management of nitrogen	For management of Phosphorus
L3	Orange orchard	193790.5	18.9	39.8	145.3
L4	Pasture grasses	295197.3	28.79	60.7	221.4
L5	Pasture grasses	270691.5	26.40	55.6	203
L6	Pasture grasses	199224.8	19.43	41	149.4

¹ based on historical maximum irrigation rate of 350 ML, divided proportionally dependent on the size of each irrigation area. Note that this does not take into account an increase in production of 9%.

²Calculations are based on critical loading rates of 36 mg/m²/day for nitrogen and 4 mg/m²/day for phosphorus (NSW EPA, 1998).

From Table 18 it can be seen that none of the irrigation areas are large enough to manage the nitrogen or phosphorus application rates if the current volume and quality of treated wastewater is continued to be irrigated. The above calculations also do not take into account an increase in production and therefore, an increase in the amount of wastewater produced.

It should also be noted that the Licence Holder has stated in the Application that cattle are grazed within the paddocks of the irrigation area, potentially contributing to additional nutrients within the soil from manure and that the pasture grasses are not harvested (only removed through grazing).

The Licence Holder has provided information on a nitrogen and phosphorus balance as part of the NIMP that was submitted with the Application. The Licence Holder has made the following assumptions in their calculations:

- pasture paddocks contain a mixture of ryegrass and clover;
- the volume of wastewater irrigated is 263,934 kL (based on actual irrigation rate between August 2017 and July 2018).
(DWER notes that this is the amount of wastewater irrigated during the 2017-2018 reporting period and therefore, does not include an increase in production by 9%);
- the average concentration of total nitrogen is 22.6 mg/L and the average concentration of total phosphorus is 5.3 mg/L. The Licence Holder has stated that “as the nutrient concentrations during this period (August 2017 to July 2018) were excessive and will not continue due to improvements in management practices and consultants, the TN and TP concentrations used in the nutrient budget are based on the recent water quality results (August to October 2018).
(It is noted that August to November 2018 results have not been made available to DWER. Average TN and TP concentrations between March 2017 and July 2018 are 74 and 30 mg/L respectively);
- the nutrient loading has been calculated for two scenarios: (a) current loading based on 263,934 kL of wastewater irrigated; and (b) 9% increase in production (for category 17) from current loading.
(DWER notes that it appears that for Scenario B it appears the Licence Holder is presuming they will achieve a 25% reduction in water usage);
- annual ryegrass can uptake 210 kg/ha of nitrogen and 9.3 kg/ha of phosphorus; and
- orange orchard can uptake 80 kg/ha of nitrogen and 9.2 kg/ha of phosphorus.

Table 19 shows the Licence Holder’s calculated nutrient loading inputs and amount removed by pasture and the orange orchard. The net nutrient loading has been calculated by DWER.

Table 19: Predicted Nutrient Loading

	Licence Holder calculated input ¹		Nutrient removal ² (kg/yr)	Net nutrient loading ³ (kg/ha/yr)	
	Scenario A (current loading)	Scenario B (9% increase from current loading)		Scenario A (current loading)	Scenario B (9% increase from current loading)
Total Nitrogen	5,965 kg/yr	6,502 kg/yr	17,182.2	- 119.94	- 114.20
Total Phosphorus	1,399 kg/yr	1,525 kg/yr	867.8	5.68	7.03

¹ The Licence Holder has not provided the formula used nor calculations to show how these numbers were obtained.

² Based on information provided in the NIMP; however, as L1 and L2 cannot currently be irrigated due to limitations imposed by the EPN; the nutrient removal amounts from L1 and L2 has not been included in Table 19.

³ Calculated by DWER. Note that this presumes that: (a) the Licence Holder is able to achieve ≤ 22.6 mg/L for TN and ≤ 5.3 mg/L for TP on a consistent basis; (b) no additional N or P have been added to the soil due to manure from grazing cattle; (c) that the cattle are grazed over the entire irrigation area and/or crops are harvested (d) no additional fertilisers have been added to the irrigation areas; (e) the whole amounts of nitrogen and phosphorus in the soil are available to the plants (orange orchard and pasture); (f) the plants cover the entire irrigation area; and (g) that the whole 93.5 ha (L3-L6) are irrigated.

From the above calculations it appears that the existing nutrient loading rates in the Existing Licence will be complied with for Scenario A and B; however, as noted above, there are a number of factors that have not been considered, such as:

- the Licence Holder has indicated that the pasture in the irrigation areas will be grazed but the Licence Holder has not taken into account additional nutrients due to manure from the grazing cattle;
- it is unknown whether the quality of wastewater used in the calculations is achievable in the long term (based on previous monitoring results, see Table 17 and Figure 3 and Figure 4);
- cattle are grazed over the entire pasture areas and nutrients are removed through harvesting of the orange orchard; and
- the pasture and orange orchard plants cover the entire irrigation areas.

The Licence Holder has exceeded the relevant annual gross nutrient loading rate limits specified on the Existing Licence in 3 reporting periods for TN and all reporting periods for TP over the last 7 reporting periods. Nutrient loading rates for TP have been up to 88 times higher than the limits specified in the Existing Licence.

As outlined in section 6.4, results of soil sampling conducted within the existing irrigation areas indicates that TN and TP may be leaching below the root zone of the plants in irrigation area L4 and therefore, potentially impacting on groundwater.

The soil in the irrigation areas has not been sampled for TP and TN in previous years, therefore, it is unknown whether TP and TN have changed at each site over time.

8.4.3 Description of potential adverse impact 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 surface water, soil and groundwater.

Agricultural drainage networks are located around and through the Premises and drain into the Harvey Main Drain which in turn discharges into the Harvey Estuary (see Table 11).

Additionally, the premises, including the proposed irrigation areas, is located entirely within the EPP. Water Services (South West) have advised that there is an emerging trend of increased N and P with ongoing contamination into the Harvey River, which is located within the EPP. See sections 5 and 7.3 for further information. River health surveys carried out by Aquatic Science Branch of DWER showed that the Harvey River downstream of the premises has significantly degraded water quality and ecological condition compared to upstream; suggesting that the premises may be impacting the Harvey River.

Depth to groundwater at the irrigation areas is approximately 2 – 3 m.

8.4.4 Criteria for assessment

The EPP states that the environmental quality objective to be achieved and maintained in respect of the Estuary are a median load (mass) of total phosphorus flowing into the Estuary of less than 75 tonnes with the median load (mass) of total phosphorus flowing into the Estuary from the Harvey River and drains being less than 38 tonnes.

Table 20 shows applicable nutrient application loading rates as per WQPN 22.

Table 20: Nutrient application criteria for treated wastewater

Parameters	WQPN 22 Nutrient application loading rate ¹
Biochemical oxygen demand	30 kg/ha/day
Total Nitrogen	140 to 300 kg/ha/yr
Total Phosphorus	10 to 50 kg/ha/yr

¹ Nutrient application loading rates have been based on sandy to sandy loam soil texture with a significant eutrophication risk of nearby surface waters due to the premises being located within the EPP.

See Table 8 for existing licence loading limits.

Screening criteria for an assessment of site suitability for wastewater irrigation (that has been adapted from US Army Corp, 1982 and US EPA, 2006) indicates that as the Premises is within the EPP area, irrigation of pasture, crops or tree plantations with wastewater may not be suitable. However, the depth to groundwater, sandy soil texture, minimal land slope and existing agricultural land use suggest that the Premises may be suitable.

8.4.5 Licence Holder controls

The Licence Holder's controls to manage the irrigation of treated wastewater is set out in Table 21.

