



Decision Document

Environmental Protection Act 1986, Part V

Licensee: **B. & J. Catalano Pty Ltd**

Licence: **L8877/2015/1**

Registered office: 2 South Western Highway
BRUNSWICK JUNCTION WA 6224

ACN: 008 961 975

Premises address: Shenton Ridge Gravel Quarry
Coalfields Road
ROELANDS WA 6226
Being part Lot 501 on Plan 26892 and Lot 21 on Plan 10674

Issue date: Friday, 31 March 2017

Commencement date: Monday, 3 April 2017

Expiry date: Wednesday, 11 November 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 that the Licence and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by:

Rachel Vukmirovic
Licensing Officer

Decision Document authorised by:

Tim Gentle
Manager Licensing – Resource Industries
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 checked="" type="checkbox"/>	New Licence <input 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
	12: Screening, etc. of material	156,000 tonnes per annual period
Application verified	Date: 23/02/2015	
Application fee paid	Date: 05/03/2015	
Works Approval has been complied with	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Compliance Certificate received	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Commercial-in-confidence claim	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Commercial-in-confidence claim outcome		
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 checked="" type="checkbox"/> No <input type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Is the Premises subject to any EPP requirements? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

3 Executive summary of proposal and assessment

The Shenton Ridge Gravel Quarry (the Quarry) is located on freehold land with adjacent lots that are adjoining the Collie River valley downstream of Wellington Dam. This Licence application is to crush and screen material at a gravel extraction operation on Lots 501 and 21 Coalfields Road. The application proposes the use a mobile crusher and screen with an approved throughput of 156,000 tonnes per annual period, hence the Premises is a prescribed premises for the purposes of Part V of the *Environmental Protection Act 1986* (EP Act) in category 12.

Category 12 screening etc. of material is defined in the *Environmental Protection Regulations 1987* as premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.

The Quarry is located approximately 24 km east of Bunbury and 24 km west of Collie in the south-west of Western Australia. The property is semi-cleared and zoned as 'General Farming' under the Shire of Harvey Town Planning Scheme No. 1. The quarry is located on the ridge of the Darling Scarp and the property has significant slopes that lead into neighbouring properties.

The Quarry has been active since 2009 (Stages 1-6), operating under an Extractive Industry Licence (EIL) approved by the Shire of Harvey.

Planning approval for the continuation of gravel extraction (Stages 7-11) on Lots 501 and 21 Coalfields Highway, Roelands was granted for a period of five years on 11 November 2015. An Extractive Industry Licence (EIL) was issued on 20 January 2017. Both the planning approval and the EIL expire on 11 November 2020.

Works Approval W5709/2014/1 (Works Approval) was issued on 31 March 2016 for B. & J. Catalano (the Applicant) at Shenton Ridge Gravel Quarry Cells 7 to 11. Subsequently a Notice of Amendment was issued on 23 December 2016 following an appeal determined by the Minister for Environment on 14 November 2016. The Works Approval was granted with an approved premises production capacity of 156,000 tonnes per annual period.

At the commencement of operations an existing gravel stockpile of up to 100,000m³ remaining from previous mining activities will be progressively removed. The proposed Stages of the quarrying operation are included in Schedule 1 maps of the Licence.

The primary environmental risks from operations are noise, dust and the contamination of stormwater.



Residential and Other Sensitive Premises

The distances to residential and sensitive receptors depicted in the map of dust and meteorological monitoring locations in Schedule 1 maps of the Licence are as follows:

Table 1: Receptors and distance from prescribed activity

Residential and Sensitive Premises	Distance from Prescribed Activity
Residential premises (Res. 4/Struc.4)	880 m north of Stage 9
Residential premises (Res.1/Struc.1)	1,530 m west of Stage 6
Planned residential premises ¹	900 m south of Stage 7
Abandoned/derelict dwelling (Res. 5/Struc.5)	1,000 m northeast of Stage 11
Industrial premises (Struc.4b)	550 m north of Stage 9
Major highway (Coalfields Hwy)	60 m north of Stage 9

Note 1: The dwelling on this premises is not yet constructed although planning approval from the Shire of Harvey was granted for two years on 27 April 2016.

Specified Ecosystems

The Quarry is situated proximate to the following specified ecosystem:

Table 2: Specified ecosystems

Specified ecosystems	Distance from Prescribed Activity
Resource Enhancement Wetlands (4)	100 m east of Stage 11
	210 m east of Stage 10
	150 east of Stage 8
Multiple Use Wetland	Approximately 640 m south-east of Stage 11

No Priority or Threatened Ecological Communities have been identified in the vicinity of the Quarry.

Groundwater and water sources

Table 3: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental Value
Groundwater	Depth to groundwater is approximately 20 metres below ground level (mbgl) with seasonal fluctuations within a few metres (Lundstrom, 23 May 2016).	Groundwater is not used for potable use with most water sourced from surface waters (Water Corporation, 2014). The site does not fall within a <i>Rights in Water Irrigation Act 1914</i> (RIWI Act) Groundwater Proclamation Area.
4 minor non-perennial watercourses (tributaries of the Collie River)	Located within the Premises boundary but outside of the extraction Stages	Surface water lies within the Collie River Irrigation District proclaimed under the <i>RIWI Act 1914</i> .



Other site characteristics

Table 4: Other factors or sources of concern

Other emission or sources of concern	Location
Community dam used for potable water supply for the Roelands Farm and Village. The community dam is not listed by the Department of Water as a Public Drinking Water Source Area.	5km downstream of Resource Enhancement Wetlands referred to in Table 2.

The whole site is underlain by the granitoid rocks of the Darling Scarp with overlying soils generally described as being a shallow layer of thin brown loamy gravels over local clay and clay subsoils (Lundstrom, April 2014a). Cap-rock thickness varies from 0.5 to 1.5 m, and maximum excavation depths are approximately 1.0 to 1.5m below current ground level, depending on resource thickness (Lundstrom Environmental Consultants, 2016).

