



Decision Document

Environmental Protection Act 1986, Part V

Works Approval Holder: City of Rockingham

Works Approval Number: W5914/2015/1

Registered office: City of Rockingham
 Civic Boulevard
 ROCKINGHAM WA 6168

Premises address: Millar Road Landfill Facility
 Lot 2170 on Plan 211650 Millar Road
 BALDIVIS WA 6176

Issue date: 19 February 2016

Commencement date: 22 February 2016

Expiry date: 21 February 2024

Amendment Date: 26 May 2016

Prescribed premises category
 Schedule 1 of the *Environmental Protection Regulations 1987*

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
64	Class II Class III putrescible landfill site: premises on which waste (as determined by reference to the waste types set out in the document entitled 'Landfill Waste Classification and Waste Definitions 1996' published by the CEO and as amended from time to time) is accepted for burial.	20 tonnes or more per year	450,000 tonnes per annual period

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.

Decision Document prepared by: Thomas Kaethner
 Licensing Officer

Decision Document authorised by: Caron Goodbourn
 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 type="checkbox"/> Licence amendment <input type="checkbox"/> Works Approval amendment <input checked="" type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	62	50,000 tonnes per annual period
	64	450,000 tonnes per annual period
Application verified	Date: 06/03/2016	
Application fee paid	Date: 23/02/2016	
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 checked="" type="checkbox"/> Assessed under Part IV <input checked="" type="checkbox"/>



Is the proposal subject to Ministerial Conditions?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: 271 EPA Report No: Bulletin 596
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 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 Miller Road Landfill Facility (MRLF), located on Lot 2170 Millar Road, Baldvis is owned and managed by the City of Rockingham. The MRLF has been in operation since 1993.

The MRLF accepts Class I, II and III landfill waste from municipal, commercial and residential sources. The premises is designed to accept 50,000 tonnes per annum for storage and transfer, 50,000 tonnes per annum Class I inert landfill and each cell has a design capacity of 400,000 tonnes per year of Class II or III putrescible landfill waste. The facility has a nominated throughput of 390,000 tonnes per annum.

Initial construction of the landfill began in 1993 with the facility opening that same year. Since then 15 cells have been commissioned. The only currently active cells are Cells 14 and 15 which are due for closure in February 2017, as well as a small portion of available void space within Cells 12 and 13. All cells have been constructed with either compacted low permeability clay or geo-synthetic composite lining and capping systems with leachate collection systems and evaporation ponds.

The MRLF is located on the Swan Coastal Plain within the Spearwood Dune System and the site geology largely comprises of siliceous sands. The closest sensitive receptors are single residences on lots zoned semi-rural approximately 230m and 250m to the east of the landfill. These properties have recently been sold with planning approval granted for extractive industry where they're situated. Beyond this 2 farmhouses are located approximately 420m and 470m from the south eastern boundary of the landfill within the same land use zone. The next closest receptor is a residential subdivision located approximately 500m to the north east of the site boundary in Wellard zoned 'Existing Urban Expansion'. Progressive filling towards the northern most point of the boundary brings landfill operations closer to the Wellard subdivision but will not encroach further than to within 500m of the existing development. Lot 2170 is located adjacent to Bush Forever Site 349 Leda and Adjacent Bushland, being separated from the site by Millar Road.

The MRLF has a Methane Gas Power Generation Facility (MGPF) operated by AGL Energy to harvest methane produced during the waste decomposition process. A recycling area is located at the entrance and a green waste recycling area is located adjacent to Cell 3. Based on void space and expected tonnages, landfilling at the site is expected to cease in 2035.

This Works Approval relates to the development of landfill Cells 16 to 19 and includes establishment of 2 new leachate ponds situated atop Cell 8. This has the capacity to alleviate some of the winter leachate management issues experienced intermittently at the facility as well as to allow for leachate management associated with the new cells. Capping of all cells is assessed through the Capping



Plan requirement as detailed in Licence condition 1.3.11 of L70641997/11 including construction quality assurance and as constructed documentation prior to the establishment of the leachate ponds A and B (See Schedule 1 map). The proposal states that the existing MGPF has the capacity to manage additional landfill gas generated by Cells 16 – 19 and all site capping works. The proposal includes plans to progressively connect landfill gas pipework associated with these cells into the existing management system.