Table 21: Licence Holder's controls for treated wastewater irrigation (from Application)

Site infrastructure	Description
Infrastructure	<p>The following four areas are irrigated: L1, L2, L3 and L4 with L1 and L2 unable to be irrigated from 5 December 2018 due to current EPN conditions. The Licence Holder is proposing to additionally irrigate to areas L5 and L6.</p> <p>Irrigation areas L4, L5 and L6 are divided into laser levelled paddocks.</p> <p>Irrigation occurs via flood irrigation with a pipeline system bordering the periphery of the irrigation area, fitted with a series of valves.</p> <p>Flow meters are located at the WWTP, Pond 1 and Winter Dam. Flow meters are maintained as required and on an annual basis.</p> <p>Runoff of irrigated wastewater is prevented through bunding the perimeter of each paddock (except L3).</p>
Procedures Management /	<p>Selection of the cells within the irrigation areas and irrigation rate is undertaken manually by an operator who also manually changes the two inch ball valves of the cell(s) to be flooded.</p> <p>Cattle are grazed within the paddocks of the irrigation areas containing pasture; however, the pasture grasses are not manually harvested.</p> <p>During wet periods, irrigation is deferred and treated wastewater retained within either Pond 1 (capacity of 6,000 kL) or the Winter Dam (capacity of 8,000 kL).</p> <p>Wastewater is distributed evenly over the irrigated areas with irrigation bays used on a schedule across the field with the same amount of irrigation time on each bay.</p> <p>Irrigation occurs only within the designated irrigation areas.</p> <p>A 30 m buffer zone is maintained between watercourses and irrigation areas.</p> <p>A minimum 300 mm freeboard is maintained on the storage ponds to ensure unwanted overflow of treated wastewater does not occur.</p> <p>Vegetation cover is maintained over the irrigation area except for L3 where no vegetation is maintained between the orange tree rows.</p> <p>Irrigation on visibly waterlogged land will be avoided.</p> <p>Irrigation is managed to prevent the occurrence of soil erosion.</p> <p>Uncontrolled loss of wastewater from treatment plants and associated operations will be</p>

Site infrastructure	Description
	<p>prevented.</p> <p>Desludging of Pond 1 will occur in 2019 to increase holding capacity.</p> <p>Implement a water reduction program to reduce water use by 25% by the end of 2019:</p> <ul style="list-style-type: none"> • Water reduction measures include: guns and hoses, stormwater to DAF reduction, turning off package washing showers solenoid installation, homegeniser seal lubrication, condensate recovery program and environmental training on water usage. Water reduction measures will not result in an overall decrease in wastewater to be irrigated, with expected throughputs are still predicted to increase to 1,100m³/day as a result of increased production.
Monitoring	<p>As stated in the NIMP, the Licence Holder has committed to the following monitoring:</p> <ul style="list-style-type: none"> • Continue existing surface water monitoring at WQ1 and WQ2, and include an additional surface water monitoring location, WQ3 (see Figure 6). Surface water will be monitored for pH, EC, OC, TN and TP on a six monthly basis; • Continue existing soil sampling at locations S1 to S6 and include an additional two locations (S7 and S8); one in each of the proposed irrigation areas (see Figure 6). Soil sampling will be monitored for pH and EC on an annual basis; and • Continue existing treated wastewater quality monitoring within Pond 1 or the Winter Dam (whichever one is sourced for irrigation) for pH, TDS, TSS, BOD, TN, TP and EC on a monthly basis.

The NIMP commits to implementing the following improvements in the future for managing irrigation of wastewater; however, these have not been considered by DWER as timeframes and detailed information has not been provided on how these commitments will be achieved. Note that some future commitments may require prior approval and/or assessment by DWER.

- Reduce TN and TP concentrations in wastewater to 5 mg/L and 3 mg/L respectively. With TP to be reduced through increasing ferric dosing rates (that currently occurs 5 to 7 days a week);
- seeking expert advice to continue to improve the quality of treated wastewater;
- Lease additional land (approximately 41.5 ha) to irrigate wastewater in the short term at current production rates (or approximately 56.5 ha to increase production rates by approximately 9%); and
- Construction of an additional storage pond with approximate capacity of 8,000 m³.

8.4.6 Key findings

The Delegated Officer has reviewed the information regarding the discharge of treated wastewater to land (irrigation) – nutrient loading impact analysis and has found:

1. The Licence Holder has exceeded the relevant annual gross nutrient loading rate limits in the Existing Licence in 3 reporting periods for TN and all reporting periods for TP over the last 7 reporting periods. Nutrient loading rates for TP have been up to 88 times higher than the limits specified in the Existing Licence.
2. Irrigation of treated wastewater to areas L1 and L2 is not allowed under the EPN.
3. Treated wastewater quality appears to be inconsistent from January 2017 to January 2019 when compared to results from August 2014 to December 2016.
4. Downstream surface water quality results are generally higher than upstream surface water quality results, with the most significant differences occurring in 2017.
5. Soil monitoring indicates that TN and TP may be leaching below the root zone for the plants in irrigation area L4 and therefore, potentially impacting on groundwater.
6. The Licence Holder has indicated in the application that soil samples were taken

from the proposed irrigation areas; however, the results of this sampling has not been included in the application. It is noted that soil sampling results for location SS was included in Appendix B of the application; however, there is no indication of the physical location of this sampling site.

7. It is noted that there is only one, at maximum two, soil sampling sites within each irrigation area; therefore, soil sampling results to date may not give an accurate indication of what is occurring onsite.
8. Preliminary assessment of nutrient loading rates at the premises shows that the irrigation area (L3 – L6) is not a large enough area to manage the nutrient application rates for TN and TP.
9. Screening criteria for an assessment of site suitability for wastewater irrigation (US Army Corp, 1982 and US EPA, 2006) indicates that as the premises is within the EPP, the irrigation of pasture, crops or tree plantations with wastewater may not be suitable. However, the depth to groundwater, sandy soil texture, minimal land slope and existing agricultural land use suggest that the premises may be suitable.
10. River health surveys carried out by Aquatic Science Branch of DWER showed that the Harvey River downstream of the Premises has significantly degraded water quality and ecological condition compared to upstream of the Premises.

8.4.7 Consequence

Based on the treated wastewater quality and volume irrigated, preliminary assessment of nutrient loading rates, applicant controls, groundwater and agricultural drain line use for cropping and stock watering and that the Premises is within the EPP, the Delegated Officer has determined that there will be mid-level impacts at a local scale. Therefore the Delegated Officer considers the consequence to be **Major**.

8.4.8 Likelihood of Risk Event

Based upon the irrigation area available, proximity to receptors, soil type, soil monitoring results, current treated water quality, volume irrigated and compliance history in regards to nutrient loading rate limits the Delegated Officer has determined that mid level impacts at a local scale will probably occur in most circumstances as the irrigation has not appeared to be managed appropriately. Therefore, the Delegated Officer considers the likelihood to be **Likely**.

8.4.9 Overall rating of Risk Event

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 14) and determined that the overall rating of the risk of treated wastewater irrigated impacting on receptors is **High** and subject to regulatory controls.

8.5 Risk Assessment – Discharge of treated wastewater to land (irrigation) – hydraulic loading impact analysis

8.5.1 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 plant root zone into groundwater and/or waterlogging and overland flow of treated wastewater into adjacent agricultural drains causing surface water and groundwater contamination and affecting ecosystem health.

8.5.2 Identification and general characterisation of emission

Common contaminants in wastewaters from milk and juice processing facilities include high concentrations of organic matter (expressed as chemical oxygen demand (COD) or biochemical

oxygen demand (BOD)), nutrients (particularly nitrogen and phosphorus), fats, oils and grease, total dissolved solids (Dairy Australia, 2017), and cleaning agents (from Application).

Wastewater generated from the milk and juice processing facilities is combined and then directed through solids removal followed by a DAF plant and dual SBR system before being stored in either Pond 1 or the Winter Dam until it is used to irrigate pasture and an orange orchard on the premises.

Pond 1 has a total volumetric holding capacity of 6,000 kL. The Winter Dam has two compartments, with each having a capacity of 4,000 kL; therefore, the Winter Dam has a total volumetric holding capacity of 8,000 kL. Irrigation is either from Pond 1 or the Winter Dam (with Harvey Fresh also having the ability to irrigate directly from the outlet of the WWTP) to irrigation areas that total 93.5 ha (including existing irrigation areas L3 – L4 and proposed irrigation areas L5 – L6). Irrigation to irrigation areas L1 and L2 is not permitted under the EPN.

The irrigation area is fairly flat, with a slope of approximately 0.88% across irrigation areas L3, L4 and L6 and a slope ranging from 0.81% to 1.16% across irrigation area L5, sloping east to west.