The Applicant's Dust Management Plan (Lundstrom, 11 May 2016) describes the soil texture as dominantly gravel with minor sand and trace amounts of fines (clays and silts). Grain size distribution is approximately:

- Gravel (>2.0mm): 69%
- Sand (0.063<2.0mm): 27%
- Fines (Silt & Clay; <0.063mm): 4%

Data has been extracted from the Bunbury weather station within 24 km west of the site (Collie data is not recent, only provided data up to 1975). The Bunbury data which shows wind direction vs wind speed (22 November 1995 to 20 September 2010) is presented in Figures 1 and 2 below.



Figure 1: Wind rose depicting wind direction versus wind speed in km/hr at 9 am (BOM, 2017a)

Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 30 Sep 2010)

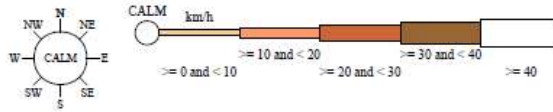
Custom times selected, refer to attached note for details

BUNBURY

Site No: 009965 • Opened Nov 1995 • Still Open • Latitude: -33.3567° • Longitude: 115.6447° • Elevation 5.m

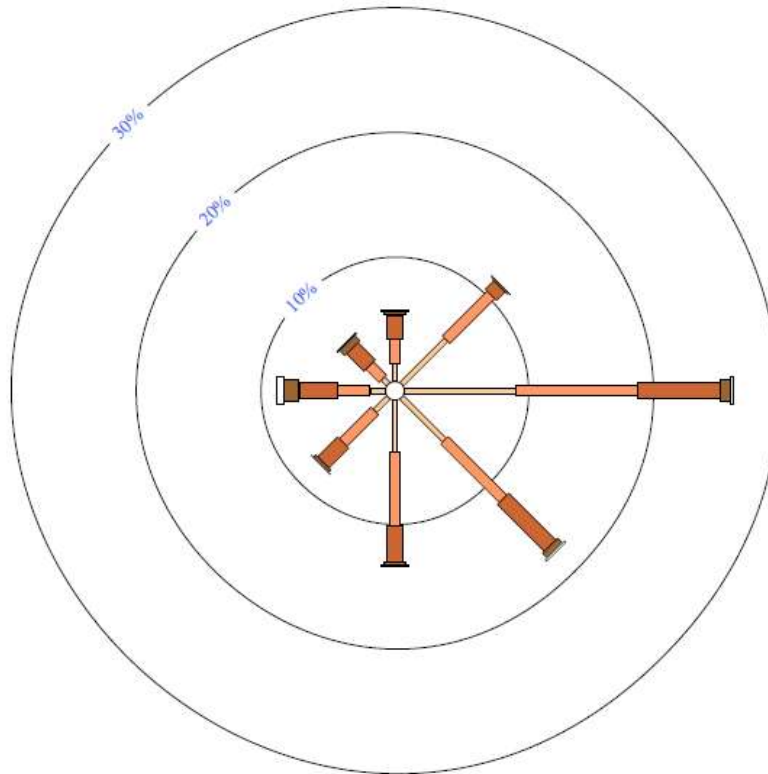
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am
5351 Total Observations

Calm 4%



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Figure 2: Wind rose depicting wind direction versus wind speed in km/hr at 3 pm (BOM, 2017a)

Rose of Wind direction versus Wind speed in km/h (22 Nov 1995 to 30 Sep 2010)

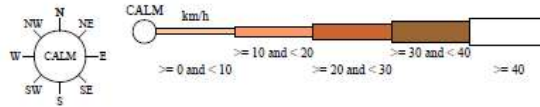
Custom times selected, refer to attached note for details

BUNBURY

Site No: 009965 • Opened Nov 1995 • Still Open • Latitude: -33.3567° • Longitude: 115.6447° • Elevation 5.m

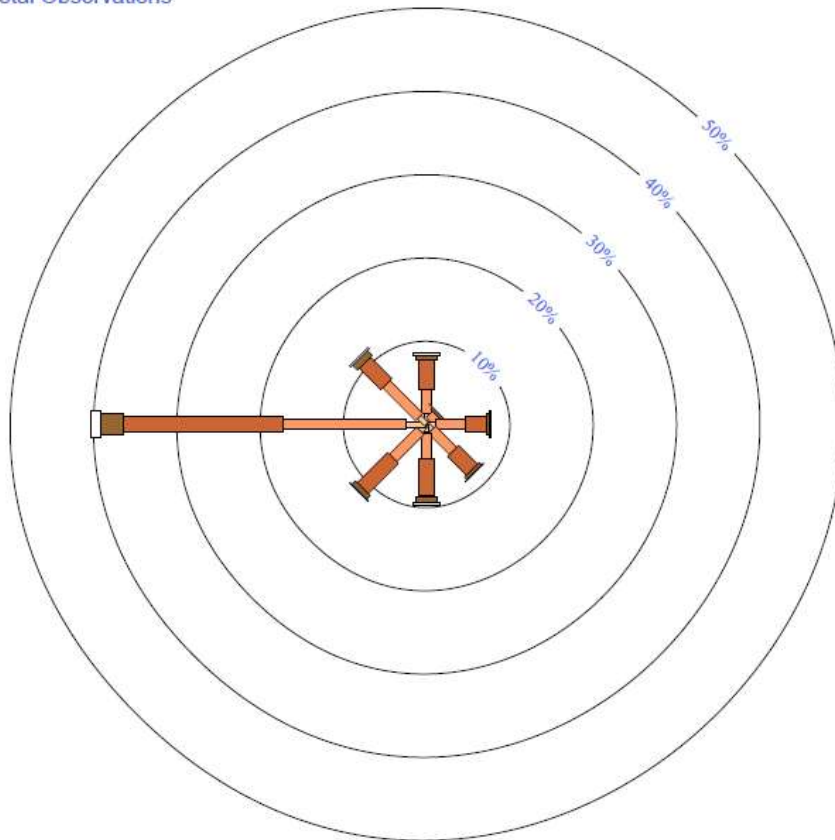
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



3 pm
5357 Total Observations

Calm *



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The morning wind prevails mostly from the east or south-east, with afternoon winds prevailing mostly from the west.

