



Decision Document

Environmental Protection Act 1986, Part V

Proponent: **Goodchild Abattoirs Pty Ltd**

Licence: **L5423/1990/15**

Registered office: 30 Wellington Street
BUNBURY WA 6230

ACN: 008 944 492

Premises address: Goodchild Abattoir
189 Rosamel Road
PARKFIELD WA 6233
Being Lot 300 on Plan 37367 as depicted in Schedule 1.

Issue date: Thursday, 24 September 2015

Commencement date: Thursday, 1 October 2015

Expiry date: Wednesday, 30 September 2020

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER) has decided to issue a licence. DER considers that in reaching this decision, it has taken into account all relevant considerations and legal requirements and that the Licence and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by: Amine Callegari
Licensing Officer

Decision Document authorised by: Jonathan Bailes
Delegated Officer



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1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.



2 Administrative summary

Administrative details		
Application type	Works Approval <input type="checkbox"/>	
	New Licence <input checked="" type="checkbox"/>	
	Licence amendment <input type="checkbox"/>	
	Works Approval amendment <input type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	15: Abattoir	30 000 tonnes per year
	55: Livestock saleyard or holding pen	290 000 animals per year
Application verified	Date: 30 July 2015	
Application fee paid	Date: 10 August 2015	
Works Approval has been complied with	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
Compliance Certificate received	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
Commercial-in-confidence claim	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Department of Water consulted Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Environmental Protection (Swan Coastal Plain Lakes) Policy 1992		
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	



3 Executive summary of proposal and assessment

Goodchild Abattoirs Pty Ltd (Goodchild) operates a domestic sheep and cattle abattoir at Lot 300, Rosamel Road, Parkfield approximately 15 km northeast of Bunbury in the Shire of Harvey. The abattoir has been in operation at the current site since 1977 and currently operates four days per week. The facility is able to process up to 290 000 animals per year. The premises is situated within the Kemerton Industrial Zone Buffer Area of the Kemerton Industrial Park, a strategic industrial area for heavy industry.

A residential subdivision has been established southwest of the abattoir with the closest residence located 600m from the facility's aerobic wastewater treatment pond. Other sensitive receptors in the surrounding area include Rosamel Wetland, an Environmental Protection Policy (EPP) Wetland 200m west of the premises boundary, a conservation category wetland on the eastern boundary of the premises, and the Leschenault Estuary (conservation category wetland) 1km west of the premises boundary. Surrounding land users include a piggery east of the abattoir and Department of Parks and Wildlife managed land.

The premises covers an area of approximately 25h; 9ha of native vegetation and 16ha of abattoir infrastructure and cleared land. Site infrastructure comprises a slaughterhouse, open and covered livestock holding yards, stock holding paddocks, internal roads, administration buildings, aerobic and facultative wastewater treatment ponds, a reverse osmosis wastewater treatment plant and treated water storage tanks. Abattoir operations comprise receipt and holding of live animals, slaughter of live animals, collection and removal of solid wastes including offal, carcasses, blood, screening waste and paunch material to appropriately licensed offsite disposal facilities, treatment of wastewater and contaminated stormwater, and reuse or offsite disposal of treated wastewater.

All wastewater and contaminated stormwater from the abattoir and livestock holding yards is directed into the site wastewater treatment system (WWTS). The WWTS has been recently upgraded via works approval W5595/2014/1 to include a tertiary treatment stage to improve the quality of treated water. The WWTS comprises a primary and secondary screening system, a HDPE lined aerobic wastewater treatment pond, six clay lined facultative ponds and a reverse osmosis treatment plant. Treated water is transferred to storage tanks for reuse on site as wash down water for the holding yards. Wastewater may also be collected from the final facultative pond for offsite disposal to a licensed facility due to shut down or malfunction of the WWTS. As a result of the WWTS upgrade, Goodchild has been able to decommission the unlined anaerobic pond which was previously the first stage in the wastewater treatment process. A hydrogeological assessment of the site in 2011 identified a plume of elevated nutrient concentration which is attributed to seepage from the unlined anaerobic pond and the previously clay lined aerobic pond.