A significant physical constraint for siting a wastewater irrigation scheme is ensuring that the area of land selected is sufficiently large enough to enable the wastewater and its dissolved constituents to be taken up by vegetation or retained within the soil profile without excessive seepage into groundwater. A preliminary assessment of the wastewater hydraulic loading at the site can be determined as follows (US EPA, 2006):

$$F = 3.65 \frac{Q}{LP} \text{ (metric)}$$

Where:

- F = field area, ha (acres)
- Q = average flow, m³/d (mgd)
- L = loading rate, cm/wk (in/wk)
- P = period of application, wk/yr
- 3.65 = metric conversion factor =

$$0.0001 \frac{\text{ha} \cdot \text{m}}{\text{m}^3 / \text{d}} \times \frac{100 \text{ cm} \times 365 \text{ days}}{\text{year}} \times 1/\text{m}$$

The land area required for irrigation was calculated using the above calculation and the following assumptions:

- a maximum irrigation amount of 401.5 ML (therefore, irrigation rate is based on approximately 1,640 kL/day, assuming that the total amount is irrigated within 35 weeks of the year), which includes the 9% increase in production);
- generic loading rate of 3.8 cm/week for pasture and 2.5 cm/week for tree plantations (US EPA, 2006); and
- the period each year (P) when irrigation can be carried out at the Premises is assumed to be 35 weeks;

It should be noted that although the Licence Holder provided a water balance for the site, the Delegated Officer noted the following issues which suggest that it would not be suitable for input into the above calculation:

- the water balance was based on actual irrigation volumes from August 2017 to July 2018 and not the estimated 1,100 kL/day (401.5 ML/year);
- the water balance included irrigation areas L1 and L2, however, these are unable to be irrigated due to the current EPN;

- the water balance included additional treated wastewater storage ponds although, details relating to the design and construction of the ponds has not been included as part of this Application and no works approval application has been submitted, therefore these ponds cannot be used in the assessment; and
- formulas / calculations were not included to show how the water balance was estimated.

Therefore, DWER has calculated a water balance based on the maximum irrigation volume of 401.5 ML/year, an irrigation area of 93.5 ha, an assumed design percolation rate of 5 mm/week to remove salt in the root zone, precipitation data (1951 to 2019) from the Bureau of Meteorology, evaporation data from the Department of Primary Industries and Regional Development, and a generic crop factor of 1.0 for pasture and 0.7 for citrus (these are the same crop factors that have been used by the Licence Holder). The water balance indicated that inputs (precipitation and irrigation) exceed outputs (evapotranspiration and percolation to remove salt) for 4 months of the year indicating that wastewater should be stored during this time and irrigation only occur during the remaining 8 months (35 weeks) of the year.

Based on the above assumptions, the land area required for irrigation is calculated to be approximately 45 ha for pasture and 68 ha for the orange orchard; therefore, a combined area of approximately 56.7 ha. As the current and proposed irrigation area totals 93.5 ha, the hydraulic loading rate is not a limiting factor for irrigation at the Premises.

However, it is noted that the Licence Holder currently irrigate for 12 months of the year (rather than 35 weeks as assumed above). Based on the above water balance, which suggests that inputs (precipitation and irrigation) exceed outputs (evapotranspiration and percolation to remove salt) for 4 months of the year, there is potential for treated wastewater to be infiltrating past the crop root zone into groundwater and/or waterlogging, and overland flow of treated wastewater into adjacent agricultural drains causing surface water and groundwater contamination and affecting ecosystem health for 4 months of the year (May to August). The River Health survey (see section 8.4.3) suggests that this may be occurring.

8.5.3 Description of potential adverse impact 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.

8.5.4 Criteria for assessment

The Delegated Officer has had regard to NSW EPA, 1998 and US EPA, 2006 documents. These guidelines are considered appropriate and present a conservative approach to water balance calculations.

8.5.5 Licence Holder controls

The Licence Holder's controls to manage irrigation, including hydraulic loading, are as set out previously in Table 21 above.

8.5.6 Key findings

The Delegated Officer has reviewed the information regarding the discharge of treated wastewater to land (irrigation) – hydraulic loading impact analysis and has found:

1. The combined rate of treated wastewater irrigation and rainfall to the irrigation areas L3 – L6 exceeds the hydraulic outputs (evapotranspiration and percolation) from May to August. Treated wastewater applied during this time may infiltrate past the root zone into groundwater.

2. The current storage ponds onsite (Pond 1 (6, 000 kL) and the Winter Dam (8,000 kL)) only have capacity for approximately 12 days storage (based on a maximum rate of 1,100 kL/day).
3. Groundwater beneath the Premises and surface water adjacent to the Premises may be contaminated by elevated concentrations of nitrogen and phosphorus which could be discharged as base flow and surface water flow into agricultural drains immediately adjacent to the Premises, including the Harvey River Main Drain which in turn discharges into the Harvey Estuary.
4. Screening criteria for an assessment of site suitability for wastewater irrigation (US Army Corp, 1982 and US EPA, 2006) indicates that as the Premises is within the EPP, the irrigation of pasture, crops or tree plantations with wastewater may not be suitable.
5. River health surveys carried out by Aquatic Science Branch of DWER showed that the Harvey River downstream of the Premises has significantly degraded water quality and ecological condition compared to upstream.

8.5.7 Consequence

Given the depth to groundwater (see Table 11), the potential for treated wastewater to be discharged to groundwater and/or adjacent agricultural drains and the location of the premises within the EPP, the Delegated Officer has determined that excess runoff and potential pollution of groundwater and surface water could occur on a scale that includes mid and low level off-site impacts at a local and wider scale respectively. Therefore, the Delegated Officer considers the consequence to be **Major**.

8.5.8 Likelihood of Risk Event

Based upon the irrigation area available, climate data, the amount and quality of wastewater for disposal and compliance history in regards to nutrient loading rate limits, the Delegated Officer has determined that the likelihood of on and off site impacts at a mid and low level respectively will probably occur in most circumstances. Therefore the Delegated Officer considers the consequence to be **Likely**.

8.5.9 Overall rating of Risk Event

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 14) and determined that the overall rating for the risk of an excess hydraulic loading of treated wastewater on receptors during operation is **High** and subject to regulatory controls.

8.6 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 22 below. Controls are described further in section 0.

Table 22: Risk assessment summary

	Description of Risk Event			Licence Holder	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway and Receptor			
1.	Wastewater to land with excessive contaminants (including increase in volume of wastewater)	Onsite disposal of treated wastewater via existing irrigation areas L3 – L4 and proposed irrigation areas L5 – L6.	Direct discharge to land. Discharge to existing drainage network from overland flows.	Infrastructure controls	High	Risk event is tolerable and is subject to regulatory controls.
2.	Wastewater to land with excessive hydraulic loading (including increase in volume of wastewater)	Increased efficiency in milk processing operations.	Infiltration to groundwater.	Management controls (NIMP)	High	Risk event is tolerable and is subject to regulatory controls.

9. Regulatory controls – Amended Licence controls for management of discharge of treated wastewater to land (irrigation)

9.1 Existing Licence Conditions

9.1.1 Treated wastewater discharge management

The following Existing Licence conditions relate to the management of the irrigation of wastewater at the Premises:

Existing Licence condition 1.3.7 (Revised Condition 7) requires the Licence Holder to manage the irrigation of treated wastewater such that:

- (i) *bunding/cut-off drains are maintained adjacent to treated wastewater irrigation areas to prevent runoff;*
- (ii) *no irrigation generated run-off, spray drift or discharge occurs beyond the boundary of the Premises;*
- (iii) *treated wastewater is evenly distributed over the irrigation area;*
- (iv) *no soil erosion occurs;*
- (v) *irrigation does not occur on land that is waterlogged; and*
- (vi) *vegetation cover is maintained over the irrigation area.*

Existing Licence condition 1.3.8 requires the Licence Holder to:

Operate the Premises and apply waste to land in accordance with the document prepared by the Licensee entitled “Harvey Fresh – Nutrient and Irrigation Management Plan, Revision number 4” and dated September 2012.