The Quarry is located on the edge of the Darling Scarp, where climate differs slightly from that on the adjacent Swan Coastal Plain. The climate is Mediterranean with hot dry summers and cool wet winters.

Rainfall and temperature

Like Collie, the Quarry is located on the Darling Scarp and therefore rainfall and temperatures are likely to be well represented by the Collie weather station, approximately 24 km east of the Quarry.

The mean number of days of rainfall is greatest in winter months where more than 13 days of rainfall exceeding 1 mm is commonly experienced (BoM, 2016a). The Bureau of Meteorology (2016) provides the mean rainfall and maximum temperature for Collie (Figure 3).

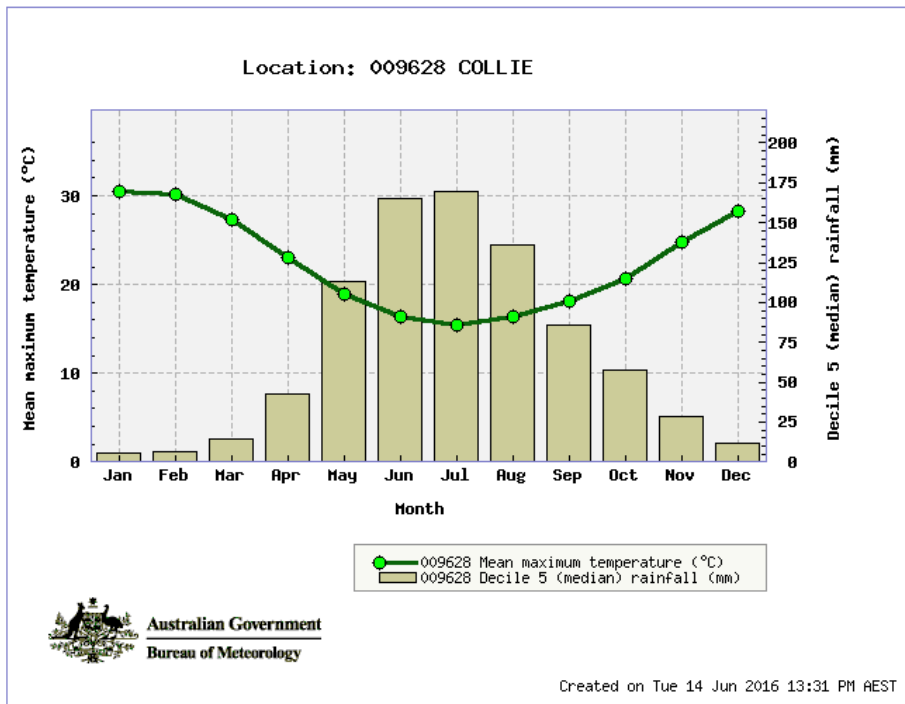


Figure 3. Collie mean temperature and rainfall

The Wokalup weather station is located approximately 18.5 km north of Shenton Ridge Gravel Quarry. As a comparison with Collie, the mean Wokalup temperature and rainfall is very similar although slightly greater for both parameters (Figure 4, BoM 2016a). Therefore data from both weather stations can be used to identify typical rainfall and temperature patterns in the area of the Shenton Ridge Gravel Quarry. Rainfall is likely to be greatest over the months of June to August.

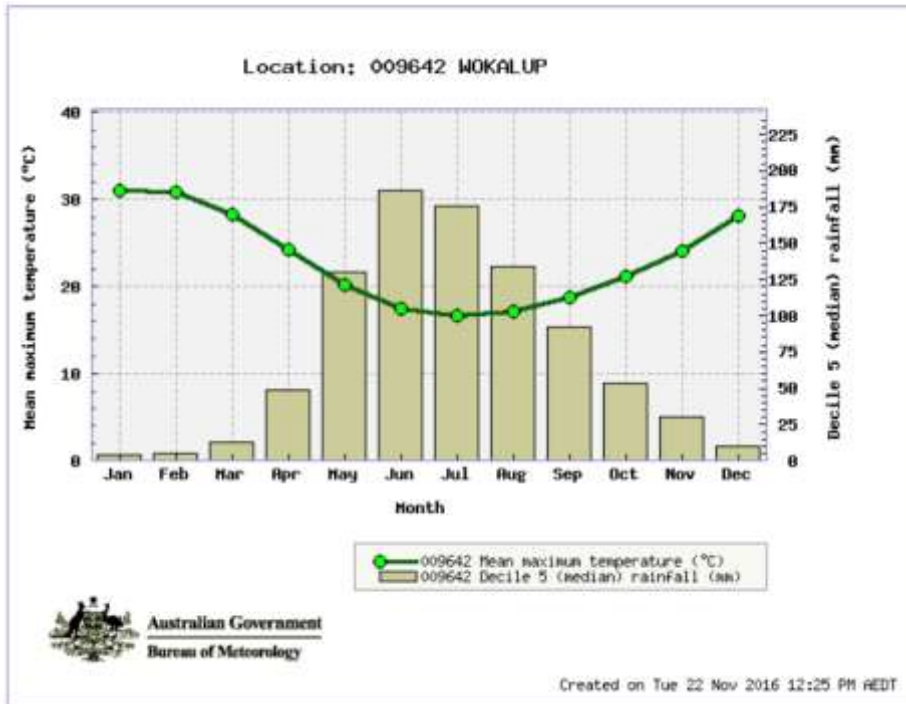


Figure 4. Wokalup mean temperature and rainfall

Using rainfall intensity frequency duration (IFD) data for the coordinates of the existing detention pond at the Premises, the 1 in 10 year Annual Recurrence Interval (ARI), 2-hour duration storm event has been calculated to be 19.8 mm per hour. This means that the average period in which rainfall is expected to exceed 19.8 mm per hour over 2 hours is every 10 years. The 1 in 50 year ARI, 2-hour duration storm event equates to 26.5 mm per hour. It is noteworthy however, that periods between exceedances are generally random and this measure presents a measure of estimated likelihood only. Figure 5 illustrates IFD data for the Quarry (BoM, 2016c).