Key issues associated with operation of the facility include odour emissions, solid waste management and wastewater management. There are numerous odour sources within the abattoir although historically the WWTS has been the primary odour source. Decommissioning of the anaerobic pond has removed the primary odour contributor; however correct management of the WWTS and other odour generating activities is essential to minimise odour emissions as the premises is located within the recommended separation distance for sensitive land uses.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
General conditions	L1.2.3	<p><i>Emission:</i> Contaminated stormwater runoff from solid waste storage areas, the abattoir facility, and livestock holding yards containing high levels of salinity, sediments and nutrients.</p> <p><i>Impact:</i> Contamination of surrounding land and surface water systems. Potential impacts on the ecology of surface water from the addition of nutrients, sediment and salt and reduced oxygen. There are a number of sensitive surface waters in the vicinity of the premises which could be impacted if they receive contaminated stormwater runoff. These include the Rosamel Wetland (EPP wetland) 500m west of the abattoir infrastructure, the Leschenault Estuary (conservation category wetland) 1km west of the premises boundary and a conservation category wetland on the eastern boundary of the premises which is 500m from the main abattoir building and livestock holding yards.</p> <p><i>Controls:</i> The premises has an established stormwater management system. All stormwater runoff from areas where there are potential contaminants including the abattoir, solid waste storage area, and livestock holding yards is directed into the WWTS via bunding and solids trap/s or sumps. Uncontaminated stormwater is directed to soak wells or surrounding land.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Rare <i>Risk Rating:</i> Low</p>	<p>Application supporting documentation</p> <p>L5423/1990/14</p> <p>Hydrogeological Assessment, Goodchild Abattoir, Golder Associates 2011</p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Regulatory Controls</u> Condition 1.2.3 has been included on the licence requiring the licensee to prevent contamination of stormwater runoff and treat any contaminated or potentially contaminated stormwater. This condition replaces the requirements of previous licence conditions 4, 5 and 6.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Rare <i>Risk Rating:</i> Low</p>	
Premises operation	L1.3.1 - L1.3.4	<p><i>Emission:</i> Discharge of contaminated wastewater, partially treated wastewater or animal wastes to the surrounding environment from the abattoir, wastewater treatment system (WWTS), waste storage areas or livestock holding yards.</p> <p><i>Impact:</i> Contamination of surrounding land, surface and groundwater systems due to high nutrient and sediment levels in wastewaters and organic wastes from the abattoir. High nutrient levels can result in eutrophication of surface water systems or contamination of groundwater systems which may affect down gradient users. Groundwater levels are at approximately 3-15m below ground level and flow is generally in a westerly direction. There are sensitive receivers down gradient from the premises which may be affected by groundwater contamination. The closest bore down gradient of the premises is an irrigation bore in the subdivision west of the abattoir. There are also a number of sensitive surface water including the Rosamel Wetland (EPP wetland) 500m west of the abattoir infrastructure, the Leschenault Estuary (conservation category wetland) 1km west of the premise boundary and a conservation category wetland on the eastern boundary of the premises which is 500m from the main abattoir building and livestock holding yards.</p> <p><i>Controls:</i> The abattoir and associated livestock holding yards are concrete lined and bunded to prevent runoff and seepage of contaminated water or discharge of animal waste to the environment. All wash down water and animal waste from the abattoir and livestock holding yards is directed via drainage and bunding through screens to the</p>	<p>Application supporting documentation</p> <p>L5423/1990/14</p> <p>Hydrogeological Assessment, Goodchild Abattoir, Golder Associates 2011</p> <p>Works Approval W5595/2014/1 application supporting documentation</p> <p>Works Approval W5595/2014/1</p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>wastewater treatment system. All abattoir and screening wastes are collected in impermeable containers and stored in the waste storage area awaiting offsite disposal at licensed facilities. Blood is separated from the wastewater stream and directed into a blood containment tank for storage prior to offsite disposal. There is no on site waste disposal.</p> <p>As part of Works Approval W5595/2014/1 the Licensee committed to establishing the reverse osmosis plant and associated infrastructure and tanks within a bunded area. The plant has been constructed on a concrete hardstand area however there is no secondary containment in place around the infrastructure to contain the wastewater in the event of leakages or failure of one of the storage tanks (the largest tank at the plant holds 32kL of treated wastewater). The licensee has provided a risk assessment that determines that the risk is low and proposes management actions to control the risk, which include:</p> <ul style="list-style-type: none">• Regular inspection of the components of the advanced wastewater treatment system. Early intervention and mitigation if any components appear to be faulty and/or degraded.• All critical control points are fitted with alarms to alert personnel of system failure (e.g. pump failure).• Regular monitoring to detect water levels in wastewater tanks.• Management of valves and/or pumps to isolate a tank or other component of the advanced wastewater treatment system.• Wastewater disposal via carting to a licenced, off-site premise where required.