The Licence Holder has submitted a revised NIMP, dated January 2019, with the licence amendment application and a further revised NIMP, dated May 2019, with comments on the draft amended licence; however, assumptions made within the NIMP (see Table 23) are not reflective of current operations onsite, or what is proposed to occur in the near future. Given that the 2012 NIMP is no longer current and the January 2019 NIMP does not reflect current practices onsite, this Existing Condition will be removed from the Licence.

Table 23: January 2019 NIMP – assumptions and current operations

Assumptions made within the January 2019 NIMP	Current operations onsite
Total of 16,000 m ³ available for storage of treated wastewater	Only Pond 1 and the Winter Dam, total of 14,000 m ³ , is currently available for the storage of treated wastewater.
Irrigation areas L1 – L6 are available for the disposal of treated wastewater to land	The EPN restricts the irrigation of treated wastewater to only allow irrigation to areas L3 and L4. This Licence amendment is to include proposed areas L5 and L6.
there will be a 25% reduction in water usage	While the NIMP does include strategies on how water usage may be reduced, and DWER acknowledges that the volume of wastewater irrigated has decreased over the last three reporting periods (hence it is assumed less water was used) it is unknown if water usage is able to be reduced by 25%, particularly given that the Licence Holder is requesting an increase in production of 9%.
Treated wastewater quality of 5 mg/L for TN and 3 mg/L for TP will be achieved	Current treated wastewater quality for March 2017 to July 2018 is shown in Table 17. The average treated wastewater quality during this time is 74 mg/L for TN and 30 mg/L for TP. It is acknowledged that results from December 2018 and March 2019 show an average of 20.1 mg/L for TN and 3.1 mg/L for TP; however, this is still above the quality proposed.

9.1.2 Emissions to land and Premises description

Existing Licence condition 2.2.1 (Revised condition 7) requires the Licence Holder to:

Ensure that where waste is emitted to land from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emissions to land		
Emission point reference and location on Map of emission points	Description	Source including abatement
L1, L2, L3 and L4	Discharge to on-site irrigation area	Treated wastewater via DAF and SBR

The EPN that was served on the Licence Holder on 5 December 2018, includes a condition to cease all discharge of wastewater to irrigation areas L1 and L2 to prevent further use of nutrient saturated emission areas. Therefore, Existing Licence condition 2.2.1 will be amended to remove irrigation areas L1 and L2.

This Decision Report has assessed the risk of discharge of treated wastewater to land (irrigation), which includes the proposed areas L5 and L6. The Delegated Officer determined that the overall rating of the risk of treated wastewater irrigated impacting on receptors, in terms of nutrient and hydraulic loading, is high and medium respectively, and subject to regulatory controls as outlined in this Decision Report.

The Licence Holder has provided lease agreements to show that they have legal access to the

proposed irrigation areas. It is noted that the lease agreement for proposed irrigation area L5 (Lot 190 on Plan 202110 and Lots 33, 34, 35 and 36 on Plan 205324) is valid until 31 July 2019; and the lease agreement for proposed irrigation area L6 (Lot 401 on Deposited Plan 52503) is valid until 31 December 2019; however, the Licence Holder has advised that both leases are able to be extended.

The Amended Licence (Condition 7) allows for the irrigation of treated wastewater to areas L5 and L6, subject to conditions in the Amended Licence, which include restricting the months when irrigation can take place (see section 9.2.1) for irrigation area L6 and increasing soil and surface water quality monitoring and requiring the Licence Holder to monitor groundwater (see sections 9.1.4, 9.1.5, 9.2.2 and 9.2.3). The Premises description and Premises Plan have been updated to include the proposed irrigation areas L5 and L6.

9.1.3 Emission limits to land

Existing Licence condition 2.2.2 requires the Licence Holder to:

Not cause or allow emissions to land greater than the limits listed in Table 2.2.2.

Table 2.2.2: Emission limits to land				
Emission reference	point	Parameter	Limit (including units)	Averaging period
L1 – L4		Total nitrogen	250 kg/ha	Annual
		BOD	30 kg/ha	Daily
L1 – L2		Total phosphorus	9 kg/ha	Annual
L3 – L4		Total phosphorus	30 kg/ha	Annual

The Existing Licence was amended in October 2015 to increase the nutrient loading rate limits for the orange orchard irrigation areas, L3 and L4, from 9 kg/ha/yr to 30 kg/ha/yr. However, the Licence Holder has advised DWER that only L3 is an orange orchard and L4 has remained as pasture. Therefore, the Licence Holder is requesting the nutrient loading rate limits for irrigation area L4 to return to the 9 kg/ha/yr nutrient loading rate limit. As irrigation area L4 is not intended to be an orange orchard, the Delegated Officer has determined that the nutrient loading rate limit for L4 will return to 9 kg/ha/yr.

Proposed irrigation areas L5 and L6 will be added to Revised Condition 8 and as they include pasture, the same as L4. Therefore the loading limits will be the same as for irrigation area L4. This also aligns with condition 1.3 of the EPN.

Monthly loading rates were also added to Revised Condition 8 and were based on irrigation over 12 months of the year for L3 to L5 and irrigation over 8 months for L6. The Delegated Officer considers the inclusion of monthly loading rates necessary to ensure that wastewater is irrigated as evenly as possible throughout the irrigation period for each irrigation area; however, following comments from the Licence Holder (see Appendix 2) these monthly loading rates have been removed at this time.

9.1.4 Soil quality monitoring

Table 3.3.2 of Existing Licence condition 3.3.1 require the Licence Holder to monitor ambient soil quality on an annual basis at 6 locations across the irrigation area with no specified depth for the sample to be taken from. The samples are required to be analysed for pH and electrical conductivity.

As soil sampling has only been conducted at one (unknown) depth, it is unknown whether nutrients are leaching through the soil profile. Additionally, only 6 locations within the current 67.7 ha irrigation area (L1 – L4) are sampled.

Soil sampling in June 2018 was conducted at all six locations at three depths, 0.3 m, 0.5 m and 1 m below ground level and were analysed for additional parameters including total phosphorus

and total nitrogen. The soil sampling results show that TP and TN are significantly higher at S3 (irrigation area L3) than the other sampling locations. TN results for S3 at 0.3 m are up to 4 times higher and at 0.5 m up to 12 times higher than the other sampling locations. TP results for S3 at 0.3 m are up to 9 times higher and at 0.5 m up to 21 times higher than the other sampling locations. See section 6.4 for further information.

Revised condition 10 has been included in the Licence, to replace Existing Table 3.3.2, to require the Licence Holder to monitor soil quality at 22 sites across the irrigation areas (L3 – L6) and past irrigation areas (L1 – L2) for pH and electrical conductivity and the following additional parameters: moisture content, TN, nitrate nitrogen, ammonium nitrogen, phosphorus (Colwell), phosphorus buffering index, saturated hydraulic conductivity and exchangeable sodium percentage. These parameters have been added as soil monitoring parameters guidance provided in the Environmental Guidelines – *Use of Effluent by Irrigation* (NSW DEC, 2003).

The Licence Holder will be required to monitor these parameters at the following soil profile depths: 0-10 cm, 10 – 30 cm, 30 – 60 cm and 60 – 100 cm or until the duplex clay layer is encountered. These soil profile depths have been added to determine whether nutrients may be leaching into the soil profile and past the root zone of the plants.

Routine sampling and testing of the required sections of the soil profile will provide results that can be compared with standard reference tables for irrigated wastewater to consider and assess the ongoing suitability of the soils to receive the wastewater and determine any future potential limitations on quantity and quality of applied wastewater.

9.1.5 Surface water quality monitoring

Table 3.3.1 of Existing Licence (condition 3.3.1) requires the Licence Holder to monitor ambient surface water quality on a six monthly basis at two locations, SE and SW of the Premises boundary. The samples are required to be analysed for pH, electrical conductivity, organic carbon, TN and TP.

Surface water sampling has not been conducted on a consistent basis with sampling been omitted 5 times in the last 5 years. As the sampling has only been conducted, at most, on a six monthly basis, seasonal variations in surface water quality are unknown.

Available surface water quality results show that downstream results are the same or higher than upstream results for all parameters, with July 2015 and October 2015 showing the largest differences (see section 6.3). However, WQ1 may be influenced by previous irrigation at L1 and L2 as it is downstream of a drain from these former irrigation areas.