Intensity-Frequency-Duration Table

Location: 33.275S 115.900E Issued: 24/3/2017

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

Average Recurrence Interval

Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	67.0	87.7	113	131	155	191	222
6Mins	62.6	81.9	105	122	144	178	206
10Mins	50.1	65.2	82.6	94.7	112	136	157
20Mins	34.9	45.0	55.5	62.6	72.9	87.5	99.6
30Mins	27.7	35.5	43.2	48.3	55.8	66.4	75.1
1Hr	18.3	23.2	27.8	30.8	35.3	41.5	46.6
2Hrs	12.0	15.1	18.0	19.8	22.6	26.5	29.6
3Hrs	9.33	11.8	14.0	15.4	17.6	20.6	23.0
6Hrs	6.11	7.73	9.19	10.1	11.5	13.5	15.1
12Hrs	4.00	5.07	6.04	6.66	7.60	8.92	10.0
24Hrs	2.60	3.29	3.92	4.34	4.95	5.81	6.51
48Hrs	1.64	2.08	2.48	2.75	3.14	3.69	4.14
72Hrs	1.22	1.55	1.86	2.06	2.37	2.79	3.13

(Raw data: 23.67, 5.21, 1.6, 38.86, 8.09, 2.53, skew=0.65, F2=4.91, F50=17.97) © Australian Government, Bureau of Meteorology

Figure 5: IFD data for the Shenton Ridge Gravel Quarry



Compliance documentation for part of Stage 7 (now defined as Stage 7a) was submitted to DER on 16 March 2017.

This Licence is a new licence to be issued for the Premises to authorise the operation of Stage 7a and all other Stages (7b, 8, 9, 10 and 11) upon submission of compliance documentation in accordance with Works Approval W5709/2014/1.

Conditions of the Licence have been assessed in section 4 of this document.

References

1. Shire of Harvey (2015) *Ordinary Council Meeting Minutes*, 27 October 2015 (in text ref Shire of Harvey, October 2015).
2. Lundstrom Environmental Consultants Pty Ltd *Stormwater Management Plan* prepared for B & J Catalano Pty Ltd and received by DER on 23 May 2016 (in text ref Lundstrom 23 May 2016).
3. Water Corporation *Water Forever – South West Draft Report*, 2014 (in text ref Water Corporation, 2014).
4. Lundstrom Environmental Consultants Pty Ltd *Works Approval Application Gravel Extraction on Lots 501 and 21 Coalfields Road, Roelands Shire of Harvey* prepared for B & J Catalano Pty Ltd dated April 2014 (in text ref Lundstrom, April 2014a).
5. Lundstrom Environmental Consultants Pty Ltd *Revised Dust Management Plan* prepared for B & J Catalano Pty Ltd and received by DER on 11 May 2016 (in text ref Lundstrom, 11 May 2016)
6. Bureau of Meteorology *Rose of wind direction versus wind speed in Km/h 9am (22 Nov 1995 to 30 Sep 2010)* accessed at http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.009965.9am.pdf (in text ref BoM, 2017a).
7. Bureau of Meteorology *Rose of wind direction versus wind speed in km/hr 3 pm (22 Nov 1995 to 30 Sep 2010)* accessed at http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.009965.3pm.pdf (in text ref BoM, 2017b).
8. Bureau of Meteorology (BoM) accessed at www.bom.gov.au (in text ref BOM 2016a).
9. Bureau of Meteorology (BoM) accessed at <http://www.bom.gov.au/cgi-bin/hydro/has/CDIRSWWebBasic> (in text ref BoM 2016b).
10. Bureau of Meteorology (BoM) *Intensity-Frequency-Duration Table* Location: 33.275S 115.900E accessed at <http://www.bom.gov.au/hydro/has/cdirswebx/cdirswebx.shtml> (in text ref BoM 2016c).