• Use of spill kits and pumps where required to contain and/or return any spilled wastewater to the lined wastewater treatment ponds.• Ongoing monitoring to detect contamination in local groundwater. Early intervention and mitigation if groundwater contamination is detected.	<p>compliance information received by email 25 April 2014.</p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Risk Assessment</u> <i>Consequence:</i> Moderate <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p> <p><u>Regulatory Controls</u> Condition 1.3.1 has been included on the licence specifying that all contaminated waters are to be directed through the wastewater treatment system to prevent discharge of contaminated water. This condition replaces the requirements of previous licence conditions 4, 5 and 6. Condition 1.3.2 has been included on the licence to replace the requirements of previous licence condition 9. The condition is designed to protect the conservation category wetland located on the eastern premises boundary from impact by stock or contamination from treated or untreated wastewaters. Condition 1.3.3 has been included on the licence to specify infrastructure where potentially harmful wastes can be stored and/or treated, to ensure only approved containment infrastructure, suitably designed to prevent discharge of contaminated wastes to the environment, is used. Partially treated wastewater can still have sufficiently high nutrient levels to cause an impact if released to the environment. Condition 1.3.4 has therefore been included on the licence to specify management measures necessary to ensure the likelihood of releases occurring from the wastewater ponds is minimised. The condition also replaces the requirements of previous licence condition 10.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Insignificant. <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Low</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Fugitive emissions	N/A	<p>Licence L5423/1990/14 contained fugitive dust conditions (conditions 2 and 3). The risk of fugitive dust has been reviewed as part of this licence reissue.</p> <p><u>Emission Description</u> <i>Emission:</i> Potential for fugitive dust emissions due to stock movement within livestock holding yards and during animal deliveries or transfers. There is also the potential for dust lift off from truck movements on internal trafficable areas and from open paddocks within the premises that are not specifically used for abattoir or cattle holding purposes. Fugitive dust emissions are more likely to occur during the summer months when there are sustained periods of hot, dry and windy conditions. <i>Impact:</i> Reduced local air quality causing a nuisance. <i>Controls:</i> The area is within Kemerton Industrial Zone Buffer Area of the Kemerton Industrial Park and is therefore surrounded by vacant land (and an adjacent piggery). However there are residences within a residential subdivision approximately 400 m southwest of the premises boundary. Previous licence L5423/1990/14 contained conditions 2 and 3 requiring implementation of reasonable and practicable measures to prevent or minimise the generation of visible dust from crossing the boundary of the premises. The licensee has implemented suitable measures to meet these requirements with livestock holding yards being sealed with concrete and all internal roads being sealed. Paddock areas where stock are channelled toward the livestock holding yards have also been lined with crushed limestone to prevent dust generation. DER has no recent records of dust complaints relating to the premises.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Low</p>	<p>Application supporting documentation</p> <p>L5423/1990/14</p> <p><i>Environmental Protection Act 1986</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<u>Regulatory Controls</u> As fugitive dust is assessed to be low risk, the reissued licence will not include specific conditions relating to control of fugitive dust emissions. The licensee is required to comply with the general provisions of the <i>Environmental Protection Act 1986</i> .	
Odour	L3.1.1	<u>Emission Description</u> <i>Emission:</i> Odour emissions may be generated from the WWTS, solid waste storage areas, and general abattoir and livestock holding activities conducted on the premises. <i>Impact:</i> Nuisance impacts on neighbouring residences. The closest residence is approximately 400 m southwest of the premises boundary and 600m south west of the aerobic wastewater treatment pond. Historically DER has received occasional odour complaints potentially regarding the premises although these have not been substantiated due to other odour sources in the area. DER has received a number of odour complaints from residences in the adjacent subdivision in 2015 although the odour source has not been confirmed as either the abattoir or another source. The anaerobic pond has historically been the most significant source of odour on site. <i>Controls:</i> The upgraded WWTS has been designed to improve the quality of treated wastewater resulting in a reduced likelihood of odour emissions associated with wastewater treatment. The upgraded system includes the addition of aerators in the facultative ponds to increase the rate of nutrient breakdown and reverse osmosis treatment to improve the final quality of the treated water. Upgrade of the system has enabled the licensee to decommission the old anaerobic pond which was the primary source of odour for the premises. Since its decommissioning there have not been any odour complaints which have been directly attributed to activities on the premises. Solid wastes are stored on site for minimal amount of time with daily removal to licenced premises for disposal. Previous licence L5423/1990/14 included condition 1 requiring that odour emissions did not impact on persons not on the premises. <u>Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate	Application supporting documentation L5423/1990/14 DER Guidance Statement: Separation Distance, Draft 2015



