



ENVIRONMENT PROTECTION ACT 1970

## WORKS APPROVAL APPLICATION ASSESSMENT REPORT

<b>Application No.</b>	1002191
<b>Applicant Name</b>	Landfill Operations Pty Ltd
<b>Address of Premises</b>	408-546 Hopkins Road, Truganina, 3029 and 1154-1198 Christie's Rd, Ravenhall
<b>Proposal</b>	Disposal of municipal solid waste, Category C contaminated soil and solid and inert waste.

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## ABBREVIATIONS & GLOSSARY

AHD	Australian Height Datum – sets the mean sea level as zero elevation.
AMRR	Accumulated Monthly Residual Rainfall
APS	Annual Performance Statement - EPA licence holder's annual report of their environmental performance against their licence requirements, including explanations of all non-compliance
AQA	Air Quality Assessment
Background levels	The level or range of levels (usually determined from a number of sites or a series of measurements from the same site) of an indicator measured in a manner and at a location specified by the Authority in waters outside the influence of any contaminant containing a measurable level of that indicator (Section 4, SEPP (GoV))
Beneficial uses	Uses and values of any segment (i.e. water, atmosphere and land) of the environment that government and communities want to protect both now and in the future
Best Environmental Practice	The best combination of eco-efficient techniques, methods and processes or technology used in an industry sector or activity that demonstrably minimises the environmental impact of a generator of emissions in that industry sector or activity
Buffer	An area around a facility/premise maintained between sources of pollution or emission and sensitive land uses. This is an environmental control measure used to protect sensitive land uses from impacts resulting from a failure of landfill design or management or abnormal weather conditions. Under normal operating conditions in compliance with licence conditions, impacts should not occur within the buffer
Capping	Covering of solid waste, utilising a range of potential of materials, preventing the mobility of a contaminated material
CFA	Country Fire Authority
CO <sub>2</sub>	Carbon dioxide
Concentrate and contain	Process designed to concentrate a material into a smaller volume and then contain it
Contamination	The action or state of making or being made impure by polluting or poisoning
Construction Quality Assurance (CQA) Plan	A planned system of activities to provide demonstrable assurance that the landfill has been constructed to the approved design requirements (specifications, construction, installation and testing). CQA

	documentation is subsequently verified by an Environmental Auditor as part of auditing cell construction
CUN	Clean Up Notice
DELWP	Department of Environment, Land, Water and Planning
DHHS	Department of Health and Human Services
DTPLI	Department of Transport, Planning and Local Infrastructure noting this is no longer in existence and has been restructured into Department of Environment, Land, Water and Planning
EMP	Environmental Management Plan
EPA	Environment Protection Authority Victoria
EP Act	<i>Environment Protection Act 1970</i>
Environmental Audit	A total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of any segment of the environment by any industrial process or activity, waste, substance (including any chemical substance) or noise.
Environmental Audit System	<p>EPA's role is to administer the environmental audit system in Victoria, which includes appointing environmental auditors and the review of audits undertaken.</p> <p>The <i>Environment Protection Act 1970</i> in Part IXD, particularly sections 53V and 53X establishes the types of audits that can be conducted and the outcomes of audits.</p> <p>Once finalised, environmental audits are published on EPAs website.</p>
Environmental Auditor	A person appointed under s. 53S of the EP Act as 'an environmental auditor for the purposes of the <i>Environment Protection Act 1970</i> .'
Environment protection principles	Eleven fundamental principles that form part of the environmental management and policy framework of the <i>Environment Protection Act 1970</i> and guide EPA's decision making for the benefit of the Victorian environment and community.
EPA Pollution Abatement Notice	Notice issued under section 31A (or section 31B for minor works) of the <i>Environment Protection Act 1970</i> , aimed to prevent further occurrence of pollution or potential environmental risk
ERR	Earth Resources Regulation, Victoria's resource and mining industry regulator and part of the Department of Economic Development, Jobs, Transport and the Resources
EES	Environmental Effects Statement

Evapotranspiration	The process by which water is transferred from the land to the atmosphere by evaporation from the soil and others surfaces and transpiration from plants
Financial Assurance (FA)	A requirement under the <i>Environment Protection Act 1970</i> for all licensed landfills. Financial Assurances are a mechanism by which a landfill operator provides a guarantee that the costs of site remediation, site closure and post-closure liabilities are not borne by the state or local government. Financial Assurances are held for the period during which a landfill poses a risk to the environment, and may be discharged by the Authority when monitoring and regular inspections demonstrate that the landfill does not pose a risk to the environment.
GCL	Geosynthetic Clay Liner
Geomembrane	Low permeability synthetic membrane liner or barrier used to control fluid or gas migration in a human-made project, structure or system
GHG	Greenhouse gases expressed as tonnes of CO <sub>2</sub> equivalent, unless otherwise stated.
GMMP	Groundwater Monitoring and Management Plan
Intermediate cover	A layer of material or substance used to cover a specifically designated waste lift
ILEAP	Independent Landfill Expert Advisory Panel
Joint Information Session	Information session conducted by multiple government agencies and the community
Joint Process	An integrated approach to the EPA Works Approval, the planning permit application and other government approval processes, which aims to streamline the notice and consultation process for participants and stakeholders.
kLpa	Kilolitres per annum
Landfill BPEM	<i>Siting, design, operation and rehabilitation of landfill Best Practice Environmental Management (August 2015) EPA Publication 788.3</i>
Landfill WMP	<i>Waste Management Policy (Siting, Design and Management of Landfills) No. S264, Gazette 14/12/2004</i>
Leachate	Liquid that has percolated through waste and leached out some of the constituents of the waste
LFG	Landfill Gas

LFN	Low Frequency Noise
Liner System	Barrier system to contain waste, leachate and landfill gas within a landfill waste body that can be designed with different configurations and materials to meet different design specifications.
MCC	Melton City Council
MRSD	<i>Mineral Resources (Sustainable Development) Act 1990</i>
MRL	Melbourne Regional Landfill
MRLCCG	Melbourne Regional Landfill Community Consultation Group
MRLCRG	Melbourne Regional Landfill Community Reference Group
MW	Melbourne Water
MWRRG	Metropolitan Waste and Resource Recovery Group
MWRRIP	Metropolitan Waste and Resource Recovery Implementation Plan
MWPAN	Minor Works Pollution Abatement Notice
MWpa	Megawatts per annum
ORP	Oxidation reduction potential
North Portion	Proposed landfill extension to the north of Riding Boundary Road comprising Cells 8-16
PAN	Pollution Abatement Notice
PEM	Protocol for Environmental Management
PIN	Penalty Infringement Notice
PM <sub>2.5</sub>	Particulate matter of a size of less than 2.5 micrometres i.e. 0.0025 mm
PM <sub>10</sub>	Particulate matter of a size of less than 10 micrometres i.e. 0.01 mm
PPA	Planning Permit Application
PPV	Planning Panels Victoria
P&E Act	<i>Planning and Environment Act 1987</i>
PSA	Planning Scheme Amendment
PSP	Precinct Structure Plan



Phytocap	A cap designed with specific soils and vegetation designed to treat environmental problems without the need to excavate contaminant material and dispose of it elsewhere
Prescribed Industrial Waste (PIW)	Waste specified as prescribed industrial waste under the <i>Environment Protection Act 1970</i> and <i>Environment Protection (Industrial Waste Resource) Regulations 2009</i>
Referral body	For the purpose of this Works Approval Application Assessment Report this is a government agency whom the Works Approval Application has been referred to under the <i>Environment Protection Act 1970</i>
Rehabilitation Bond	Financial security which must be provided by an operator prior to work commencing under Section 80 of the MRSD Act
Rehabilitation Management Plan	Plan submitted under the <i>Mineral Resources (Sustainable Development) Act 1990</i> , and Schedule 13 of the Mineral Resources Development Regulations 2002 (Appendix 1)
Responsible Authority	Government entity that will oversee and implement the planning permit application, in this case Melton City Council
s20B Conference	Section 20B Conference under the <i>Environment Protection Act 1970</i>
s22 Notice	Section 22 Notice under the <i>Environment Protection Act 1970</i> used to require further information
Scheduled Premises	Scheduled premises under the <i>Environment Protection Act 1970</i> and <i>Environment Protection (Scheduled Premises and Exemptions) Regulations 2007</i>
Scheduled Premises Regulations	<i>Environment Protection (Scheduled Premises and Exemptions) Regulations 2007</i>
SEPP	State Environment Protection Policies
SEMETS	South East Melbourne Transfer Station
Section 173 agreement	Section 173 Agreement under the <i>Planning and Environment Act 1987</i>
Segment	Any portion or portions of the environment expressed in terms of volume, space, area, quantity, quality or time or any combination thereof
South Portion	Proposed landfill extension to the south of Riding Boundary Road comprising Cells 1-7