Revised condition 12 has been included in the Licence, to replace Existing Table 3.3.1, to require the Licence Holder to monitor surface water quality at 6 locations around the Premises and irrigation areas. WQ1 has been moved upstream of a drain that flows from the Premises, which should a more accurate upstream The Licence Holder committed to monitoring at location WQ3, therefore it has been added to the Licence. Additional monitoring locations WQ4 and WQ6 are also required by the EPN. Additional monitoring location WQ5 has been chosen as an upstream location from the proposed irrigation area L6.

The samples will be analysed, as per the Existing Licence, for pH, electrical conductivity, organic carbon, TN, TP and the following additional parameters: soluble reactive phosphorus, filterable reactive phosphorus, nitrite and nitrate and ammonium. Additionally, monitoring has been increased from six-monthly to monthly until 24 months of consecutive data is recorded, then reducing to quarterly monitoring. This will enable a better understanding of surface water quality around the Premises and should show any seasonal variations.

Routine sampling and testing of the required surface water locations will provide results that can be compared with standards to consider and assess whether the irrigation of treated wastewater at the Premises may be impacting of nearby surface water quality, and therefore, whether there may be any additional downstream impacts.

9.1.6 Category 61 - Waste acceptance and processing of accepted wastes

Wastewater from the Capel Cheese Factory has previously been received at Harvey Fresh for treatment in the wastewater treatment system. Approximately 360 kL and 318 kL was received in 2016-2017 and 2017-2018 respectively.

The Licence Holder has advised that liquid waste will no longer be received at the premises. Category 61 will be removed from the prescribed premises category table and Existing Conditions 1.3.2 and 1.3.3 will be removed as they relate to the acceptance of waste and the processing of the accepted waste and are no longer required.

9.1.7 Category 17 – increase in production

The Licence Holder has applied to increase the throughput of Category 17: milk processing from 165,000 to 180,000 tonnes per annual period. The Licence Holder has advised that this will increase the amount of wastewater produced, by approximately 9%, therefore increasing irrigation volumes from 1,000 kL/day to 1,100 kL/day.

The Licence Holder has indicated that wastewater volumes will decrease due to no longer accepting liquid waste at the site; however, the volumes accepted were minimal (approximately 1% of wastewater received) and are not considered to significantly reduce the amount of wastewater requiring on-site disposal.

This Decision Report has assessed the risk of discharge of treated wastewater to land (irrigation) (see sections 8.4 and 8.5) using the increased irrigation volume of 1,100 kL/day. The Delegated Officer determined that the overall rating of the risk of treated wastewater irrigated impacting on receptors, in terms of nutrient and hydraulic loading, is high and medium respectively, and subject to regulatory controls as outlined in this Decision Report.

The Amended Licence allows for this increase in production, subject to conditions in the Amended Licence, which include restricting the months when irrigation can take place (see section 9.2.1), increasing soil and surface water quality monitoring and requiring the Licence Holder to monitor groundwater (see sections 9.1.4, 9.1.5, 9.2.2 and 9.2.3).

Following a meeting with the Licence Holder on 29 May 2019, the Delegated Officer agreed that winter irrigation will only be restricted for irrigation area L6 (see Appendix 2); however, increased soil and surface water quality monitoring is still required and groundwater monitoring is required within 30 days of each groundwater monitoring bore being installed. Additionally, the Licence Holder is still required to comply with yearly and monthly nutrient loading limits.

9.2 Additional Regulatory Controls (Licence conditions)

9.2.1 Discharge of treated wastewater to the Irrigation Areas

The draft Amended Licence included a condition that was added to the Licence to restrict the irrigation of treated wastewater to the months of September, October, November, December, January, February, March and April for irrigation areas L3 – L6.

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 (with an increase of 9% production), and additional areas available for irrigation (including the proposed L5 and L6 areas), and considers there is a risk of nutrients being leached to surface and groundwater if irrigation occurs during the winter months when soils are already saturated.

The site soils, quality and beneficial uses of groundwater and surface water in the area, location of the Premises (being in the EPP) 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 Licence Holder provided a water balance with their application; however, the Delegated Officer noted that assumptions used in the water balance were not suitable and recalculated the

water balance using a number of factors outlined in Section 8.5.

The recalculated water balance indicates that inputs (precipitation and irrigation) exceed outputs (evapotranspiration and percolation to remove salt) from May to August indicating that wastewater should be stored during this time and irrigation should only occur from September to April. The Licence Holder currently irrigates 12 months of the year and there is a risk that contaminants in the wastewater that is irrigated during May to August may infiltrate past the crop root zone into groundwater and/or cause waterlogging and overland flow into adjacent agricultural drains causing surface water and groundwater contamination affecting ecosystem health. River health surveys (see section 8.4.3) suggest that the premises may already be impacting the Harvey River.

Groundwater quality at the premises is fresh to brackish with depth to groundwater at the Premises being approximately 2 to 3 m. Drains, used for agricultural purposes, are located adjacent and within the Premises boundary (see Table 11). A minor, non-perennial watercourse is located through the proposed irrigation area L6 and drains into an existing agricultural drain that flows E to W through the premises. The Harvey Main Drain is located immediately south of the premises boundary and the whole of the Premises (including the proposed irrigation areas) is located entirely within the EPP with the Premises being identified as being in a high risk nutrient export area requiring a significant phosphorus load reduction (see Table 11).

Condition 7 was added to the draft Amended Licence to restrict the irrigation of treated wastewater to the irrigation areas L3 – L6 from September to April inclusive. The implication of the condition is such that wastewater generated between May and September would have to be stored in the wastewater storage pond and/or removed from the Premises. The Application did not include any soil moisture management strategies.

The Delegated Officer has considered comments made by the Licence Holder during a meeting on 29 May 2019 and in response to the draft Amended Licence (see Appendix 2), and has determined that condition 7 will be amended to only apply to irrigation area L6. See reasoning in Appendix 2.

9.2.2 Installation of groundwater monitoring bores

The Licence Holder will be required to install at least four new groundwater monitoring bores east and west of irrigation area L5 and at least three new groundwater monitoring bores to be sited in accordance with WQPN 30 *Groundwater Monitoring Bores* (DoW, 2006) up and down hydraulic gradient of irrigation areas L3, L4 and L6. The new groundwater monitoring bores must be installed to meet the requirements of *Minimum Construction Requirements for Water Bores in Australia* (NUDLC, 2012) including the recording and submission of bore logs.

The new groundwater bores for the monitoring of irrigation of area L5 must be sited in accordance with the Groundwater monitoring bores general locations map within Schedule 1 of the Amended Licence.

The new groundwater monitoring bores for the monitoring of irrigation areas L3, L4 and L6 must include one up hydraulic gradient of irrigation areas L3, L4 and L6 and the others down hydraulic gradient of irrigation areas L3, L4 and L6. These bores are to 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.

Grounds: The irrigation of nutrient rich treated wastewater has potential risk for contamination of groundwater if not managed appropriately. The Licence Holder included a NIMP with their application which included an N and P balance. Even though the N and P balance in the NIMP shows that the existing loading rates in the Existing Licence may be complied with, the Licence Holder did not take into account an increase in the amount of wastewater irrigated, used N and P concentrations that are significantly less than N and P that has been measured between March 2017 and July 2018, and it does not take into account reintroduction of nutrients to soil from livestock that graze over the irrigation area. Additionally, the Licence Holder has exceeded

relevant annual nutrient loading rate limits as specified in the Licence. The water balance calculated by DWER indicates that irrigation should only occur 8 months of the year; however, the Licence Holder irrigates all year round and the preliminary assessment of nutrient loading rates also indicates that there may be overloading of nutrients at the Premises. Therefore, there is potential for nutrients to be infiltrating past the crop root zone.

The requirement to install new groundwater monitoring bores is necessary to establish and monitor the potential input of nutrients and contaminants from the current and proposed irrigation areas 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.

A groundwater monitoring bores general locations map has been added to Schedule 1: Maps of the Amended Licence.

9.2.3 Monitoring of groundwater

The Licence Holder will be 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, TN, TP, reactive phosphorus, ammonium-nitrogen, nitrate-nitrogen, total dissolved solids, BOD, EC and major ions (sodium, potassium, magnesium, chloride, sulphate and bicarbonate).