Installation of landfill gas monitoring bores is detailed in the Application including construction quality assurance. Installation of these bores will be assessed in a subsequent licence amendment due to uncertainty around proposed locations of bores. Ongoing assessment of landfill gas onsite will be addressed through L70641997/11 conditions for landfill gas monitoring at various locations onsite will be added through aforementioned amendment.

In summary, the proposed works consists of the following design components:

Construction of cells 16, 17, 18 and 19:

- Earthworks to form the landfill cell base.
- Cell perimeter bunds.
- Leachate extraction sump.
- Lining of the landfill floor and perimeter bunds.
- Protection/cushion geofabric.
- Leachate collection pipework.
- Leachate drainage layer.
- Separation geofabric.
- Leachate extraction/transfer infrastructure.

Installation of landfill gas extraction infrastructure:

- Drilling and installation of gas extraction wells.
- Connection of individual wells to manifolds.
- Connection of manifolds to delivery pipework.
- Connection of delivery pipework to existing power generation facility.

Construction of leachate evaporation ponds:

- Surface preparation.
- Earthworks to form the:
- Leachate pond base.
- Leachate pond perimeter bunds.
- Vehicle access point.
- Lining of the pond surface.
- Pond safety system.
- Pond perimeter bunding.
- Associated leachate delivery pipework.

This works approval amendment is in response to an application submitted by the proponent to vary the liner material quality assurance testing requirements both at the place of manufacture and following delivery of materials to the site.

The original works approval application referenced the *Victorian EPA Best Practice Environmental Management Guideline: Siting, Design, Operation and Rehabilitation of Landfills 2015*; as well as *GRI GCL-3 Test Methods, Required Properties and Testing Frequencies of Geosynthetic Clay Liners, Geosynthetic Institute, Revision 2, 2010*. The proponent has sought to reduce time delays and roll disturbance/exposure onsite from sampling, packaging and awaiting test results from interstate laboratories by adjusting testing requirements.

The proposed variation has been assessed and the risk assessment is outlined in the decision table. Proposed testing methodologies and frequencies are summarised in Appendix A.



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	Interpretation W 1.2.1	<p>Construction</p> <p>Condition 1.2.1 for this works approval requires that all construction works are completed in accordance with the specified works approval application supporting documentation. This includes drawings, appendices, specifications and supporting information submitted as supporting information documented in Table 1.2.1 of this condition.</p> <p>CQAP Addendum: City of Rockingham Millar Road Landfill – Request for Amended Construction Quality Control Testing prepared by IW Projects and dated 8 December 2015 has been included in the in the interpretations to ensure its provisions are added as requirements in general conditions.</p> <p>Where condition W1.2.1 refers to CQAP the aforementioned addendum supersedes manufacturer and construction quality assurance testing in the original application. Quality assurance reporting for these purposes will be assessed against this.</p> <p>Previous condition W1.2.3 has been removed as it is deemed unclear and unenforceable under new licencing processes. Dangerous goods are regulated by Department of Mines and Petroleum. Definitions for dangerous goods and environmentally hazardous material have been removed from the interpretation section for the same reason.</p>	Application supporting documentation L7064/1997/11
Premises operation	L1.3.1 L1.3.2	<p>Operation</p> <p><u>Emission Description</u></p> <p><i>Emission:</i> Contamination of local groundwater with landfill leachate due to liner failure. <i>Impact:</i> Contaminant accumulation in both local and regional groundwater aquifers</p>	Application supporting documentation