SPPF	State Planning Policy Framework
SV	Sustainability Victoria
SWMMP	Surface Water Monitoring and Management Plan
SWRRIP	Statewide Waste and Resource Recovery Infrastructure Plan
TDS	Total Dissolved Solids
WAA	Works Approval Application
WAAAR	Works Approval Application Assessment Report
WAA Doc 1, WAA Doc 2 ...	Works Approval Application Document 1, Works Approval Application Document 2, etc. refers to Works Approvals documents that are cross-referenced in this report. The abbreviated reference system reflects the order in which documents were submitted by Landfill Operations. A complete list of Works Approval Application submission documents is presented in Appendix A of this Assessment Report
Wastes Hierarchy	One of the eleven environment protection principles of the EP Act.
WHO	World Health Organization
WMP	Waste Management Policy
Works Authority	Approval under the <i>Mineral Resources (Sustainable Development) Act 1990</i>
Work Plan	Work plan specified under the <i>Mineral Resources (Sustainable Development) Act 1990</i>
WRRG	Waste and Resource Recovery Group

It is noted that Landfill Operations Pty Ltd (Landfill Operations) is a wholly-owned subsidiary of Cleanaway Waste Management Ltd (Cleanaway) are used interchangeably within this report.

## EXECUTIVE SUMMARY

### BACKGROUND INFORMATION

Landfill Operations Pty Ltd (a wholly owned subsidiary of Cleanaway Waste Management Ltd) has applied for a Works Approval from Environment Protection Authority (EPA) for an extension of the Melbourne Regional Landfill. The current facility has 7–10 years of capacity remaining under its current approvals and EPA licence (Licence Number 12160).

Boral acquired an EPA licence (December 1998) and planning permission (1999) to use voids created by quarry operations to dispose of mostly municipal (Type 2) waste. Landfill Operations acquired the MRL facility from Boral in March 2015. The Melbourne Regional Landfill facility has been receiving waste since 1999.

In addition to the Works Approval, the proposed extension also requires a planning permit application from the Minister for Planning under the Melton Planning Scheme. This planning permit application was subsequently called in by the Minister for Planning (5 April 2016) in accordance with section 97B(1) of the Planning and Environment Act 1987. EPA's assessment of a Works Approval application is separate to the planning permit assessment process.

### WORKS APPROVAL APPLICATION PROCESS

Key stages of the Works Approval application process and technical assessment included (in chronological order):

- on 29 February 2016, EPA received Works Approval application
- on 13 May 2016, EPA formally accepted the Works Approval application
- on 14 June 2016, joint advertisement and notification of the Works Approval application and planning permit application for an extended 32-day community consultation period and was referred to statutory and non-statutory agencies for review
- on 19 and 20 June 2016, held joint Works Approval Application and planning permit application drop in information sessions in Caroline Springs
- on 7 September 2016, EPA issued a section 22 Notice request for further information to Landfill Operations
- from 29 September to 28 October 2016, a joint Planning Panel Hearing and section 20B Conference was held to provide stakeholders and the community with the opportunity to present their views on the Works Approval application and planning permit application to an independent panel
- on 9 December 2016, EPA received the further information requested by the section 22 Notice
- between 9 December and 23 January 2017, EPA conducted an additional consultation and referral period to allow stakeholders opportunity to review and comment on the additional information received in response to the section 22 Notice
- between January and February 2017, EPA's Independent Landfill Expert Advisory Panel considered the Works Approval application and EPA's assessment and provided an expert peer review

- on 11 January 2017, EPA received the Planning Panel report with recommendations that EPA must consider in its Works Approval application assessment
- on 16 January 2017, EPA held a second Information Session to explain further information requested and information provided
- January – February 2017, EPA's Independent Landfill Expert Panel, considers the Works Approval application, EPA's assessment and provides expert peer review
- January – February 2017, receives independent peer reviews of the odour modelling and the stormwater management plan
- February – March 2017, completion of technical assessments by EPA specialists of how the Works Approval application meets the Environment Protection Act (EP Act), relevant policies and best practice guidelines for landfills.

## **PROPOSED WORKS**

The proposed activities subject to this Works Approval application relate to the:

- extension of the existing landfill to areas west and northwest of the current facility; following progressive quarrying of the site by Boral
- construction of 16 new landfill cells in two portions (North and South) to create a total additional landfill airspace volume of 53 million cubic metres
- commencement of landfilling in 2025 for a period of 30 years, operating 24 hours seven days a week (except for public holidays)
- continuing the acceptance of putrescible waste, non-putrescible waste (solid inert waste), pneumatic tyres shredded into pieces less than 250 millimetres, and Category C contaminated soil.

The proposals for the Type 2 landfill have been designed to meet the Landfill Best Practice Environmental Management (BPEM) guidelines. This guidance sets out objectives, required outcomes and suggested measures for the construction, operation and rehabilitation of landfills based on internationally recognised best practice in the landfill sector. It is regularly reviewed and amended to ensure it is up to date with international best practice.

Key features of the proposals include:

- a liner and landfill cap system to contain the waste
- leachate collection system and leachate ponds
- a landfill gas collection system that will provide gas for combustion in gas engines (the engines themselves are not part of this Works Approval application)
- a separate stormwater management system
- litter fencing and wheel wash facility
- progressive sequencing of landfilling following quarry excavation.

Following the disposal phase, the landfill would be progressively rehabilitated in accordance with a Rehabilitation Plan to form a safe and stable landform. The proposed end use is public open space.

Prior to the disposal of any waste in the proposed cells, Landfill Operations will need to provide a Financial Assurance bond to the EPA. This guarantees that the costs of site remediation, site closure and post-closure liabilities will not be borne by the state.

## **CONSIDERATION OF KEY ISSUES**

The Works Approval application assessment process identified and considered the following key issues:

- Landfill Operation's and Cleanaway's track record
- air
- odour
- landfill gas
- groundwater
- surface water
- noise
- greenhouse gas emissions
- water use
- climate change
- soil resources
- land
- health
- compliance with section 50C of the EP Act
- consistency with Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) and Metropolitan Waste and Resource Recovery Implementation Plan (MWRRIP)
- compliance with the Landfill Waste Management Policy (WMP) and Landfill BPEM
- compliance with the environmental protection principles of the EP Act.

### **Track Record and Fit and Proper Person Test**

The Applicant has provided an accurate account of its landfill compliance track record and EPA considers Landfill Operations and its parent company, Cleanaway, to meet the 'fit and proper person' requirements of the EP Act.

### **Air**

Landfills can pose a risk to air quality through landfill gas, odour and dust generation and transportation off-site. Regulatory model AERMOD, local representative meteorological data, terrain and topography inputs were used for dust modelling. The estimated air quality impacts meet the assessment criteria specified in the State Environment Protection Policy –Air Quality Management (SEPP AQM) and the Protocol for Environmental Management for Mining and Extractive Industries and the Landfill BPEM. Current dust controls are considered best practice and

limited observations indicate they appear to be working but a formal best practice comprehensive dust management Plan will be required.

### **Odour**

The control and mitigation of odour emissions was identified as an area of particular importance due to their potential impact on the current and future sensitive receptors. EPA has both currently and historically received a large number of pollution reports from residential areas surrounding Melbourne Regional Landfill, at a distance of up to three to four kilometres from the landfill. Since January 2015, 450 odour pollution reports have been reported by the community, although EPA has rarely confirmed strong landfill odours during targeted and responsive odour investigations.

The modelling of future odour scenarios from sources as large as MRL is complex and associated with a high degree of uncertainty. Based on both EPA's assessment and an independent review of the application's odour modelling, the assumptions and methodology used in the Works Approval application odour models were considered inadequate. The modelling did not realistically simulate the landfill odour emissions and lacked appropriate ground truthing with field observations. Accordingly, EPA used a different approach to assess odour risks, based on the odour surveillance and odour impact monitoring, complemented by the modelling to gain an understanding of the local odour dispersion and transport. This risk assessment was found to better represent future odour emissions and more realistically shows the occasional odour detected by people living and working near landfills.