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	L1.2.1	<p>Condition 1.2.1 requires the Licensee to maintain stormwater infrastructure constructed in accordance with works approval W5709/2014/1 fit for its purpose.</p> <p><u>Emission Description</u> <i>Emission:</i> Spills of hydrocarbons outside of containment systems or during re-fuelling activities. <i>Impact:</i> Soil contamination, potential impacts to groundwater and surface water systems leading to impacts to ecosystems. The depth to groundwater is at least 20 mbgl with seasonal fluctuations (Lundstrom, 23 May 2016). <i>Controls:</i> There will be no on-site storage of hydrocarbons or chemicals. Plant will be refuelled each morning using a mobile refuelling vehicle equipped with a "snap-on, snap-off, fast fill and auto shut-off" facility. A hydrocarbon spill response procedure will be implemented during operation (Lundstrom, April 2014a).</p> <p><u>Risk Assessment</u> Based on the fact that there will be no on-site storage of hydrocarbons except in vehicle tanks and that vehicles will be refuelled with a 'snap-on, snap-off, fast-fill and auto shut-off facility' (Lundstrom, April 2014a), the Delegated Officer has determined the risk as follows: <i>Consequence: Slight</i> – minimal on-site impacts. <i>Likelihood: Unlikely</i> – the risk event will probably not occur in most circumstances. <i>Risk Rating:</i> The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined the overall rating of risk to be low.</p> <p><u>Regulatory Controls</u> No additional general conditions are required on the Licence for the storage and management of hydrocarbons. The general provisions of the <i>Environmental Protection Act 1986</i> and the</p>	<p>Works Approval W5709/2014/1 accessed at www.der.wa.gov.au</p> <p>Lundstrom Environmental Consultants Pty Ltd <i>Stormwater Management Plan</i> prepared for B & J Catalano Pty Ltd and received by DER on 23 May 2016 (in text ref Lundstrom 23 May 2016)</p> <p>Lundstrom Environmental Consultants Pty Ltd <i>Works Approval Application Gravel Extraction on Lots 501 and 21 Coalfields Road, Roelands Shire of</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
		<i>Environmental Protection (Unauthorised discharges) Regulations 2004</i> apply.	<p>Harvey prepared for B & J Catalano Pty Ltd dated April 2014 (in text ref Lundstrom, April 2014a)</p> <p>General provisions of the <i>Environmental Protection Act 1986</i></p> <p><i>Environmental Protection (Unauthorised discharges) Regulations 2004</i></p>
Premises operation	L1.3.1 – 1.3.2	Condition 1.3.1 has been added to the Licence to set premises production capacity limits as approved by works approval W5709/2014/1. Condition 1.3.2 has been added to the Licence to authorise the operation of Stage 7a. Stages 7b, 8, 9, 10 and 11 are only authorised upon receipt of compliance documentation in accordance with works approval W5709/2014/1.	Works Approval W5709/2014/1 accessed at www.der.wa.gov.au
	L1.3.3 – 1.3.5	The inclusion of conditions L1.3.3-1.3.5 is justified in the risk assessment of fugitive dust emissions in Appendix A.	
	1.3.6	The inclusion of condition 1.3.6 is justified in the risk assessment of noise emissions in Appendix B.	
Emissions general	L – no conditions	There are no specific conditions relating to emissions general in this section.	N/A
Point source emissions to air including monitoring	L – no conditions	There are no point source emissions to air proposed during operation.	N/A



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Point source emissions to surface water including monitoring	L - no conditions	There are no point source emissions to surface water proposed during operation.	N/A
Point source emissions to groundwater including monitoring	L – no conditions	There are no point source emissions to groundwater proposed during operation.	N/A
Emissions to land including monitoring	L – no conditions	There are no emissions to land proposed during operation.	N/A
Fugitive emissions	L1.3.3 – 1.3.5 L2.3.1 – 2.3.2	DER’s assessment and decision making on fugitive dust emissions and management is detailed in Appendix A.	Reference documents listed in Appendix A
Odour	L – no conditions	Odour is not expected during operation. No specified conditions relating to odour emissions are required in the Licence.	N/A
Noise	L1.3.6	DER’s assessment and decision making on noise is detailed in Appendix B.	Reference documents listed in Appendix B
Monitoring general	L2.1.1-2.1.2	No additional general monitoring conditions are required in the Licence other than calibration requirements.	N/A
Monitoring of inputs and	L – no conditions	No specified conditions relating to the monitoring of inputs and outputs are required to be added to	N/A



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
outputs		the Licence.	
Process monitoring	L – no conditions	No specified conditions relating to process monitoring are required to be added to the Licence.	N/A
Ambient quality monitoring	L2.2.1-2.2.2	DER's assessment and decision making on ambient quality monitoring is detailed in Appendix C.	Reference documents listed in Appendix C
Meteorological monitoring	L2.4.1	Meteorological monitoring conditions are required during operation for interpretation of monitoring data, in particular wind strength and direction with respect to identifying likely sources of dust. The inclusion of this condition is justified in Appendix A.	N/A
Improvements	L – no conditions	No improvement conditions have been included in the Licence.	N/A
Information	L3.1.1-3.1.3 L3.2.1 – 3.2.2 L3.3.1	No additional reporting conditions are required on the Licence other than the minimum record keeping, annual reporting and notification requirements. The requirement to submit a review of stormwater management is justified in Appendix C.	N/A
Licence Duration	N/A	The expiry date of the Licence will be consistent with the planning consent issued by the Shire of Harvey (11 November 2020) as per DER Guidance Statement <i>Land Use Planning</i> (February 2017).	DER Guidance Statement: <i>Land Use Planning</i> (February 2017)



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
16/03/2015	Application advertised in West Australian newspaper	Nil comments received.	-
13/03/2015	Application referred to public authorities	Comments received 10/04/2015 from the Shire of Harvey informing DER that planning consent had not been issued for the proposal.	Planning approval granted 11/11/2015 with an expiry of 11/11/2020. The expiry date of the licence is consistent with the planning approval
30/03/2016	Proponent sent a copy of final draft instrument	Confirmation of no changes received 31/03/2016	-
29/03/2016	Proponent sent a copy of revised draft instrument	Confirmation of no changes received 29.03/2016	-



6 Risk Assessment

Note: This matrix is taken from the DER Guidance Statement: Risk Assessment, February 2017

Table 1: Emissions Risk 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

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



Appendix A – Fugitive dust emissions

Emission Description

Emission: Airborne dust generated during crushing and screening of target material (gravel), loading and unloading of vehicles, movement of stockpiles and vehicular movement on unsealed roads.

Impact: Amenity impacts may include visible dust plumes and nuisance dust deposition at residential premises. Public health effects may include potential acute effects such as asthma, and chronic effects such as reduced respiratory function. Dust can irritate the respiratory system and increase the frequency of asthma attacks. Those people with chronic respiratory problems may be affected (Department of Health website, accessed 17/03/2017). There is an industrial premises located 550 m north of Stage 9 and residential premises located 880 m north of Stage 9. No other sensitive receptors are located within 1000 m of the extraction Stages. The planned residence on Lot 500 does not currently exist and therefore has not been considered as a receptor for the purposes of this assessment.