Grounds: The Delegated Officer considers that irrigation of treated wastewater on the Premises may impact groundwater and surface water quality if discharge to land is not conducted in a controlled manner. Groundwater is approximately 2 to 3 m below ground level and agricultural drains are located immediately adjacent and through the irrigation areas. Additionally, the Premises is entirely located within the EPP where irrigation of wastewater may not be suitable (see section 8.4.4). Monthly monitoring of standing water levels is required for the first two years, reducing to quarterly in the third year, to establish 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 groundwater quality to be identified and allow comparison against suitably sited up gradient bore (MB01) and the two down gradient bores (MB02 and MB03). 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 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. Transfer to New Format Licence and Notice of Amendment

For the Licence Amendment, DWER has included changes that were authorised under the Notice of Amendment to extend the expiry date of the Licence (April 2016). The Amended Licence has been issued in a new format with existing conditions being transferred, but not reassessed, to the new format. Therefore, numbering, wording and format of existing conditions may have changed, but the intent remains the same. Additional changes, as proposed by the Licence Holder for this Licence Amendment, are detailed within this Decision Report, but not included in Table 24 below.

Table 24: Conditions map

Existing Licence condition	Licence Amendment condition	Description
Expiry date: 30 September 2017	Expiry date: 30 September 2031	On 29 April 2016, a Notice of Amendment to extend the expiry date of Licences was issued. The Harvey Fresh licence, L4404/1991/15, was extended from 30 September 2017 to 30 September 2031.
1.1.3	-	Reference to Australian or other standards This condition has been removed from the licence as it is not required. Australian Standards are specified within the monitoring conditions and defined within the definitions of the licence.
1.1.4	-	Reference to a guideline or code of practice This condition has been removed from the licence as it is not required. No guides or codes of practices are referenced within the licence.
1.1.5	1, Table 2	Authorised emissions This condition has been removed from the licence as it is not required. Emissions are authorised within Condition 1 of the Amended licence.
1.2.1	-	Pollution control and monitoring equipment This condition has been removed from the licence as it is not required. Condition 6 of the Amended Licence specifies infrastructure and equipment that must be maintained in good working order and operated in accordance with the corresponding operational requirements.
1.2.2	-	Spills of environmentally hazardous materials This condition has been removed from the licence as it is not required. Spills can be managed under the general provisions of the EP Act and associated regulations.
1.2.3	-	Stormwater This condition has been removed from the licence as it is not required. Potentially contaminated stormwater can be managed under the general provisions of the EP Act and associated regulations.
1.3.1, 2.1.1	-	Investigation of exceedance of limit These conditions have been removed they are not required. Condition 18 of the Amended Licence requires the Licence Holder to report on the exceedance of limits within the licence.
1.3.4 and Table 1.3.3	6, Table 4	Containment infrastructure Information in Existing condition 1.3.4 has been included in Revised Condition 6, Table 4.
1.3.5	6, Table 4	Wastewater storage pond management Existing Condition 1.3.5 has been included in Revised condition 6, Table 4.
1.3.6	6, Table 4	Uncontrolled loss of wastewater Existing Condition 1.3.6 has been included in Revised condition 6, Table 4.
1.3.7	7	Irrigation of treated wastewater management Existing Condition 1.3.7 has been included in Revised condition 7.
3.1.1	9, 10, 11, 12 and 15	Australian standards and NATA accreditation Information with Existing Licence condition 3.1.1 has been included in Amended Licence conditions 9, 10, 11, 12 and 15.

Existing Licence condition	Licence Amendment condition	Description
3.1.2	13	Monitoring frequency Existing Licence Condition 3.1.2 has been transferred to Amended Licence Condition 13.
3.1.3	-	Recording of process parameters This condition has been removed from the licence as it is not required. The Licence Holder is required to report on throughputs for each Category in the AACR and all monitoring data is required to be reported in the AER.
3.1.4 and 3.1.5	-	Calibration of monitoring equipment These conditions have been removed as they are not required nor enforceable.
3.2.1 and Table 3.2.1	9, Table 7	Monitoring of emissions to land Existing Licence condition 3.2.1 has been transferred to Amended Licence condition 9, Table 7.
4.1.1	15	Records Existing Licence condition 4.1.1 has been transferred to Amended Licence condition 15.
4.1.2	-	Awareness of conditions of Licence This condition has been removed from the Licence as it is not required.
4.1.3	17	Annual Audit Compliance Report Existing Licence condition 4.1.3 has been transferred to Amended Licence condition 17.
4.1.4	16	Complaints management system Existing Licence condition 4.1.4 has been transferred to Amended Licence condition 16.
4.2.1 and Table 4.2.1, 4.2.2	18	Annual Environmental Report Existing Licence condition 4.2.1 and 4.2.2 have been transferred to Amended Licence condition 18.
4.3.1 and Table 4.3.1	19	Notification requirements Existing Licence condition 4.3.1 has been transferred to Amended Licence condition 19.
Schedule 1 Maps – Map of emission points	Schedule 1, Irrigation Areas	Map of Emission points has been replaced by the Irrigation Areas map in the Amended Licence.
Schedule 1 Maps – Map of monitoring locations	Schedule 1, Soil monitoring locations and Surface water monitoring locations	Map of monitoring locations has been replaced by Soil monitoring locations and Surface water monitoring locations maps.
Schedule 2: Reporting & Notification Forms – AACR Form	-	This form has been removed from the licence as it is not required. The AACR approved form can be found on the DWER website.
Schedule 2: Reporting & Notification Forms – LR1 Form		This form has been removed from the licence as it is not required.

11. Licence Holder's comments

The Licence Holder was provided with a draft Amended Licence on 14 May 2019. A meeting to discuss the draft decision was held with the Licence Holder on 29 May 2019. Written comments and further requested information on the draft Amended Licence was received on 30 May 2019.

The Licence Holder was provided with a revised draft Amended Licence on 31 May 2019. Comments were received via telephone on 4 June 2019 (see Appendix 2) and a further revised draft was provided to the Licence Holder on 4 June 2019.

The Licence Holder waived the remaining consultation period on 5 June 2019 with no further comments on the draft amended licence or decision report.

Comments from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

12. Conclusion

This assessment of the risks of the discharge of treated wastewater to the irrigation area, including proposed areas L5 and L6, removal of Category 61, increase the approved premises production capacity for Category 17 and decreasing the total phosphorus loading limits for irrigation area L4, 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).

Based on this assessment, it has been determined that the Amended Licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Caron Goodbourn
Manager, Process Industries
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Licence L4404/1991/15 – Harvey Fresh Juice and Dairy Factories	Existing Licence	accessed at www.dwer.wa.gov.au
2.	<i>Notice of Amendment of Licence expiry dates, Section 59B(9) and Section 59(1)(k) Environmental Protection Act 1986, Licensed Prescribed Premises, 29 April 2016</i>		accessed at www.dwer.wa.gov.au
3.	Licence amendment application and supporting information, 11 December 2018		DWER records (A1747535)
4.	Resubmitted licence amendment application and supporting information for licence amendment, 11 January 2019	Application	DWER records (A1755183)
5.	<i>Harvey Fresh – Nutrient Irrigation Management Plan</i> , Parmalat, Harvey Fresh, prepared for Harvey Fresh by 360 Environmental, January 2019	NIMP	DWER records (A1755183)
6.	Internal comments on application from Department of Water and Environmental Regulation, Water Services, received 11 March 2019	DWER, 2019	DWER records (DWERDT141887)
7.	Harvey Fresh (1994) Ltd, 1 August 2016 to 31 July 2017 Annual Environmental Report and Annual Audit Compliance Report, received 29 September 2017 with clarification email received 17 November 2017		DWER records (A1535885 and A1564928)
8.	Harvey Fresh (1994) Ltd, 1 August 2017 to 31 July 2018 Annual Environmental Report and Annual Audit Compliance Report, received 24 August 2018 and amended 7 September 2018		DWER records (A1714102 and A1718266)
9.	Environmental Protection Notice 2009 and October 2013 revoke		DWER records (A1686676 and A690079)
10.	Environmental Protection Notice, Reference No. DWERDG672/18, 5 December 2018		DWER records (A1745534)
11.	Perth Groundwater Map		accessed at https://maps.water.wa.gov.au
12.	Water Information Reporting		accessed at http://wir.water.wa.gov.au
13.	Bureau of Meteorology – Climate data online		accessed at www.bom.gov.au
14.	Dairy Australia, <i>Anaerobic Digestion as a Treatment and Energy Recovery Technology for Dairy Processing Waste Streams</i> , GHD, June 2017	Dairy Australia, 2017	accessed at: https://manufacturing.dairyaustralia.com.au/resource-library/technical-research-studies
15.	National Water Quality Management Strategy, Paper No. 4, <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> , Volume 1, The Guidelines (Chapters 1 – 7), Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, October 2000	ANZECC & ARMCANZ	accessed at www.waterquality.gov.au
16.	<i>Environment and Health Protection Guidelines: On-site sewage management for single households</i> , NSW EPA Technical Guidelines,	NSW EPA, 1998	available at https://www.olg.nsw.gov.au/sites/default/files/Onsite-sewage-management-guide.pdf