EPA's risk assessment concluded that:

- the proposed landfill extension complies with the SEPP (AQM) odour requirements
- there is a low to medium risk of odour detection occurring, compared with the low risk suggested by the odour modelling in the application
- the risks are lower as the distance from the cells increases (Cells 10, 13 and 16 are 1.5–2 kilometres away from the residential areas of Caroline Springs and Deer Park).

To manage odour, Landfill Operations have proposed an Odour Management and Monitoring Plan be developed and implemented in accordance with appropriate conditions.

### **Landfill gas**

Landfill Gas (LFG) is produced through the degradation of waste materials in landfills and is odorous, an asphyxiant and potentially explosive when mixed with air. LFG is emitted to the atmosphere and can escape through the liner and move through geology and service structures around landfills. As such, LFG requires rigorous management and monitoring.

LFG generation has been assessed in the Works Approval application through a conceptual site model and a LFG risk assessment. The LFG risk assessment has some omissions, but the proposed LFG management practices identified in the Works Approval application were considered to be best practice as noted in BPEM. These measures will reduce LFG risk and odour from an active cell, but does not prevent it. Best practice LFG management and monitoring has been proposed in the Works Approval application and can be expected to be reinforced by EPA licence conditions.

### **LFG buffer distances**

With regards landfill gas buffer it is noted that landfill gas migration risks will continue for decades after a landfill stops receiving waste. Development within 500 metres of a landfill is allowed by BPEM, upon the completion of an appropriate assessment of landfill gas risk. The Independent Landfill Expert Advisory Panel report recommended that a 100 metre buffer internal to the

Melbourne Regional Landfill site be maintained. After further assessment, EPA concluded that 100 metres is not an acceptable landfill gas buffer. This assessment was based on the known migration of landfill gas at distances exceeding 110 metres at the current Melbourne Regional Landfill site. EPA also concluded that there is currently no data available to confirm whether a buffer of less than 500 metres would mitigate the risk of landfill gas migration in the case of landfill gas management failure. As a result, EPA maintains that the default 500 metre buffer should be maintained at this time, but notes that this could be amended to a shorter distance should appropriate data become available.

### **Groundwater and surface water**

The protection of the groundwater and surface water environment has been investigated throughout the Works Approval application process. No impacts are expected on groundwater or surface water, and EPA noted that Melbourne Water do not object to the channel diversion of a tributary of Skeleton Creek. Additional design information will need to be prepared and approved at the Detailed Design stage. Groundwater and surface water management and monitoring plans should be prepared, approved and implemented as required by appropriate conditions.

### **Noise**

With the abatement proposed, operational noise will meet the permissible noise levels set in SEPP(N-1). Noise from trucks (low frequency rumbling) may, however, have an impact on premises close to the South West corner. EPA has concluded on the basis of the Works Approval application that the risk of noise is minimal if all mitigation measures are adhered to.

### **Greenhouse gases**

Sources of greenhouse gas emissions have been considered and will be minimised through the adoption 'best practice' mitigation measures. This includes the implementation of a framework to evaluate future equipment and fuel choices, and the capture, minimisation and combustion (converting the more greenhouse intensive methane to carbon dioxide of landfill gas).

### **Water use**

Groundwater extraction and rainwater will be the primary source of water used on the site. Annual volumes are estimated to be 39 megalitres during the disposal phase, reducing to zero once the landfill is capped and vegetation is established. Such water usage rates are considered negligible.

### **Climate Change**

Taking into account the location of the site, EPA considered potential influences of climate change on the proposed landfill to be most likely limited to more extreme weather events.

The Works Approval application proposals include a landfill gas collection system to capture gas such that they can be burnt in gas engines to produce electricity. This capture and conversion minimising landfill gas emissions is considered by EPA to be best practice and will assist in reducing climate change impacts.

### **Soil Resources and Land**

Prior to any landfilling, the soil resources and land at the site will have already been significantly altered by the Boral quarrying operations such that the beneficial uses from soil resources and mineral resource will already have been extracted prior to landfilling commencing.

The proposals will create an authorised and licensed parcel of contaminated land, albeit in a suitable location with containment measures that meets best practice requirements.

### **Human health**



EPA has considered the issue of potential effects on human health through the referral process with the Department of Health and Human Services (DHHS). Additionally, an updated independent literature review was commissioned by EPA and DHHS to provide a current understanding of research on potential human-health impacts from air emissions from non-hazardous waste landfills. The key conclusion from this review showed that living near a non-hazardous waste landfill is not associated with any adverse health effects, but some gases and compounds may be odorous and may affect the wellbeing of the local community. DHHS did not object to the proposed landfill but did highlight that the EPA should ensure that various requirements, such as buffer distances, are met.

### **Consistency with SWRRIP and MWRRIP**

The EPA may refuse to consider an application for a Works Approval in relation to a waste management facility if the operations would be inconsistent with the Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) and Metropolitan Waste and Resource Recovery Implementation Plan (MWRRIP). The proposed facility is considered to be consistent with the SWRRIP and MWRRIP for the purposes of being able to consider the application, albeit it is noted that the proposed lifespan until 2055 is beyond the duration of the SWRRIP (2015-2044) and MWRRIP (2016-2046).

### **Compliance with BPEM and Landfill WMP**

The Works Approval application included several documents and investigations containing information to demonstrate compliance with Landfill WMP and the Landfill BPEM, including:

- The proposed landfill is listed in the landfill schedule of MWRRIP 2016, with an identified currency (subject to Works Approval) of 2016–2046. This does not cover the additional 11 years beyond 2046 proposed in this Works Approval application.
- The proposed landfill siting complies with Landfill WMP requirements.
- The Works Approval application demonstrates representative groundwater is of Segment C and groundwater levels at the site show a temporal variability that is impacted by rainfall recharge and groundwater extraction. Hydrogeological assessments and groundwater experts agreed that long-term undisturbed groundwater levels are within two metres of some cells in the South Portion. Accordingly, additional design and management measures have been proposed to ensure there is appropriate separation of the waste body from groundwater.
- The landfill setting is considered to comply with the BPEM buffer requirements for groundwater, surface waters, buildings and structures and aerodromes. Optimising the separation/buffer distance between the landfill and potential sensitive receptors is critical to effectively manage the impact of residual odour emissions on local amenity into the future. EPA strongly recommends a minimum odour buffer of 1,500 metres north and northeast and 1,000 metres west of the site. This is based on the targeted EPA odour surveillance analysis of the existing landfill, extensive experience with other landfills within the State combined with local wind pattern characteristics.
- The Works Approval application contains sufficient design features to comply with the Landfill BPEM but that further detailed design information should be provided prior to the start of landfill construction.



## **Compliance with environment protection principles the EP Act**

The Works Approval application is required to adhere to the environment protection principles contained within the EP Act. As such, the Works Approval application must include text that indicates how the applicant is meeting the relevant principles. Six principles were identified and assessed by EPA as being relevant to this application. The result of the assessment was that some principles were not met by an application in excess of the SWIRRP:

- Principle 1B – Integration of economic, social and environmental considerations. EPA believes that with the proposed duration of the application that disproportionate effects are likely to be experienced by the local community, even with a landfill that complies with BPEM
- Principle 1D – Intergenerational equity. The duration of the landfilling proposed means the site will be locked in as a landfill, despite the potential for future changes due to the dynamic and evolving legislative, policy and waste management arena
- Principle 1I – Waste Hierarchy. Although the proposals are BPEM compliant, landfilling is at the bottom of the waste hierarchy and the Works Approval application would lock in landfilling at the site. The dynamic and evolving nature of the governance and management of waste means that the need for landfilling may change in 20 or 30 years.

## **DECISION**

EPA has assessed the Works Approval application and has issued Landfill Operations with a Works Approval. In granting the Works Approval, EPA considered:

- the Works Approval application
- referral responses and submissions
- the recommendations of the Chair of the Joint Planning Panel Hearing and section 20B conference
- the independent reviews conducted on behalf of EPA
- technical assessments undertaken by EPA in-house specialists.

The Works Approval issued by EPA is for a landfill that is smaller than what was proposed in Landfill Operations' Works Approval application, and is subject to the satisfactory completion of a series of conditions, outlined in the next section of the Executive Summary.