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Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Regulatory Controls</u> Due to location of the premises within the recommended 1000m odour buffer for abattoirs and sensitive land uses, and the premises having a number of areas and processes with the potential to generate odour, it has been assessed as being a moderate risk. The primary controls for odour are through the Licensee's effective management of the WWTS and waste storage, which are subject to regulatory controls through sections 1.3 and 2 of the licence. Condition 4.1.4 requires the licensee to implement a complaints management system. DER will continue to investigate any odour complaints received regarding the premises and if substantiated will review the licence to include any additional controls that may be required.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p>	
Monitoring general	L2.1.1 - L2.1.4	Ambient environmental quality and process monitoring is included in the licence. Therefore general monitoring conditions relating to collection, preservation and testing of samples (L2.1.1), monitoring intervals (L2.1.2), and monitoring equipment calibration requirements (L2.1.3-2.1.4) have been included.	Application supporting documentation
Monitoring of inputs and outputs	L2.2.1	Licence L5423/1990/14 contained requirements in condition 20 to maintain a record of the number of animals slaughtered at the premises in order to confirm the premises design capacity is not being exceeded. The requirement to measure the number of animals slaughtered has been retained in condition 2.2.1.	Application supporting documentation L5423/1990/14
Process monitoring	L2.3.1	Licence L5423/1990/14 contained requirements in conditions 14 and 15 to maintain a flow meter and record monthly cumulative readings of wastewater discharge from the abattoir to the WWTS. The requirement to measure the abattoir wastewater discharge to the WWTS will be retained in condition 2.3.1. In addition, a requirement to monitor the quality of discharge water from the WWTS has been included in order to confirm the treatment system is operating effectively and that water quality is suitable for reuse as wash down water.	Application supporting documentation L5423/1990/14