	1998		
17.	<i>Process Design Manual: Land Treatment of Municipal Wastewater Effluents</i> , US EPA technical guidance document, September 2006	US EPA 2006	accessed at www.epa.gov
18.	Minimum Construction Requirements for Water Bores in Australia, third edition, National Uniform Drillers Licensing Committee 2011, February 2012	NUDLC, 2012	accessed at www.water.wa.gov.au
19.	Water Quality Protection Note 30 – Groundwater Monitoring Bores, Department of Water, February 2006	WQPN 30	accessed at www.water.wa.gov.au
20.	Water Quality Protection Note 22 – Irrigation with nutrient-rich wastewater, Department of Water, July 2008	WQPN 22	accessed at www.water.wa.gov.au
21.	Environmental Guidelines – Use of Effluent by Irrigation, Department of Environment Conservation (NSW), 2003	NSW DEC, 2003	available at http://www.environment.nsw.gov.au/resources/water/effguide.pdf
22.	Resource Management Technical Report No. 65 - Evaporation Data for Western Australia, G.J. Luke, K.L. Burke, T.M. O'Brien, Department of Agriculture Western Australia (now known as the Department of Primary Industries and Regional Development), 2003	evaporation data	accessed at https://researchlibrary.agric.wa.gov.au
23.	Harvey Fresh (1994) Ltd, Soil Sampling Program prepared for Lactalis Australia, May 2019		DWER records
24.	Response to draft amended licence and draft decision report, received by DWER via e-mail from Harvey Fresh at 6:07 pm on 29 May 2019 and 9:55 am on 30 May 2019.		DWER records (DWERDT163503 and DWERDT163579)
25.	File note, internal advice from hydrogeological expert on location of groundwater monitoring bores for the irrigation of area L5, 30 May 2019	File note, May 2019	DWER records
26.	Waiver of consultation period, received via email from Harvey Fresh on 5 June 2019.		DWER records (DWERDT165398)
27.	DWER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Water and Environmental Regulation, Perth.		accessed at www.dwer.wa.gov.au
28.	DWER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Water and Environmental Regulation, Perth.		
29.	DWER, November 2016. <i>Guidance Statement: Environmental Siting</i> . Department of Water and Environmental Regulation, Perth.		
30.	DER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Water and Environmental Regulation, Perth.		
31.	DER, February 2017. <i>Guidance Statement: Decision Making</i> . Department of Water and Environmental Regulation, Perth.		

Appendix 2: Summary of applicant’s comments on risk assessment and draft conditions

Table 25: Summary of Licence Holder comments – meeting between DWER and Licence Holder on 29 May 2019

Summary of Licence Holder comments	DWER response
<p>Item A</p> <p>Irrigation area L3 (orange orchard) is not currently utilised for the irrigation of wastewater as the area is not suitable for flood irrigation, in that it is not bunded and contains orange trees that generate a higher amount of runoff than pasture. Also the quality of wastewater may not be suitable for the orange trees due to the amount of salts in the wastewater. Therefore, area L3 is currently unable to be utilised for the irrigation of treated wastewater; however the Licence Holder are investigating options to enable wastewater to be irrigated to this area.</p> <p>Due to the above, and the EPN preventing irrigation on areas L1 and L2, irrigation area L4 is the only currently available irrigation area and will reach the nutrient loading limits, as specified in the EPN, by 6 June 2019.</p> <p>Additionally, only one pond is currently available on site for the storage of treated wastewater which has a volume equivalent to approximately 8 to 10 days storage. Therefore, the Licence Holder is requesting to be able to irrigate to area L5 during the coming winter period.</p> <p>The Licence Holder confirmed its commitment to lodge a works approval for the construction of an additional storage dam, ready for commissioning before the start of the next (2020) winter season to enable wastewater to be stored over the winter period when conditions are not suitable for irrigation. The Licence Holder also advised that it was actively seeking additional irrigation areas.</p>	<p>The Delegated Officer has considered the Licence Holder’s comments in response to a condition proposed to restrict the irrigation of treated wastewater to the high rainfall months of September to April (see section 9.2.1) and provides the following response:</p> <ul style="list-style-type: none"> (a) The Delegated Officer reiterates the expectation that the Licence Holder will not find itself in a similar situation this time next year, in that it will have installed additional storage, irrigation areas and other waste efficiencies and improvements as committed to in the meeting; (b) The Licence Holder does not currently sample groundwater and only samples surface water at two locations (see section 6.3) to show whether nutrients from the irrigation of treated wastewater are being contained within the Premises; (c) Soil sampling is only conducted at an unknown depth at six locations across the existing irrigation areas (see section 6.4). Soil sampling results for 19 June 2018 show that TP increased from 0.5 m to 1 m for sampling sites S1 and S2 (within irrigation area L4). The results also show that TN increased from 0.5 m to 1 m for sampling site S2. There is also currently no soil moisture monitoring at the Premises; (d) A risk assessment has been conducted on the discharge of treated wastewater to land (irrigation) in regards to nutrient and hydraulic loading impact analysis. This risk assessment was based on a proposed increase to the quantity of wastewater irrigated, at current irrigation quality. See sections 8.4 and 8.5 for further information; (e) The Licence Holder has not provided a soil moisture monitoring and management plan to ensure that irrigation only occurs under non saturated conditions; and (f) The Licence Holder has provided additional soil sampling results (Soil Sampling Program report, dated May 2019, as part of a requirement of the EPN) that shows that irrigation area L5 is comprised of deep, loamy sand; however, advice from a hydrogeological expert within DWER (File note, May 2019) suggests that the duplex clay layer would be encountered within the western and central areas of L5 similar to that of L4 (at approximately 30 to 50 cm bgl). Therefore additional bores, surface water monitoring and soil monitoring have been added to the licence, which will seek to identify potential impacts or export of nutrient should they occur. <p>Considering that:</p>

Summary of Licence Holder comments	DWER response
	<p>(a) groundwater monitoring (from the newly constructed bores) will commence within 30 days of the bores being installed and surface water monitoring is required to be conducted on a monthly basis;</p> <p>(b) irrigation area L5 is located the furthest from the Harvey Main Drain and the minor watercourse that flows through irrigation area L6; and</p> <p>(c) the Licence Holder has expressed concern that limiting the irrigation of treated wastewater to summer months only would most likely cause business operations to cease;</p> <p>the Delegated Officer has removed the restriction on the irrigation of treated wastewater for area L5 for this Licence Amendment. The restriction will remain for irrigation area L6 as a minor watercourse is located through the irrigation area.</p> <p>The restriction on the irrigation of treated wastewater over winter for areas L3 and L4 has also been removed. This restriction was an administrative error as it does not reflect the current EPN conditions.</p> <p>Following the information that the Licence Holder provides through monitoring of groundwater, surface water and soil, DWER will determine if additional regulatory controls are required to manage the irrigation of treated wastewater at the Premises.</p>
<p>Item B</p> <p>The Licence Holder expressed concern over the cost of soil sampling.</p>	<p>Routine soil sampling and testing of the required sections of the soil profile will provide results that can be compared with standard reference tables for irrigated wastewater and allow for any trends to be monitored over time, to consider and assess the ongoing suitability of the soils to receive wastewater and determine any future potential limitations on quantity and quality of applied wastewater.</p> <p>Some soil monitoring has already been completed by the Licence Holder through requirements of the EPN and therefore, DWER has reduced the number of parameters to be monitored as a requirement of the licence and added that soils only need to be monitored at certain depths or until the duplex clay layer is encountered.</p>
<p>Item C</p> <p>The Licence Holder expressed concern that the surface water quality monitoring was cumbersome and does not align with the current EPN.</p>	<p>The surface quality monitoring required in the draft amended licence reflects the surface water quality monitoring locations within the EPN for four of the six sites. (WQ1 being in the same location as SWQ2, WQ4 being in the same location as SWQ3, WQ2 being in the same location as SWQ4 and WQ6 being in the same location as SWQ5).</p> <p>WQ3 was added to the amended Licence as this was a commitment made by the Licence Holder.</p>