The extent of the Works Approval issued is limited to the seven cells south of Riding Boundary Rd ('the South Portion') – an area of 96 hectares, providing 23.3 million cubic metres of airspace, and nominal 13 years of landfilling (2025 to 2038).

In reaching its decision, EPA has considered government waste management plans (the SWRRIP and MWRRIP), which set out the need for the proposed landfill. These plans only identify a need to 2044 and 2046. The landfill proposed in the Works Approval application would therefore have extended 9 years past the identified need and EPA is not prepared to approve a duration longer than the published plans.

Furthermore, EPA determined that the proposal – as restricted to the South Portion only:

- is identified in the 2016 MWRRIP landfill schedule
- is compliant with the Landfill BPEM, Landfill WMP. This means it has been assessed as meeting international best practice standards and is suitably located
- is compliant with SEPPs
- is consistent with SWRRIP
- is not expected to adversely affect the interests of any person other than the applicant
- is not expected to adversely affect the quality of any segment of the environment nor cause pollution or environmental hazard
- is compliant with the environment protection principles of the EP Act
- has not been objected to by DHHS
- has been made by Landfill Operations who is considered to be a fit and proper person.

It is highlighted that the Works Approval is dependent on Landfill Operations obtaining a valid planning permit and that the Landfill Operations will need to obtain an EPA Licence amendment prior to disposing of waste in the proposed cells. EPA will recommend the formalisation of required odour and landfill gas buffers in the planning scheme.

## **CONDITIONS & NEXT STEPS**

The Works Approval issued is subject to a series of conditions, which help define the extent that the approval is for the South Portion only and requires specific activities to be undertaken – some prior to the commencement of construction, and others that will extend throughout the lifetime of its operation. The conditions include:

- possession of a valid planning permit
- formalisation of landfill gas and odour buffers in the planning scheme
- installation of key containment and environment protection requirements
- reporting requirements
- the provision of a Financial Assurance to an amount agreed by EPA
- the provision of detailed design documents for written approval prior to commencement of any construction
- the inclusion of the identified additional design and management measures within the final designs
- the development and implementation of odour, groundwater, surface water and landfill gas monitoring and management plans
- engagement of an environmental auditor (appointed under the EP Act) to prepare an environmental audit report before the construction of a new landfill cell or the leachate collection pond.

Subject to the satisfactory completion of the conditions attached to the Works Approval, and the granting of the associated planning approval, Landfill Operations can commence construction of the landfill, if:

- design documents (plans, technical specifications and construction quality assurance documents) are submitted for the first cell and the leachate pond.
- design documents are assessed by an environmental auditor for EPA approval prior to construction of the first cell and the leachate pond.

This is to ensure that the detailed design documents comply with Landfill BPEM.

Should Landfill Operations wish to construct subsequent cells or a leachate pond, the following steps must occur:

- Landfill Operations must notify EPA, and submit detailed construction plans for that cell and demonstrate that it meets the Landfill BPEM (current at that time).
- EPA reviews the plans and ensures they meet best-practice requirements and that the designs meet any future landfill design improvements.
- the construction of each cell and/or leachate pond must be verified by an environmental auditor appointed by EPA under the *Environment Protection Act 1970* to verify that the construction of that cell or leachate pond complies with EPA approved design documents for that cell or leachate pond.
- on completion of construction, the operator then submits a licence amendment application. An EPA Auditor report must confirm that the cell's construction has been verified as complying with the approved plans.
- the landfill operator can only start filling the cell with waste after EPA grants a licence or licence amendment.

## 1 BACKGROUND INFORMATION

### LANDFILL OPERATIONS PTY LTD

- 1.1 Landfill Operations Pty Ltd (hereafter referred to as Landfill Operations) is a wholly-owned subsidiary of Cleanaway Waste Management Limited (hereafter referred to as Cleanaway), a national resource recovery, waste management, recycling and industrial services company.
- 1.2 Cleanaway currently operate eight open landfills across Australia through various subsidiaries, including, as at 8 March 2017, three EPA licensed facilities in Victoria.
- 1.3 In March 2015, Cleanaway acquired the Melbourne Regional Landfill (MRL) at 1100-1152 Christies Road, Ravenhall from Boral Recycling Pty Ltd (ultimate holding company Boral Limited, hereafter referred to as Boral).
- 1.4 Boral operated the landfill from 1999 after obtaining EPA licensing in December 1998 and a planning permit (PA2091/97) in 1999. Boral utilised the voids created by quarrying activities conducted on the site and surrounding properties since the mid-1960s. Boral continues its quarrying operations at Boral Deer Park Quarry.
- 1.5 On 29 February 2016, EPA received a Works Approval Application (WAA) proposing an extension of MRL west and northwest of the current EPA licensed premises boundary.
- 1.6 A planning permit application (PPA) (Application Number: PA2016/5118) was also submitted to Melton City Council (MCC) on 29 February 2016 for the proposed expansion. This was subsequently called in by the Minister for Planning on 5 April 2016 for Ministerial decision making pursuant to section 97B(1) of the *Planning and Environment Act 1987*.
- 1.7 The proposed landfill extension will continue utilising quarry voids created by Boral operations and is considered part of long-term progressive rehabilitation of the quarry site.

### SITE

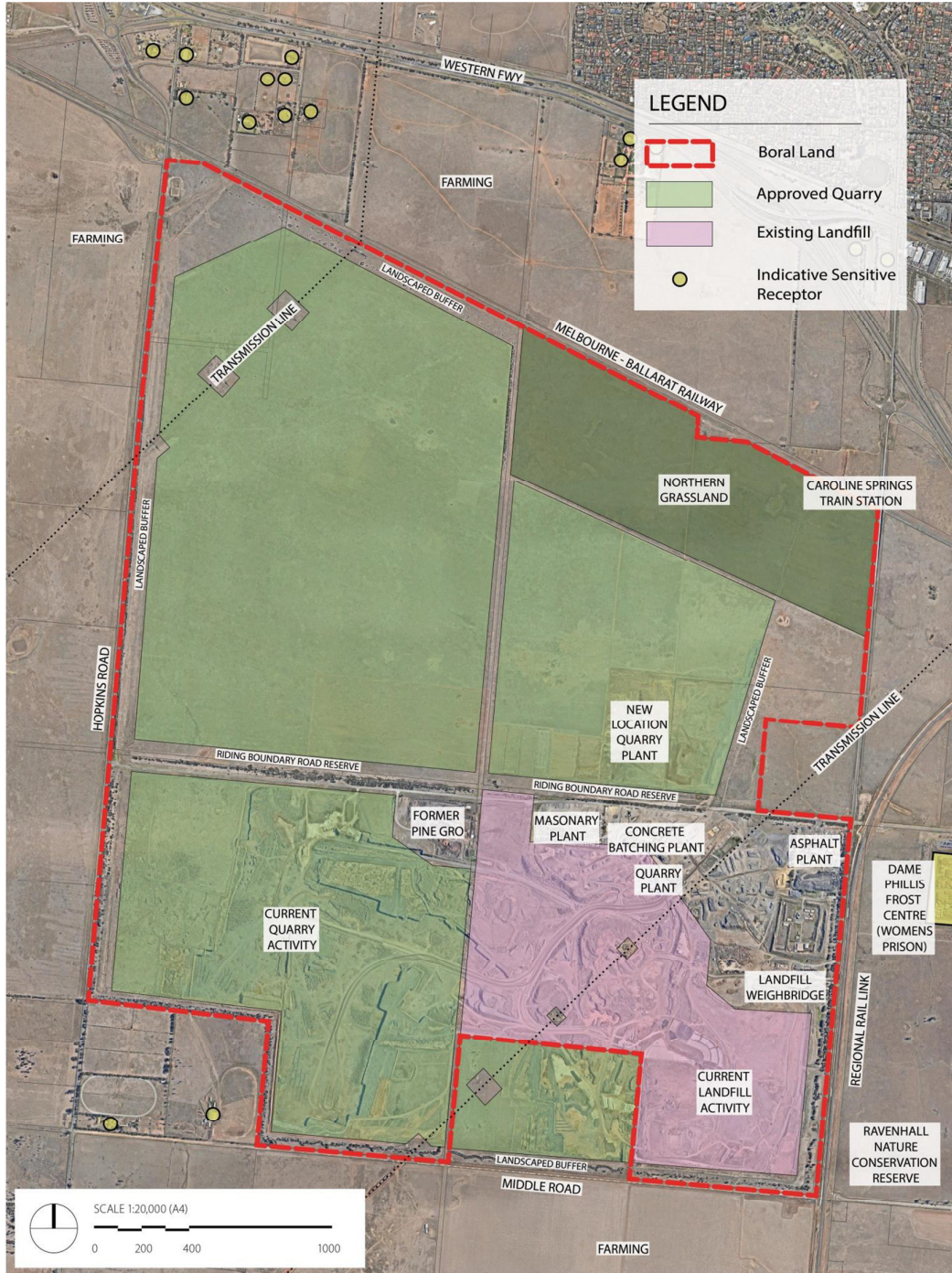
- 1.8 MRL is approximately 20 kilometres from central Melbourne in the city's outer western suburbs. It is approximately 1.5–3 kilometres southwest of Caroline Springs, as shown in Figure 1.