Controls: the Revised Dust Management Plan details measures proposed to manage dust that include:

- *“A 15kl water cart will be on site during all periods when earth is being moved or crushing is being conducted. If and when dust is caused to occur during these periods, the water cart will be employed to damp down the areas of concern. During crushing a spray bar is employed at all times.*
- *If the wind is blowing strongly in the direction of Coalfields Road and conditions are dusty, then operations will be stopped until such time as adequate wetting down has occurred.*
- *If the wind is blowing strongly in the direction of the closest structure (Struc. 4B) and conditions are dusty, then operations will be stopped, if dust becomes airborne beyond the height of the native bush along the northern boundary, until such time as adequate wetting down has occurred.*
- *Crushing and stockpiling activities will be located in topographic low points with raw and processed stockpiles arranged such that windbreaks are created to further prevent impacts from fugitive dust.*
- *A polymer based spray-on soil stabilizer will be applied to topsoil and overburden stockpiles if they do not stabilize by crusting and grass re-growth.*
- *Internal roads will be surfaced with gravel.*
- *Truck loads will always be covered so that no dust is generated in transit*
- *A complaints system will be put in place and these will be recorded by the Quarry Manager and acted on promptly.*
- *A notice will be erected at the front gate and this will provide emergency contact details for the Quarry Manager”.* (Lundstrom, 11 May 2016).

A dust monitoring plan has been proposed by the applicant which includes continuous dust monitoring at the northern boundary of the site using a real-time dust monitoring device (Dust Track™ II Aerosol Monitor 8530). It is proposed to place the dust monitor between structure 4A and Stages 9, 10 and 11. The monitoring equipment can measure dust particles of PM₁₀, PM_{2.5} and PM₁. The equipment has an automatic feedback mechanism for a pre-set trigger value (proposed trigger value 1000 µg/m³ PM₁₀) (Lundstrom, 11 May 2016).

Additionally, the works approval application states that “*stockpiles will be a standard height of 9 m*” (Lundstrom, April 2014a).

Risk Assessment

Noting the distance to sensitive receptors and the proponent controls, the Delegated Officer has determined the risk as follows:

Consequence: **Moderate**, low level off-site impacts on a local scale.

Likelihood: **Possible**, the risk event could occur at some time.



Risk Rating: The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined the overall rating of risk to be **medium**.

Regulatory Controls

As the risk rating has been determined as moderate based on the applicant controls the following conditions have been included in the licence:

- Condition L1.3.3 has been included to specify the maximum height of stockpiles (9 metres).
- Condition L1.3.4 requires the Licensee to cover all truck loads prior to exiting the Premises.
- Condition L1.3.5 requires the Licensee to have a 15 kilolitre water cart on site at all times material is being processed or moved and to have a spray bar on crushing and screening equipment at all times. This condition also restricts the operation of crushing and screening equipment to 12 weeks. The Amendment Notice to Works Approval W5709/2014/1 states that there will be licence controls including “*the temporal extent of the duration of crushing, screening and loading of trucks limited to 12 weeks per year*” (Amendment Notice to works approval W5709/2014/1, issued 23 December 2016). This proposed condition has incorrectly included the loading of trucks. The Revised Dust Management Plan states that loading of trucks will occur at an average of 31 trucks per day and the transport of gravel from site will occur over a 5 year duration (Lundstrom, 11 May 2016).
- Condition 2.3.1 requires the Licensee to undertake continuous real-time dust monitoring between structure 4A (closest residential receptor) and proposed extraction Stages 9, 10 and 11. The applicant proposed trigger value has been included in the condition with the requirement to have SMS text message automatic feedback. Fugitive dust management actions have been specified in condition 2.3.2 in the event of a trigger level exceedance.
- Condition 2.4.1 has been included requiring the Licensee to undertake meteorological monitoring to assist in the determination of sources of dust.

Residual Risk

Noting the distance to sensitive receptors, the proponent controls and the additional management actions in the event of trigger level exceedances, the Delegated Officer has determined the residual risk as follows:

Consequence: **Moderate**, low level off-site impacts on a local scale.

Likelihood: **Unlikely**, the risk event will probably not occur in most circumstances.

Risk Rating: The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined the overall rating of risk to be **medium**.

References

1. Department of Health Website Health effects of dust accessed at: http://www.healthywa.health.wa.gov.au/Articles/F_I/Health-effects-of-dust (in text ref. Department of Health website, accessed 17/03/2017).
2. Lundstrom Environmental Consultants Pty Ltd Revised Dust Management Plan prepared for B & J Catalano Pty Ltd and received by DER on 11 May 2016 (in text ref Lundstrom, 11 May 2016).
3. Lundstrom Environmental Consultants Pty Ltd Works Approval Application Gravel Extraction on Lots 501 and 21 Coalfields Road, Roelands Shire of Harvey prepared for B & J Catalano Pty Ltd dated April 2014 (in text ref Lundstrom, April 2014b).
4. Amendment Notice to Works Approval W5709/2014/1 accessed at www.der.wa.gov.au



Appendix B - noise

Emission Description

Emission: Noise generated from crushing and screening of gravel, loading and unloading of vehicles and vehicle movement.

Impact: Human health impacts and loss of amenity. The closest sensitive residential receptor is located 880 m north of Stage 9. All other residential premises are located more than 1000 m from extraction stages. The planned residence on Lot 500 does not currently exist and therefore has not been considered as a receptor for the purposes of this assessment. An industrial premises is located approximately 550 m north of Stage 9.

Controls: The location of crushing and screening equipment behind a four metre high noise bund. Crushed material will be stockpiled in a manner that buffers receptors from potential noise during the loading of trucks. Noise modelling undertaken for Stage 9 and 10 indicates that the operation should be able to comply with the *Environmental Protection (Noise) Regulations 1997*. The noise modelling predicts that noise from Stage 9 and 10 will comply with the daytime noise assigned levels at the industrial premises located 550 m north of Stage 9. Residential premises (Res.4/Struc.4) is located further north of the industrial premises at 880 m from Stage 9 and the noise contours also indicate that the daytime assigned levels at Res.4/Struc.4 will be met for Stage 9 (Lloyd George Acoustics, April 2015). The noise contours generated through the acoustic modelling are depicted in Figure 6 below. The proposed dwelling on Lot 500 is at a similar distance from Stage 7 (900m south) as Res.4/Struc.4 is from Stage 9, and therefore it is assumed that the daytime noise assigned levels will be complied with. The applicant has committed to restricting crushing and bulldozing operations to 7am to 5pm Monday to Friday (Lundstrom, April 2014b).