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		<p>affecting water quality for use, and ecosystem health. Previous groundwater monitoring reports characterise groundwater beneath the landfill as of poor quality with demonstrated impacts from waste contaminants typical for landfill and nearby nickel processing.</p> <p><i>Controls:</i> Cells 16 to 19 and leachate ponds A and B will be constructed with lining system components that are consistent with the objectives of the Victoria EPA Best Practice Environmental Management for landfills guideline (BPEM) including a geosynthetic clay liner overlain with high density polyethylene, geofabric protection layer and a leachate collection system consisting of rock drainage aggregate underlying cushion geotextile. Proposed manufacturer and construction quality assurance measures are less stringent than BEPM requirements, however on a broad scale these are considered onerous in terms of sample density. The CQA addendum requests only changes to sampling frequencies of liner materials. No tests have been disregarded and no testing methodologies have been changed. Jurisdictional review of manufacturer and construction quality assurance requirements suggests that the proposed test frequencies are environmentally acceptable to mitigate risk to groundwater.</p> <p>Proposed testing methodologies and frequencies are summarised in Appendix A.</p> <p><u>Risk Assessment</u></p> <p><i>Consequence:</i> Moderate. <i>Likelihood:</i> Unlikely. <i>Risk Rating:</i> Moderate.</p> <p><u>Regulatory Controls</u></p> <p>L1.3.1 and L1.3.2 are existing conditions on licence L7064/1997/11 that require all landfill cells and leachate ponds to be lined to a minimum standard of 1×10^{-9} m/s and for the leachate ponds to maintain a freeboard of no less than 300mm. Reporting by a suitably qualified engineer against manufacturer and construction quality assurance for liner components and their installation is required through condition W2.1.3 and 2.1.4 to ensure acceptable liner integrity.</p>	L7064/1997/11



DECISION TABLE			
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		<p><u>Risk Assessment</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Unlikely. <i>Risk Rating:</i> Moderate.</p>	

Appendix A

GCL MQA and CQA Testing Frequency

Property	Test	MQA Frequency		CQA Frequency		Comment
		BPEM	Proposed	BPEM	Proposed	
Montmorillonite content	XRD (X-ray diffraction) Quantitative Mineralogy Analysis	50 tonnes	50 tonnes	10,000 m ²	10,000 m ²	No change requested
Carbonate content		50 tonnes	50 tonnes	NA	NA	No change requested
Bentonite form		50 tonnes	50 tonnes	NA	NA	No change requested
Particle size	AS 1289-3.6.2	50 tonnes	50 tonnes	NA	NA	No change requested
Cation exchange capacity	(Methylene Blue Method)	50 tonnes	50 tonnes	500 m ²	1,500 m ²	50 tonnes equates to 11,415 m ² . The CQA testing is 23 times more frequent than the MQA testing. This is seen as extreme to demonstrate the accuracy of the MQA testing. It is proposed to reduce the testing to approximately eight times the MQA testing requirement. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values.
Free Swell (bentonite)	ASTM D5890	50 tonnes	50 tonnes	1 sample per roll or 500 m ²	1,500 m ²	50 tonnes equates to 11,415 m ² . The BPEM CQA testing is 23 times more frequent than the MQA testing. This is seen as extreme to demonstrate the accuracy of the MQA testing. It is proposed to reduce the testing to approximately eight times the MQA testing requirement. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values.
Mass/unit length of bentonite in overlaps (visual inspection and weighting)		NA	NA	40 m overlap	40 m overlap	No change requested



Moisture Content (bentonite)	ASTM D5993 or AS 1289.2.1.1	4,000 m ²	2,500 m ²	1 sample per roll or 500 m ²	2,500 m ²	Opening up each GCL roll on delivery to site would result in damage to the plastic wrapping and potentially allow the ingress of moisture to the dry GCL. The preference is to limit the number of rolls that are opened for sampling, but to ensure that adequate testing is undertaken to confirm the appropriateness of the MQA testing results. CQA testing will occur on alternative rolls to those tested by the manufacturer; hence, between the MQA testing and the CQA testing, a significant number of rolls being supplied will have been tested. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values. All rolls will be visually inspected during placement and prior to HDPE installation. Should there be any evidence of excess moisture saturation, the affected rolls will be removed and replaced. Additional moisture content testing may be conducted on site should there be concern in regards to the placed material.
Water Absorption	ASTM D5891	NA	NA	1 sample per roll or 500 m ²	1,500 m ²	Opening up each GCL roll on delivery to site would result in damage to the plastic wrapping and potentially allow the ingress of moisture to the dry GCL. The preference is to limit the number of rolls that are opened for sampling, but to ensure that adequate testing is undertaken to confirm the appropriateness of the MQA testing results. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values.
Fluid Loss (bentonite)	ASTM D5891	50 tonnes	50 tonnes	NA	NA	No change requested
Top Geotextile Mass	ASTM D5261	20,000 m ²	20,000 m ²	NA	NA	No change requested