**Figure 1: Site location**

- 1.9 The proposed extension site is located within the property boundaries of 408–546 Hopkins Road, Truganina and 1154–1198 Christies Road, Ravenhall, as shown in Figure 2, which also shows the existing landfill premises boundary.
- 1.10 As shown in Figure 2, the extension site area is bound by Hopkins Road to the west, the Ballarat Rail Line to the north, Clarke Road to the east and Middle Road to the south. The extension is divided into two portions referred to as the ‘South Portion’ (south of Riding Road) and the ‘North Portion’ (north of Riding Road).
- 1.11 The site or ‘premises’ subject to this Works Approval Application (WAA) assessment covers an area of 347 hectares within which the landfilling will occur in 16 cells, covering an area of 210 hectares. The premises also include landfill infrastructure such as surface water runoff ponds, leachate ponds, landfill gas (LFG) collection equipment, plus bunds and other land that will not be used for waste disposal.
- 1.12 It is noted that PPA 2016/5118 covers a larger area extending to the north east, which incorporates a further seven proposed landfill cells. If planning approval were granted for this additional area, a further WA application would be needed and a WA issued before any works could occur.
- 1.13 The planning permit and Works Approval landfill extension areas to be operated by Landfill Operations are distinct from the total property area owned and operated by Boral.





**Figure 2: Showing the current Ravenhall Precinct and land uses, including the current Boral quarry and the existing Melbourne Regional Landfill location**

## SITE HISTORY & QUARRYING

- 1.14 Quarrying commenced at the site in 1968 by Boral’s predecessor, Albion Reid Pty Ltd, and operated under a planning permit issued by the Melbourne Metropolitan Board of Works.

- 1.15 From 1974 quarrying was conducted under two, fixed-term Extractive Industry Licences. These were consolidated into a single, 20-year fixed-term licence in 1989.
- 1.16 Following the introduction of the *Extractive Industries Development Act 1995*, quarrying activities at the site were brought under the Extractive Industry Work Authority No. 97. This new regime, which continues to operate today, includes a validity period spanning the life of the resource.
- 1.17 Boral continues to operate a large precinct in the area including one of Melbourne's main hard rock quarries (Boral Deer Park Quarry), an asphalt plant and concrete operation. The company estimates the quarry has a remaining 'life' of between 60–70 years.
- 1.18 From December 1998, Boral's activities expanded to include MRL under EPA licence number ES37288, and from 2013 (following the introduction of a new business system at the EPA) EPA licence number 12160.
- 1.19 Boral pursued the option of landfilling as a method of utilising quarry voids as part of a progressive end use and quarry rehabilitation and in 2013 applied to MCC for planning permission to expand the landfill. This covered an even larger area (562 hectares) than what is now proposed and was refused in 2014.
- 1.20 Prior to Cleanaway's acquisition of MRL, the landfill was licensed to accept solid inert waste, putrescible waste, asbestos of domestic origin, pneumatic tyres shredded into pieces less than 250 millimetres, and Category C contaminated soil (waste code N121). Following a request from Cleanaway, asbestos of domestic origin was removed from the licensed wastes permitted to be disposed of at MRL.

## **EXISTING LANDFILL & DISPOSAL ACTIVITIES**

- 1.21 Since acquiring MRL and EPA licence 12160 in 2015, Landfill Operations has continued to accept:
- solid inert waste
  - putrescible waste
  - pneumatic tyres shredded into pieces less than 250 millimetres
  - Category C contaminated soil (waste code N121).
- 1.22 The facility ceased accepting asbestos of domestic origin and has not been licensed to do so since Landfill Operations acquired MRL in 2015.
- 1.23 Currently MRL receives waste from the northwest Melbourne waste catchment. From 2017, MRL will receive waste brought in from Cleanaway's metropolitan waste transfer network, including waste from Melbourne's south east waste catchment. There will be no change to the existing waste sources:
- municipal Solid Waste
  - commercial and Industrial Waste
  - construction and Demolition Waste
  - waste from private waste companies and industries.
- 1.24 Planning permit (P2091/97) was approved in January 2004 and enables the existing landfill to operate 24 hours day, 7 days a week, although it is not currently doing so.



- 1.25 MRL's existing operations are divided into six staged areas, which contain individual landfill cells that are progressively filled. All stages of the landfill conform to the final overall cap design specified in the pre-settlement contour plan.
- 1.26 The existing landfill has an expected 7–10 years of remaining airspace (landfilling capacity). According to Landfill Operations APS Submission 60303960, MRL received 973,997 cubic metres (Annual Survey Data) or 808,423 tonnes (weighbridge data or waste transport certificates) of waste in 2015–16.
- 1.27 Photographs showing key features of the existing MRL are provided in Figures 3–5.



**Figure 3: View looking west from Stage 2 (existing landfill), showing the intermediate cover (foreground), the geotextile liner in the base of Cell-2M (in the middle of the photo) and the base of the excavated quarry floor for proposed Cell 3 (top of the photo).**





**Figure 4: View towards northeast across Stage 2 (existing landfill) showing the leachate pond (centre of photo)**



**Figure 5: Leachate collection wells on the capped Cell 2A of Stage 2 of the existing landfill**

## **PRESCRIBED INDUSTRIAL WASTE RECEIVED**

- 1.28 Prior to Cleanaway’s acquisition of MRL, the landfill was licensed to accept two categories of Prescribed Industrial Waste (PIW). These were:
- category C contaminated soil (waste code N121)
  - asbestos of domestic origin.
- 1.29 MRL continues to dispose of Category C contaminated soil (approximately 10 per cent of waste received at MRL falls under this waste category). Category C is the lowest level of contamination for Prescribed Industrial Waste soil categorisation.

## **REHABILITATION**

- 1.30 Rehabilitation of the existing landfill is in progress. At the end of 2016, rehabilitation had occurred for 15 cells, with a filled mass of approximately 6,376,000 tonnes. Currently, Stage 1 cells have the final capping installed and complete. According to the most recent Audit Report, all Stage 2 cells were expected to be filled by the end of 2016. Stage 3 cells are expected to begin receiving waste in late 2016, early 2017.
- 1.31 It is best practice that landfill cells receive their final cap within two years of reaching its approved capacity. Some areas are installed with an ‘intermittent cover’ or temporary cap while a BPEM compliant final cap is designed and submitted to EPA for approval.

## **LANDFILL GAS**

- 1.32 As part of long-term management and rehabilitation, Boral began operation of a LFG waste to energy plant. LFG, which would otherwise be emitted to atmosphere, is collected from completed and operational landfill cells and converted to electricity.
- 1.33 This facility was issued works approval WA61767 in 2007 which allows for the progressive installation of up to 8 generator module units.
- 1.34 Currently four modules operate under EPA licence 112063 with a rated energy capacity of 4 Megawatts. This is enough to power 4,000 homes, 24 hours a day.
- 1.35 The licence includes limits for carbon monoxide, oxides of nitrogen (as nitrogen dioxide), and oxides of sulphur (as sulphur dioxide).