Risk Assessment

Noting the results of the acoustic report and the commitment to restrict crushing and bulldozing activities to between 7 am to 5 pm Monday to Friday, the Delegated Officer has determined the risk as follows:

Consequence: **Minor** – minimal off-site impacts.

Likelihood: **Rare** – the risk event may only occur in exceptional circumstances.

Risk Rating: The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined that the overall rating of risk to be **low**.

Regulatory Controls

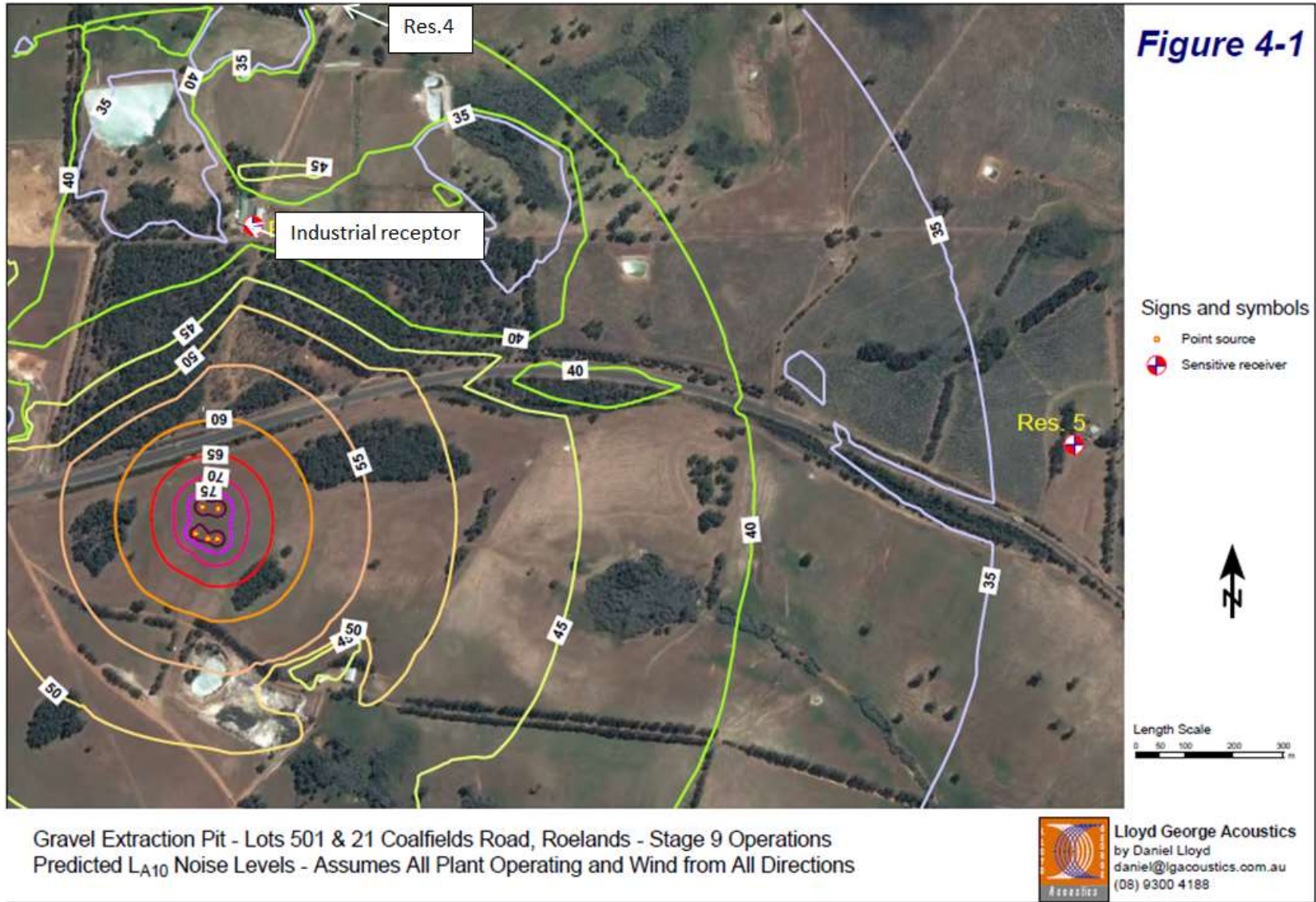
Condition L1.3.6 has been included requiring the Licensee to only operate bulldozers and crushers and screens in accordance with the hours committed to in the Noise Management Plan (Lundstrom, April 2014b). No other conditions relating to noise are required on the Licence, the *Environmental Protection (Noise) Regulations 1997* apply.

References

1. Lloyd George Acoustics *Environmental Noise Assessment Gravel Extraction on Pits Lots 501 and 21 Coalfields Road, Roelands Reference: 1452815-01* 1 April 2015 (in text ref Lloyd George Acoustics, April 2015)
2. Lundstrom Environmental Consultant Pty Ltd *Noise Management Plan* prepared for B & J Catalano Pty Ltd received by DER April 2014 (in text ref Lundstrom, 2014b)



Figure 6: Noise contours for Stage 9 Operations





Appendix C – Ambient Environmental Monitoring and Stormwater Management

Emission Description

Emission: Screened fines that contaminate stormwater causing high turbidity. Contaminated stormwater could potentially be discharged during heavy rainfall and overflow of detention basins.