Summary of Licence Holder comments	DWER response
	<p>WQ5 is located further upstream (than that of SWQ1 as required by the EPN) as the EPN has not currently taken into account irrigation of area L6.</p> <p>As treated wastewater is flood irrigated onto areas L4 – L6 and the majority of the irrigation areas are shallow duplex clay soils, there is potential for surface water runoff. Therefore, monitoring of surface water quality up and downstream of the irrigation areas is required by condition 12, Table 10.</p>

Table 26: Summary of Licence Holder comments – Information received via e-mail on 30 May 2019

Summary of Licence Holder comments	DWER response
Comments regarding the Draft Licence	
<p>Item No. 1 – 8 and 11- 13</p> <p>The Licence Holder responded to further information required or the clarification of information (highlighted in yellow in the draft amended licence and draft decision report), which included information on:</p> <ul style="list-style-type: none"> - registered address; - wastewater (from the unloading and loading of milk, - processing of milk and dairy products and juice processing) is directed to one of three 3.5 kL sumps; - clarification pond 1 is compacted clay lined and includes trapped overflows between ponds; - location of treated wastewater quality monitoring; - map showing location of infrastructure; and - GPS coordinates for northern boundary of Lot 401. 	<p>This information has been updated in the amended licence.</p>
<p>Item No. 9 - Harvey Fresh cannot support the restriction to irrigate only during the months of September to April. Excluding irrigation between the months of May to August each year is an unreasonable condition to impose, given that the recent soil sampling of all emission areas has shown that L4 and L5 in particular have very different soil profiles to the remainder of the emission areas. L4 and L5 contain deeper sand profiles, L5 in particular has a sandy profile with moderate PRI values to the full depth of the sampled test pit (1.1 m). L4 also has a higher sand content than the other emission areas and will be able to receive the treated wastewater. L4 and L5 will be able to receive irrigation over the winter months without becoming waterlogged and should be the primary irrigation areas during the wetter months.</p>	<p>See DWER response for Item A in Table 25 above.</p>

Summary of Licence Holder comments	DWER response
<p>Groundwater was encountered at a depth of approximately 1.1 m in L5 during the soil sampling event.</p> <p>A soil moisture monitoring and management plan will place another significant expense onto Harvey Fresh. The plan will require the installation of soil moisture monitoring meters, a weather station on Harvey Fresh to accurately record rainfall conditions and additional labour to monitor the equipment. The recently completed soil sampling program has demonstrated that there are pockets of deep sand which will provide ideal conditions to allow irrigation to occur over the winter months on select emission areas (L4 and L5). Visual inspection and improved management of the irrigation rates to L4 and L5 can be better managed going forward, negating the need to install additional monitoring equipment which will require careful and accurate monitoring.</p> <p>The Shire of Harvey has approved the irrigation of Lots L5 and L6.</p>	
<p>Part of Item No. 9</p> <p>The irrigation areas need to include L1 and L2 which are subject to remediation.</p> <p>The Licence Holder indicated that they are intending to remediate areas L1 and L2 by removing kikuyu currently on the paddocks, ploughing and ripping etc. Then they will replant crops and will then need to water the crops. As they are currently at their limit on their water licence, they are unable to use bore water on the crops; therefore, they will want to irrigate the crops with wastewater.</p>	<p>The Premises is currently subject to conditions of an Environmental Protection Notice (see section 5.1.4) which determined that areas L1 and L2 are unsuitable for irrigation. As such, Licence conditions have been amended to align the Amended Licence with the current EPN; and irrigation to areas L1 and L2 will not be permitted in the Amended Licence.</p> <p>As remediation for L1 and L2 has not yet occurred or has been demonstrated as being suitable to receive treated wastewater and that the EPN has been amended or removed, DWER cannot leave L1 and L2 on this amended licence.</p> <p>Once the above is satisfied DWER can amend the Licence to add L1 and L2 and allow for the irrigation of treated wastewater to these areas.</p>
<p>Item No. 10</p> <p>Currently all irrigation areas, except L3 are subject to flood irrigation. Vegetation cover will not be maintained when L1 and L2 are subject to ploughing / turning over as part of the initial remediation program (first few months). Irrigation will not occur at that time.</p> <p>The areas between the orange orchard rows on L3 are not vegetated. L3 is likely to be irrigated with sprinklers rather than flood irrigation going forward.</p>	<p>The Delegated Officer has amended condition 7(g) within Table 5 of the Amended Licence to state that vegetation cover is maintained over the irrigated area.</p>
<p>Comments regarding the draft Decision Report</p>	

Summary of Licence Holder comments	DWER response
<p>Item No. 1 to 30</p> <p>The Licence Holder responded to further information required or the clarification of information (highlighted in yellow in the draft amended licence and draft decision report), which included information on:</p> <ul style="list-style-type: none"> - number and size of treated wastewater storage ponds onsite; - throughput for category 24; - peak production for milk processing; - amount of wastewater generated; - movement of wastewater from milk and juice processing facilities; - solids waste bins (for the rotary drum screen) are located on a hardstand; - processing of floating sludge from the DAF; - treatment capacity of dual SBR system; - dried sludge is removed offsite; - wastewater from the WWTP is diverted to either Pond 1 or the Winter Dam; - design, size and location of Pond 1 and the Winter Dam; - juice processing facility; - information on laser levelling and bunding of each irrigation area; - development approval from the Shire of Harvey; - treated wastewater quality monitoring results for August to November 2018; - confirmation of the amount of liquid waste received during the 2016-2017 annual period; and - irrigation infrastructure and management. 	<p>This information has been updated in the decision report.</p>

Table 27: Summary of Licence Holder comments – comments received via telephone from Licence Holder on 4 June 2019

Summary of Licence Holder comments	DWER response
<p>The Licence Holder has expressed concern that the monthly nutrient loading limits within condition 8 of the draft amended licence are unachievable and would only allow 17 days of irrigation rather than the entire month.</p> <p>As L4 is approaching the annual loading limit, no suitable irrigation infrastructure is available for L3 and L6 is unable to be irrigated during the winter months (as per proposed licence conditions), the amount of wastewater required to be irrigated over L5 would most likely reach the monthly loading limit prior to the end of the month. The Licence Holder would then have no other irrigation area to irrigate the</p>	<p>The Delegated Officer advises that the monthly loading limits were placed on the amended licence to ensure that waste is evenly applied throughout the year and not just over a few months of the year which could pose a high risk of nutrient leaving the site.</p> <p>The Delegated Officer has considered the Licence Holder's comments and has removed the monthly nutrient loading limits for each irrigation area within condition 8; however, monthly nutrient loading rates against the Annual Loading Rate Limit are still required to</p>

Summary of Licence Holder comments	DWER response
wastewater.	<p>be reported as per condition 18. The additional monitoring placed on the licence should identify if nutrient is leaving the irrigation areas and causing pollution.</p> <p>The intent of the monthly nutrient loading limits was to ensure that the wastewater is irrigated as evenly as possible throughout the irrigation period for each irrigation area, however this is an issue that can be managed by the Licence Holder to ensure that no off-site impacts or pollution occurs as a result of over irrigation or irrigating only at a rate commensurate with soil moisture.</p>