## **LAND USE & PLANNING**

- 1.36 The site is located in an area that is currently rural with industrial land to the east and residential uses further north, east and south. The area has undergone change and is proposed to be significantly altered in the future with the proposed Mount Atkinson and Tarnet Plains Planning Scheme Precinct (PSP) development.
- 1.37 The rural areas are largely grassland except for taller vegetation confined to roadsides, fence lines and boundaries, watercourses and wind breaks.
- 1.38 The proposed MRL extension is located within the administrative boundary of Melton City Council (MCC), with Wyndham City Council 1–2 kilometres to the south. As illustrated in Figure 6 below, the proposed MRL extension is located in a Special Use Zone under the Melton Planning Scheme.



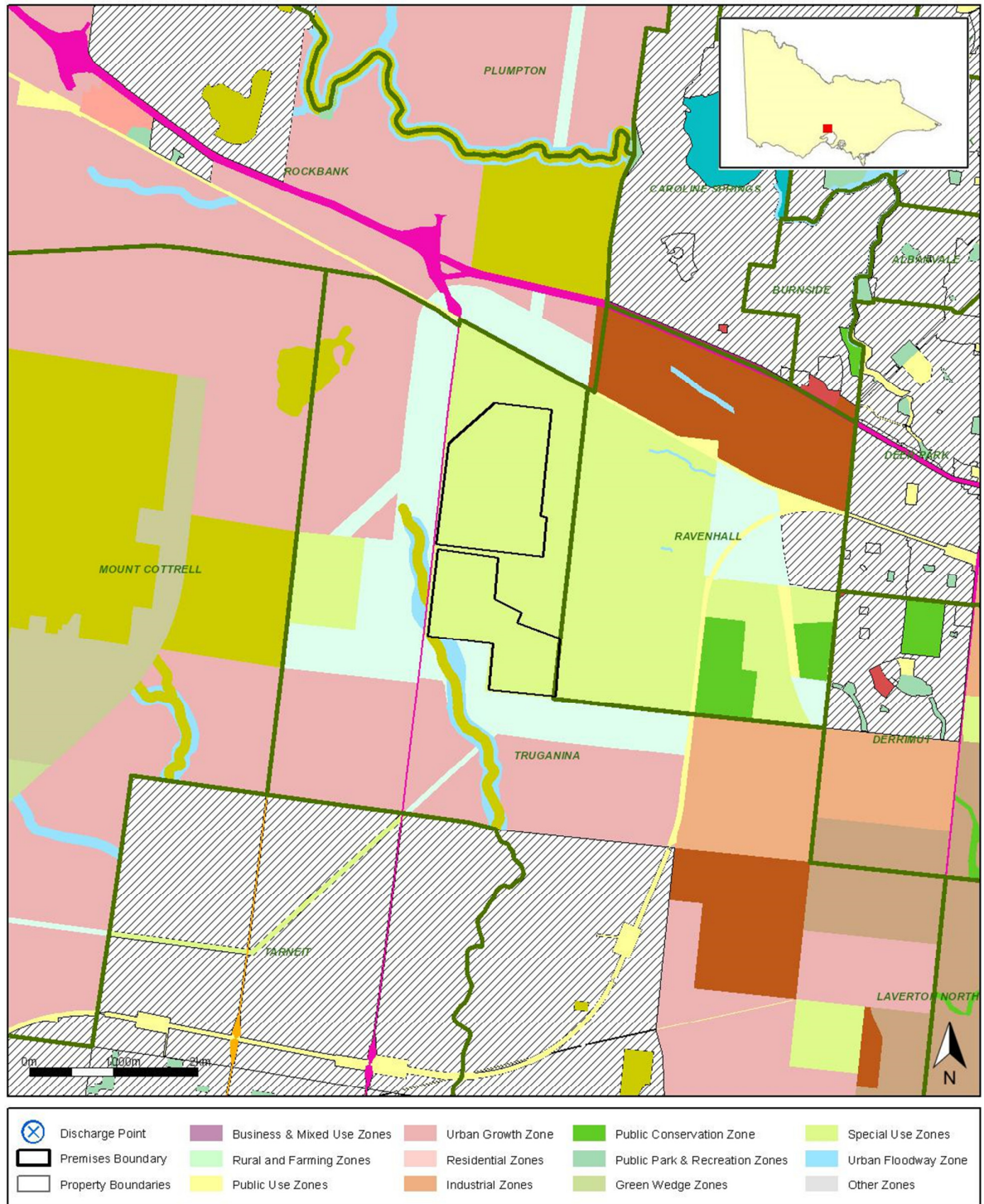


Figure 6: Melton Planning Scheme planning zones covering the site and surrounding area

## ZONES

1.39 Special Use Zones (SUZ) provide for the use and development of land for specific purposes. Schedule 1 to the SUZ (SUZ1) provides for the use and development of land

- for earth and energy resource industry. This to encourage the interim use of the land that is compatible with how land is used nearby. This also encourages land management practice and rehabilitation that minimises adverse impacts on the use and development of nearby land.
- 1.40 As shown in Figure 6 above, a strip of Farming Zone runs from the northwest corner along the western boundary to the southeast corner of the property. This was preserved as a buffer area for the landfill and quarry activity when much of the surrounding land was brought within the Urban Growth Boundary in 2010 and designated as an Urban Growth Zone (UGZ).
- 1.41 A strip of Industrial 3 Zone (IN3Z) bounds the north and northeast boundary of the site, acting as a buffer for the major residential areas of Caroline Springs, Burnside, and Deer Park beyond.
- 1.42 It is noted that currently, there are no sensitive (residential) receptors within 500 metres of any of the proposed WAA landfill cells. The nearest sensitive receptors to the South Portion are 500 and 700 metres to the southwest. The nearest sensitive receptors to the North Portion are 1,100 metres to the north and 1,400 metres to the north east.
- 1.43 As noted in paragraph 1.36 it is additionally noted that to the west of the proposed landfill extension is the Mount Atkinson and Tarneit Plains PSP development land, where it is proposed subject to a Planning Scheme Amendment to zone the land for mixed use development, including industrial and non-sensitive uses within 1,000 metres of the proposed landfill cells.

## **OVERLAYS**

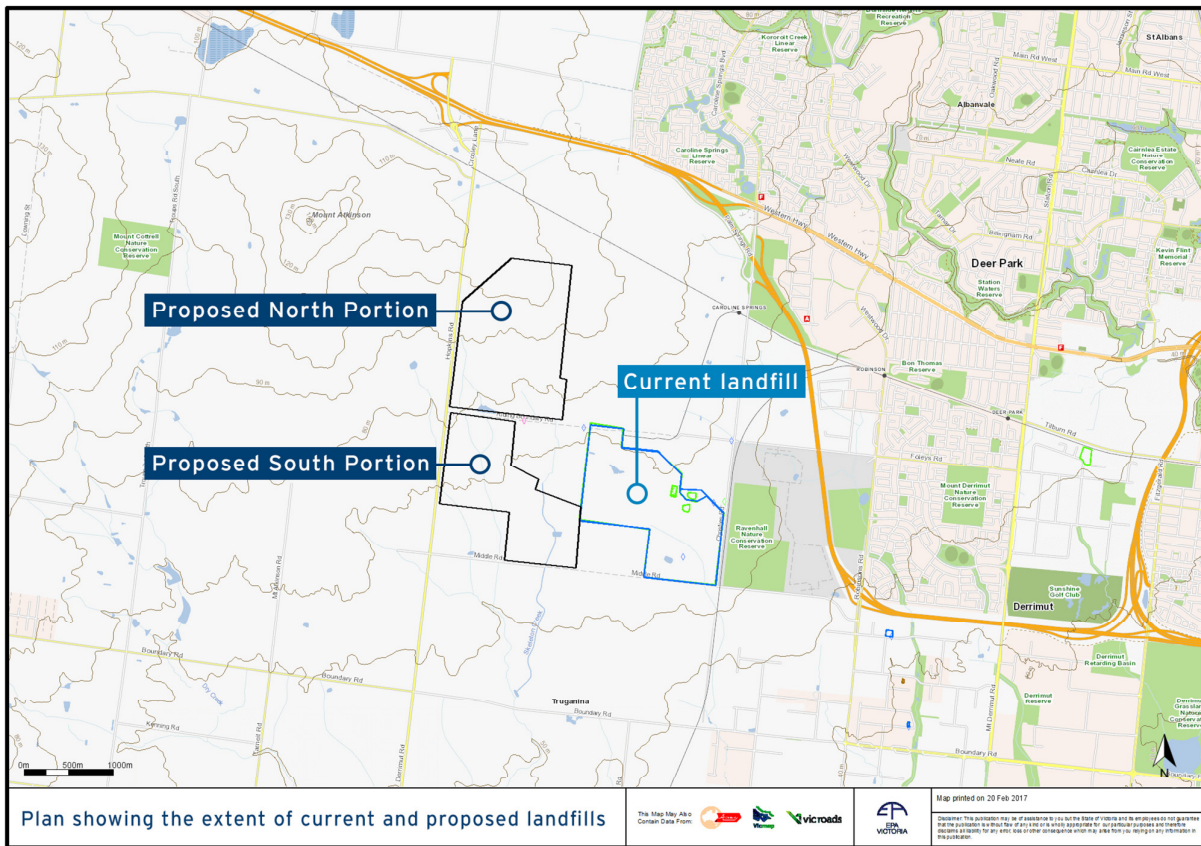
- 1.44 Small portions of the south western corner of the site are affected by Environment Significance Overlay Schedule 2 and 5 (ESO2 & ESO5). These overlays provide for the protection of wetlands, waterways and riparian strips and areas of biodiversity and seek to ensure development is compatible with identified environmental values. The same area is affected by the Land Subject to Inundation Overlay Schedule 1 (LSIO1). However, these areas are outside the WAA site.
- 1.45 The WAA proposal triggers the requirement for a planning permit according to the following clauses of the Melton Planning Scheme:
- use of land for refuse disposal under Clause 37.01 – Special Use Zone and Schedule 1 (SUZ1)
  - buildings and works for that use under 37.01- Special Use Zone and Schedule 1 (SUZ1)
  - native vegetation removal for small areas of land outside the quarry void, under Clause 52.17 – Native Vegetation.
- 1.46 Landfill Operations/Cleanaway submitted a Planning Permit Application to MCC on 29 February 2016 (Application No. 5118/2016).
- 1.47 On 5 April 2016, the Minister for Planning called in the application under Section 97B(1) of the *Planning and Environment Act 1987* (P&E Act). The Minister referred the application (and associated submissions) to Planning Panels Victoria (PPV) for independent review and consideration. The Panel will provide recommendations to the Minister for Planning, who will make the final decision.