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Ambient quality monitoring	L2.4.1	DER's assessment and decision making are detailed in Appendix A.	Application supporting documentation L5423/1990/14 Hydrogeological Assessment, Goodchild Abattoir Kemerton, Golder Associates, December 2011 Goodchild Abattoir, Wastewater Treatment Pond Closure Plan, Strategen 2013 ANZECC Guidelines 2000
Improvements	L3.1.1	As per the details in the Odour and Ambient Quality Monitoring sections, the Licensee has decommissioned the old anaerobic pond on the premises. IR1 is included in the licence requiring submission of a closure report for this infrastructure to confirm that it has been suitably decommissioned and rehabilitated in accordance with the Wastewater Treatment Pond Closure Plan.	Goodchild Abattoir, Wastewater Treatment Pond Closure Plan, Strategen 2013



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Information	L4.1.1 - L4.1.4 L4.2.2 - L4.2.3 L4.3.1	<p>Records Conditions 4.1.1 – 4.1.4 that form part of the licence template are included in this section of the licence relating to record keeping on the premises. Previous licence condition 25 has been replaced with condition 4.1.3.</p> <p>Reporting Annual reporting requirements have been specified in condition 4.2.1 of the licence replacing the requirements of previous licence condition 24. Condition 4.2.2 has also been included to require the licensee to conduct an assessment of monitoring results against previous results in order to detect changes which could indicate that the premises is impacting on the environment and that groundwater is recovering from historic nutrient contamination. As all water samples are required to be sent to a laboratory for analysis, condition 4.2.3 has also been included requiring the submission of original reports on request.</p> <p>Notification Condition 2.1.4 of the licence specifies that notification is required in the event calibration requirements in condition 2.1.3 cannot be met. Condition 4.3.1 is included in the licence specifying the notification requirements for such an event. In addition, condition 4.3.1 includes notification requirements in the event that ponds need to be taken offline for maintenance and/or desludging. This replaces the requirements of previous condition 23 as these activities could result in complaints due to an increased likelihood of odour emissions during such events. The previous licence also contained notification requirements in conditions 21 and 22 in the event of spills or leaks occurring from wastewater infrastructure including ponds and pipelines. These requirements have not been included in the reissued licence as they replicate the requirements of section 72 of the Act.</p>	Application supporting documentation L5423/1990/14 <i>Environmental Protection Act 1986</i>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Licence Duration	N/A	The overall environmental risk of these premises is categorised as moderate due to the proximity of sensitive receptors, age of the facilities and compliance history of the licensee. The licence has been issued for a period of five years as this allows a sufficient period of time for monitoring results to indicate if contamination is continuing to occur from wastewater infrastructure or if there is an improvement in groundwater quality due to improvements made to the wastewater treatment system.	N/A



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
31/08/2015	Application advertised in West Australian (or other relevant newspaper)	None received	N/A
18/09/2015	Proponent sent a copy of draft instrument	<p>22/09/2015 Licensee comments received:</p> <p>1) Object to the requirement for an odour management plan based on removal of a key odour source (anaerobic pond), complaints not being directly attributable to the abattoir, current management practices and being required to record all complaints.</p> <p>2) Object to the requirement for secondary containment around the WWTP based on existing management measures and low nutrient levels in the wastewater.</p> <p>3) Object to additional monitoring locations and parameters.</p> <p>4) Request to extend date for the Anaerobic pond closure report as closure and rehabilitation works are not yet complete.</p>	<p>1) The requirement for an odour management plan has been removed on the basis that the primary controls for odour are through the management of the WWTS and waste storage. Odour controls will be reviewed if odour complaints regarding the premises are substantiated.</p> <p>2) The unlikely event of containment overflow and catastrophic failure of the tanks is accepted, along with the fact that the water is of reasonable quality. The management actions specified by the Licensee in their risk assessment can be reviewed as part of DER's compliance activity. The licence will be reviewed if additional controls are required.</p> <p>3) Reduction in additional monitoring locations to 3 additional bores which target background water quality, locations most likely to be affected by contamination and locations where contaminated water is most likely to leave the premises boundary. The purpose of the monitoring is to detect potential future groundwater contamination not monitor existing plumes. As nitrogen has been identified as the key contaminant of concern for the premises the expanded monitoring suite has been retained.</p> <p>4) Closure report due date extended to 31 March 2016.</p>



6 Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

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



Appendix A

Ambient quality monitoring

The principle emission of concern for the Goodchild Abattoir is seepage of water with elevated nutrient levels into the underlying aquifer from infrastructure such as solid waste storage areas, livestock holding yards, the abattoir, and wastewater treatment infrastructure. The site has been reported under the requirements of the *Contaminated Sites Act 2003* as 'possibly contaminated – investigation required' due to elevated nutrient levels detected in groundwater monitoring at the premises. The groundwater level typically lies between 3-15m below ground level and flow direction is generally from east to west.

Emission Description

Emission: Seepage of contaminated wastewater (elevated nutrient levels, particularly nitrogen) from infrastructure on site including solid waste storage areas, livestock holding yards, the abattoir and wastewater treatment infrastructure.

Impact: Reduction in local groundwater quality due to elevated nutrient levels with potential impacts on down gradient users or nearby sensitive receptors. Surface water systems could experience eutrophication if affected by groundwater inflow with high nutrient levels.