Impact: Turbid water has the potential to reduce sun availability to aquatic vegetation within the downstream Resource Enhancement Wetlands, Multiple Use Wetlands and downstream river systems. The surface water systems on site drain to the Collie River. Located downstream is a community dam used for potable supply water for the Roelands Farm and Village. Increased turbidity in drinking water can have aesthetic impacts affecting appearance and taste of the water.

Controls: The Revised Stormwater Management Plan (Lundstrom, 23 May 2016) provides the applicants proposed controls:

- *“As each extraction stage is opened, a stormwater detention pond will be excavated below the workings (but within the extraction area) with the capacity to hold at least the 1 in 10 year, 2 hour storm event.*
- *As each extraction area is completed, narrow-based contour bunds will be constructed to a grade of between 0.1 and 0.4%. Contour bund design methodology is discussed further in 3.1.1 below. A total length of 3.4km of contour bunds will be constructed through the life of this extraction operation.*
- *It is proposed to construct three diversion drains which will direct overflow water from detention ponds in Stages 7 to 10 to the existing clay pit dam. Since it is not feasible to direct overflow from the detention ponds 2a in Stage 7 and 7a in Stage 11 to the “clay pit” dam, these detention ponds will be sized to receive at least the 1:50 year 2hr storm event.*
- *Cut-off bunds will be formed along the eastern edges of stages 6 and 7 and along the western edge of Stage 8 and along the northern edges of stages 10 and 11, to prevent runoff entering into mined areas.*
- *The existing (clay pit) detention pond will serve as an effective silt trap in times of high surface runoff (storm events), and will further allow for retention of water for dust suppression activities. Topsoil and overburden bunds will also be in place along the down-slope edges of the cells during the excavation stage and this will control storm runoff during this period.*
- *As part of the rehabilitation process, the ground will be ripped along the contour at six metre intervals prior to fertilisation and seeding. This leaves a depression and low bund which will attenuate surface water flows and prevent rill erosion during the period that pasture grasses are becoming established. Surface water detention ponds and cut-off bunds will be retained until vegetation ground cover is sufficient to stabilise the ground surface and prevent erosion.*
- *Regular monitoring of the erosion control measures will be undertaken and repairs implemented where necessary throughout the licence period or longer if necessary” (Lundstrom, 23 May 2016).*

In addition to the above controls, stormwater monitoring and management is proposed by the applicant:

“Surface water sampling for the purpose of pH and Total Suspended Solids (TSS) will be undertaken within 48 hours of the first significant rainfall of the year and any other rainfall events that result in strong flow within local creek-lines. If an analysis of greater than 30mg/l (TSS) is obtained, then a number of management actions will be undertaken as follows:

- a) All extraction areas above the monitoring point will be inspected to ascertain if sedimentation control works have failed and if so, these will be repaired immediately.*
- b) Follow-up sampling will be undertaken a week after any exceedance of 30mg/l.*
- c) If high sediment loads persist and these can be attributed to the extraction areas, additional detention areas will be created within the relevant extraction area.*
- d) If necessary, coagulants will be used if water within the natural creek remains sedimented for long periods of time” (Lundstrom, 23 May 2016).*



Risk Assessment

Noting the proposed detention basin capacities and the downstream receptors (wetlands and drinking water dam), the Delegated Officer has determined the risk as follows:

*Consequence: **Moderate***, low level off-site impacts on a local scale.

*Likelihood: **Possible***, the risk event could occur at some time.

Risk Rating: The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined the overall rating of risk to be **medium**.

Regulatory Controls

The monitoring and management actions proposed in the Surface Water Management Plan (Lundstrom, 23 May 2016) have been adapted into the conditions of the Licence with some modifications. Limits have been set for turbidity and pH for the receiving environment (Resource Enhancement and Multiple Use Wetlands). The trigger value set for turbidity which is the upper trigger value for slightly disturbed lakes, reservoirs and wetlands is 100 NTU (ANZECC/ARMCANZ 2000).

The trigger value set for pH is <7.0 and >8.5 which is the trigger value for slightly disturbed lakes, reservoirs and wetlands (ANZECC/ARMCANZ 2000). Condition 2.2.1 requires the Licensee to undertake daily monitoring for pH and turbidity during overflow from the detention pond. The detention pond receives overflow from detention basins 2b, 3a, 4a, 4b, 4c, 5a, 6a and 6b via diversion drains. It is not possible to direct overflow from detention basins 2a and 7a due to the topography, therefore these have been sized to contain stormwater from a 1 in 50 Annual Recurrence Interval, 2-hour duration rainfall event. Condition 2.2.2 requires the Licensee to undertake turbidity management actions in the event of trigger level exceedances. The applicability of the proposed use of coagulants (flocculants) will be assessed upon receipt of the review of stormwater management (required by condition 3.2.2) at the cessation of Stage 7b, 8, 9, 10 or 11, whichever comes first. Any use of coagulants (flocculants) will require approval from the Department of Health due to downstream drinking water users.

Residual Risk

Noting the additional controls on ambient surface water monitoring and the turbidity management actions, the Delegated Officer has determined the residual risk as follows:

*Consequence: **Moderate***, low level off-site impacts on a local scale.

*Likelihood: **Unlikely***, the risk event will probably not occur in most circumstances.

Risk Rating: The Delegated Officer has compared the consequence and likelihood rating described above through the Emissions Risk Matrix (Section 6, Table 1) and determined the overall rating of risk to be **medium**.

References

1. Lundstrom Environmental Consultants Pty Ltd *Revised Stormwater Management Plan* prepared for B & J Catalano Pty Ltd received by DER on 23 May 2016 (in text ref Lundstrom, 23 May 2016)
2. ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy accessed at <http://www.environment.gov.au/system/files/resources/53cda9ea-7ec2-49d4-af29-d1dde09e96ef/files/nwqms-guidelines-4-vol1.pdf> (in text ref ANZECC/ARMCANZ 2000)