1.48 A planning permit application was issued on 18 November 2015 by MCC to relocate Boral's quarry stockpile area across Riding Boundary Rd and to upgrade the processing plant with a new modern facility. The current plant and infrastructure was built as part of the original establishment of operations. It is understood that the replacement plant will be used to conduct the same activities as the current plant, and will not alter any other related element.

### Topography & Land Use

1.49 The site is located within the Volcanic Plains of Victoria. As shown in Figure 7, the landscape around the site is predominantly flat to gently undulating with low rises. Mount Atkinson (approximately 2 kilometres to the west of the North Portion) rises to a height of 140 metres AHD.

1.50 The broader geology of the area consists of olivine basalt plains with minor interbedded silty sands and clays. Quarrying activities have focused on the uppermost basalt layer. The natural surface water flow is in a north to south direction.



**Figure 7: Plan showing the local topography of the existing landfill and proposed extension**

1.51 The North Portion of the proposed landfill is bounded by the Ballarat train line to the north, Clarks Road to the west, Riding Boundary Road to the south, and Hopkins Road to the east. It is characterised by an unmodified and undulating land form. Currently, the land is in use as an undeveloped open paddock. It slopes downwards by approximately 30 metres from the north (100 metres AHD) to the south east corner (70 metres AHD).



- 1.52 The South Portion is bounded by Riding Boundary Road to the north, Clarks Road to the west, Middle Road to the south and is considered to be highly modified by extensive and ongoing quarrying, including a nominal 10 metre deep quarry hole below ground level across much of the site. It slopes downwards from over 75 metres AHD in the north-west corner to approximately 60 metres AHD in the south east.
- 1.53 Photographs showing the current land uses on the North and South Portions are presented in Figures 8, 9 and 10 below. It is highlighted that the annotations are for illustrative purposes only such that the extents shown have not been verified or modelled.



Figure 8: Panoramic photograph looking southeast from Hopkins across the North Portion



Figure 9: Panoramic photograph looking east from the corner of Hopkins and Riding Boundary Rd showing both the North and South Portions



Figure 10: Panoramic photograph looking southwest from Riding Boundary Rd across the South Portion

## CURRENT REGULATORY REGIME

- 1.54 The Energy and Earth Resources Division (ERR) of the Department of Economic Development, Jobs, Transport and Resources regulates Boral's quarrying activities at its Ravenhall site under the *Mineral Resources (Sustainable Development) Act 1990*. Boral holds Works Authority No. 97 under that regulatory scheme.
- 1.55 The existing landfill site allowed under Works Approvals WA31723 (from November 1997) and WA53962 (from February 2004) and planning permit P2091/97 issued to Boral covers an area of 165 hectares, which have and are being filled in six stages. Landfill works approval covers the life of the landfill and do not expire until final capping. The current approved facility has 7–10 years of capacity remaining under its current approvals and EPA licence (Licence Number 12160) held by Landfill Operations.
- 1.56 The first landfill licence was issued in August 1998 as ES37288. Waste disposal activities undertaken by Landfill Operations are limited by the requirements and conditions specified in the current EPA licence 12160.
- 1.57 Additional works approvals and licences have been issued by the EPA in September 2007 (WA61195) for enhanced biodegradation and in November 2013 (WA83920) for the construction of a leachate pond, as well as WA61767 in 2007 for the installation of a facility to combust collected LFG to electricity (in a 'waste-to-energy' biogas facility) - EPA Licence Number 112063.
- 1.58 The biogas facility was constructed in accordance with Works Approval number WA61767 in 2007 and has been operating under licence number 112063 since 2015.
- 1.59 The licences and the Works Authority set out specific conditions and working practices that the two companies must adhere to. These include, requirements for:
- Boral's quarrying activities to comply with any specifications of Works Authority No. 97 (approved by ERR)
  - comply with agreed disposal and final cap design, rehabilitation and revegetation specifications
  - undertake a range of environmental monitoring
  - report the findings of the monitoring to EPA for the landfill licence and ERR for the quarry Works Authority.

## RELEVANT LEGISLATION, POLICY AND GUIDANCE

- 1.60 The WAA is required to comply with the *Environment Protection Act 1970* (EP Act) and relevant subordinate legislation, which regulate waste disposal activities such as that proposed. There is also other related legislation that needs to be considered – such as the *Climate Change Act 2010* and the *Planning and Environment Act 1987*.

### Environment Protection Act 1970

- 1.61 Key sections of the Act, relevant to consideration of this WAA are set out below:
- Section 1 - which sets out the principles for environmental protection, in particular:
    - 1B: Principle of integration of economic, social and environmental considerations;



- 1C: The precautionary principle;
- 1D: Principle of intergenerational equity;
- 1F: Principle of improved valuation, pricing and incentive mechanisms;
- 1I: Principle of wastes hierarchy;
- 1L: Principle of accountability.
- Section 19A – Scheduled premises
- Section 19B – Works approval
- Section 19CA – Duration of works approval
- Section 20 – Licensing of certain premises
- Section 20AA – Joint advertisement
- Section 20B – Conferences
- Section 20C – Consideration of Policy
- Section 21 - Special conditions
- Section 22 - Power of Authority to require further information
- Sections 38 & 39 - Discharges etc to comply with policy, Pollution of Water
- Sections 40 & 41 – Discharges etc to comply with policy, Pollution of atmosphere
- Sections 44 & 45 – Discharge or deposit of waste onto land to comply with policy, Pollution of Land Pollution
- Section 49 – Resource Efficiency
- Section 50 - Victorian Waste and Resource Recovery Infrastructure Planning Framework (described further in paragraphs 1.66-68 below) and in particular Section 50C(1) and 50C(2)
- Section 67B – Financial assurances.

### *Climate Change Act 2010*

- 1.62 The Climate Change Act 2010 (CC Act) was passed by the Victorian Parliament in September 2010 and came into effect on 1 July 2011. Under the requirements of section 14 of the CC Act, EPA must consider climate change in WA and licensing decisions, as well as when recommending new or amended SEPPs and waste management policies.
- 1.63 The duty does not alter EPA's existing powers and obligations as set out in the EP Act. Rather, it requires the consideration of additional matters when making the relevant decisions. When making decisions relating to works approvals and licences, EPA must consider climate change in the following two ways in accordance with the requirements of section 14 of the CC Act.
- a) potential impacts of climate change
  - b) potential contribution the application will have to greenhouse gas emissions

- 1.64 It is noted that the Climate Change Act 2017, which will repeal and replace the CC Act received royal assent on 28 February 2017, however this is not in force at the time of this WAA assessment.