There are two groundwater bores operated on the premises (GWL62016) to provide drinking water for stock and process water for the abattoir. Monitoring data indicates these bores are likely to have already been affected by elevated nutrient levels, in particular nitrogen. The closest bore down gradient of the premises is an irrigation bore in the subdivision 400m west of the aerobic wastewater pond. There are also a number of nearby sensitive surface water systems which could potentially receive groundwater inflow from the premises. These include the Rosamel Wetland (EPP wetland) 500m west of the abattoir infrastructure, the Leschenault Estuary (conservation category wetland) 1km west of the premises boundary and a conservation category wetland on the eastern boundary of the premises, 500m from the main abattoir building and livestock holding yards.

A hydrogeological investigation was conducted in 2011 to assess whether nutrient contamination is present on the premises. The investigation identified a plume of elevated nutrient concentration directly down hydraulic gradient from the anaerobic and F1 aerobic wastewater treatment ponds between monitoring locations GQ4 and GQ5. The premises has therefore been reported under the requirements of the *Contaminated Sites Act 2003* as 'possibly contaminated – investigation required'.

Controls: Wastewater treatment infrastructure has been identified as the most likely source of contaminated water seepage. The abattoir and livestock holding yards have established waste collection and drainage facilities which direct all waste and contaminated water to suitable storage or treatment areas. Details on this infrastructure are included in the Premises operation section of the above decision table.

An established quarterly ambient groundwater monitoring program is in place at the abattoir which has resulted in the detection of a nutrient contamination plume. In response to the findings of the 2011 hydrogeological investigation the Licensee has amalgamated what was previously six clay lined aerobic ponds west of the abattoir into a single HDPE lined pond to reduce the likelihood of leakage occurring from this facility. In addition, the unlined anaerobic pond has recently been decommissioned and is no longer part of the WWTS. This has removed the two primary contributors to groundwater contamination although contamination could also be occurring from the facultative ponds as their permeability is unknown and monitoring bores GQ2 and GQ3 immediately west of the ponds exhibit elevated nitrogen levels.

The WWTS has also been upgraded to include a tertiary treatment stage (reverse osmosis), resulting in a significant improvement to the quality of treated wastewater. The system is capable of treating water to a standard which meets the Australian Drinking Water Guidelines. Ambient



groundwater monitoring results show a gradual decrease since 2011 in the concentration of total nitrogen and total phosphorous in groundwater at GQ4, the closest down gradient bore to the aerobic and anaerobic ponds.

Risk Assessment

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

Regulatory Controls

DER has increased the ambient groundwater monitoring requirements in the reissued licence to assist in detection of any further groundwater contamination issues on site and monitor background water quality for comparison. The new monitoring program includes an additional three monitoring locations and an expanded analysis suite. In line with recommendations of the Goodchild Abattoir Wastewater Treatment Pond Closure Plan, full nitrogen speciation has been included in the analysis suite to assess the level of toxicity of nitrogen in groundwater as ambient groundwater monitoring results indicate that nitrogen is the most significant contaminant .

GQ1-GQ4 are the existing monitoring locations for the premises. GQ1 is in close proximity to the wetland on the eastern boundary of the premises and is appropriately located to detect contamination which could impact the wetland. It is noted that groundwater flow is typically in a westerly direction away from the wetland, which is therefore unlikely to be impacted by groundwater contamination on the premises. GQ2 and GQ3 are located on the western boundary of the facultative wastewater treatment ponds (F2-F7) and are appropriately located to detect leakage from this facility due to the direction of groundwater flow. GQ4 is immediately west of the aerobic pond and monitoring results for this bore have historically shown high levels of nutrients, particularly nitrogen, associated with leakage from the aerobic and anaerobic ponds.

GQ5-GQ7 are new monitoring locations which were established for the hydrological assessment of the premises in 2011. GQ6 and GQ7 were identified through the assessment as the most likely to represent background water quality and are included in the monitoring program for comparison purposes. GQ5 is located in the south west corner of the premises and has been included to monitor for changes in nutrient levels in groundwater at the premises boundary to identify if contamination is occurring and is travelling outside the premises boundary.

Residual Risk

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

The licensee has already implemented upgrades to the WWTS to remove the primary sources of contaminated water seepage (anaerobic and aerobic wastewater treatment ponds) to prevent further groundwater contamination on the premises. Inclusion of an ambient groundwater monitoring program in the licence will allow for early detection of any future contamination which could occur and implementation of mitigation measures if required.