Mass of GCL	ASTM D5993	4,000 m ²	2,500 m ²	500 m ²	1,000 m ²	The mass of GCL is a combination of the top and bottom geotextiles and the bentonite. The most critical component of these three items is the mass of bentonite, which is covered specifically in the item below. The MQA testing frequency of both the mass of GCL and the mass of bentonite have been increased. CQA testing will occur on alternative rolls to those tested by the manufacturer; hence, between the MQA testing and the CQA testing, a significant number of rolls being supplied will have been tested. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values.
Mass of Bentonite	ASTM D5993	4,000 m ²	2,500 m ²	2,500 m ²	2,500 m ²	Due to the above reduction in mass of GCL testing frequency, it is proposed to increase in the MQA testing requirement to provide additional assurance that the mass of bentonite is in accordance with the specifications. CQA testing will occur on alternative rolls to those tested by the manufacturer; hence, between the MQA testing and the CQA testing, a significant number of rolls being supplied will have been tested.
Bottom Geotextile Mass	ASTM D5261	20,000 m ²	20,000 m ²	NA	NA	No change requested
Composite layer Thickness (Dry)	ASTM D1777	4,000 m ²	2,500 m ²	Each roll	Every 3 rd roll	Every 3 rd roll equates to approximately 500 m ² , which is five times less than the proposed amended MQA testing. CQA testing will occur on alternative rolls to those tested by the manufacturer; hence, between the MQA testing and the CQA testing, a significant number of rolls being supplied will have been tested. The proposed testing frequency is deemed adequate to demonstrate sufficient conformance of factory testing values.
Elongation	ASTM D4632	20,000 m ²	20,000 m ²	NA	NA	No change requested
Tensile Strength	ASTM D6768 or ASTM D4595	20,000 m ²	20,000 m ²	10,000 m ²	10,000 m ²	No change requested



Peel Strength	ASTM D6496	4,000 m ²	2,500 m ²	1 sample per roll or 500 m ²	1 sample per roll for side slope and 1 sample per 1,000 m ² for flatter areas.	The sloping areas are typically the higher risk areas; hence, there is no proposed change to the BPEM testing frequency for material used on the slopes. The floor area is a significantly lower risk area; hence, the proposal to reduce the testing frequency. In addition, in this project the waste loading is predominantly vertical, without waste being placed up lined side slopes. All side slope liner applications are in the capping material, which has relatively lower material loadings above the liner material. CQA testing will occur on alternative rolls to those tested by the manufacturer; hence, between the MQA testing and the CQA testing, a significant number of rolls being supplied will have been tested.
Permeability	ASTM D5887	25,000 m ²	25,000 m ²	NA	NA	No change requested
CBR of geotextile	AS 3706-4	NA	NA	10,000 m ²	10,000 m ²	No change requested
Puncture resistance of geotextile	AS 3706-5	NA	NA	10,000 m ²	10,000 m ²	No change requested
Index flux	ASTM 5887	NA	NA	10,000 m ²	10,000 m ²	No change requested
Visual inspection of GCL - Colour, thickness, needle punching, presence of needles or broken needles, and sewing density or other faults in the material.		NA	NA	Every roll	Every roll	No change requested
Thickness of GCL (i.e. uniformity of bentonite distribution) and apparent variations in the as placed moisture distribution - on-site		NA	NA	Each roll during placement. If thickness appears to be variable a check of the variability of the mass per unit area should be conducted	Each roll during placement. If thickness appears to be variable a check of the variability of the mass per unit area should be conducted	No change requested



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
5/5/2016	Draft amended works approval referred to proponent	Comments received regarding updated land use and sale of nearest residences.	This is now noted in the Executive Summary of the Decision Document
30/05/2016	Amendment granted advertised in West Australian (or other relevant newspaper)	Nil	N/A



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