### **State Environment Protection Policies**

- 1.65 The EPA considers that the following State Environment Protection Policies (SEPPs) and Protocols for Environmental Management (PEMs) are of particular relevance for this proposal:
- SEPP (Waters of Victoria) (SEPP (WoV))
  - SEPP (Groundwaters of Victoria) (SEPP (GoV))
  - SEPP (Prevention and Management of Contamination of Land) (SEPP (PMCL))
  - SEPP (Air Quality Management) (SEPP (AQM))
  - The Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry Publication 824
  - Protocol for Environmental Management for Mining and Extractive Industries Publication 1191
  - SEPP (Control of Noise from Commerce, Industry and Trade No- N1)

### **Victorian Waste & Resource Recovery Infrastructure Planning Framework**

- 1.66 The EP Act, regulations, waste management policies SEPPs, establishes a framework to ensure that landfills are appropriately located, designed, constructed, operated and managed to minimise risks to the environment and public health.
- 1.67 The Act establishes the strategic framework for landfill need through the establishment of regional waste management group framework and through the preparation of regional waste management plans. This is to ensure that appropriate waste management strategies are planned and implemented in line with accepted and approved waste management principles for the State of Victoria. One of the main goals is that waste that goes to landfill is only the residual waste and the landfill space is minimised and optimised.
- 1.68 The Victorian Government recently launched the 30 year Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) for the State. The vision of the SWRRIP is to develop an integrated statewide waste and recovery system that continues to provide an essential community service by protecting the environment and public health, maximising the productive value of resources and minimising the cost to the Victorian community. Based on the SWRRIP, the waste and resource recovery groups (WRRGs) develop regional waste and resource recovery implementation plans (RWRRIPs) to assess infrastructure needs in specific regions, including landfills. New landfill needs are outlined in the infrastructure schedules that will be developed as part of the RWRRIPs.

#### *The Waste Management Policy (the WMP)*

- 1.69 The most relevant policy for landfills is the Waste Management Policy (Siting, Design and Management of Landfills) No. S264, Gazette 14/12/2004 (the 'Landfill WMP'). In line with community expectations, the Landfill WMP seeks to protect people and the environment,

including local amenity, from the inherent risks posed by the disposal of waste to landfill. This is achieved by providing a framework and tools to implement the waste hierarchy consistent with the broader objective of ecologically sustainable development.

- 1.70 The Landfill WMP specifies certain requirements for landfill sites, in particular siting with regard to sensitive beneficial use areas (i.e. water supply catchments, groundwater protection zones), groundwater table, compliance with SEPPs and the Landfill BPEM.

*Landfill BPEM EPA Publication 788.3 – Best Practice Environmental Management: Siting, design, operation and rehabilitation of landfills*

- 1.71 A key element of the waste & resource recovery infrastructure planning framework is the implementation of best practice. EPA Victoria's (EPA Publication 788.3) Best Practice Environmental Management: Siting, design, operation and rehabilitation of landfills 2016 (the 'Landfill BPEM') is the source document for best practice environmental management measures for landfills.
- 1.72 The Landfill BPEM gives direction on the best-practice siting, design, operation, performance and rehabilitation standards for landfills in Victoria, taking into account the risk they pose to the environment, and it provides a guide for the measures required to meet legislative objectives.
- 1.73 Landfill owners and operators must have regard to this document in the planning for works approval or licensing of future landfill sites and design of new landfill cells. The Landfill WMP requires the objectives and required outcomes set out in this document to be met. The suggested measures should be used and are the default means of achieving the required outcomes.
- 1.74 The first and most important consideration in the prevention of environmental impacts from landfill is selection of an appropriate landfill site. Once an appropriate site has been selected, landfill operators must adopt best practice in:
- the assessment of landfill design and its effect on the environment
  - construction quality assurance systems
  - landfill management
  - landfill rehabilitation.
- 1.75 It is highlighted that the design and operation of landfills has evolved over time and will continue to do so in line with best practice standards and to keep up with emerging new technologies and materials (i.e. new geosynthetic materials) nationally and internationally. Best practice landfill requirements have been progressively introduced to Victorian landfills since the introduction of the BPEM in 2001. The Landfill BPEM was revised in 2010 to address LFG monitoring and management requirements as a result of the Cranbourne LFG migration issue. EPA included more clarifications around landfill liner quality, testing requirements, construction quality assurance and construction quality control requirements for design and construction of landfills, with input from world leading national and international practitioners when the BPEM was revised in 2010. The application of geosynthetic liners for landfills was strengthened in the 2010 revision of the Landfill BPEM. At the same time, EPA increased the reliance on environmental auditors for design and construction verification of landfills with the introduction of Landfill Licensing Guideline (EPA Publication 1323.3). Subsequently revisions were also made in 2015 and 2016 to strengthen the Landfill Gas management requirements.

- 1.76 The Landfill BPEM requirements have been consistently applied to all landfills in Victoria since 2010, with continuous improvements and significant involvement of environmental auditors.
- 1.77 As noted at the Joint Planning Panel Hearing and s20B conference, with regards waste policy hierarchy, EPA notes that the Landfill BPEM is a legislatively incorporated document under the Waste Management Policy (Siting, Design and Management of Landfills) 2004, which itself is declared under section 16A of the EP Act, and as such, its requirements must be complied with. This reinforces the importance and need for both landfill operators and any future surrounding development to comply with the requirements contained within the Landfill BPEM.

*EPA's Draft Guide – Assessing planning proposals near landfills (2016)*

- 1.78 EPA has prepared a draft guideline for assessing planning proposals near landfills. The guideline is intended to provide further information and advice on assessing planning permit applications and planning scheme amendments that are within proximity to operating or closed landfills. More specifically, it provides advice on what level of assessment a planning or responsible authority should require to inform its decision. The advice in this guideline is consistent with, and builds on the advice to responsible authorities in Landfill BPEM.

*Other Relevant Guidance*

- 1.79 Other guidance of relevance which EPA has had regard to in its assessment are:
- *EPA Publication 1565 – Application of environment protection principles to EPA's approvals process (2014)*
  - *EPA Publication 1518 – Recommended separation distances for industrial residual air emissions (2013)*
  - *EPA Publication 1517 – Demonstrating Best Practice (2013);*
  - *EPA Publication 1323.3 – Landfill Licensing Guidelines (2016);*
  - *EPA Publication 1254 - Noise Control Guidelines (2008);*
  - *EPA Publication 668 – Hydrogeological assessment (groundwater quality) guidelines (2006);*
  - *EPA Publication 669 – Groundwater sampling guidelines (2000);*
  - *EPA Publication 480 - Environmental Guidelines for Major Construction Sites (1996);*
  - *IWRG 701 – Sampling and analysis of waters, wastewaters, soils and wastes (2009);*  
and
  - *IWRG621 – Soil hazard categorisation and management (2009).*

## 2 WORKS APPROVAL APPLICATION PROCESS OVERVIEW

### ASSESSMENT METHODOLOGY

- 2.1 The key stages of the technical assessment of the WAA are described below, noting that the EPA and DELWP embarked upon a joint advertising and consultation process.

### CONSULTATION AND REFERRALS JUNE TO JULY 2016

- 2.2 Landfill Operations undertook its own stakeholder engagement pre-submission, as detailed in sections 5 of the WAA Doc 2. Following the submission of the WAA, EPA and DELWP led consultations with the community, with EPA referring the WAA to relevant stakeholders and referral bodies as described below.

#### Community engagement

- 2.3 The WAA and PPA were jointly advertised in the *Herald Sun*; *The Age*; the *Melton, Brimbank* and *Wyndham Leaders*; and the *Melton, Brimbank* and *Wyndham Star* newspapers on 14 and 15 June 2016 for an extended 32-day consultation period until 15 July 2016. This was to allow the community and referral bodies to consider the information and engage with any third party specialists to advise them on complex technical issues.
- 2.4 Submissions for both the WAA and PPA were collated by PPV.
- 2.5 PPV received 3,962 submissions from stakeholders on the WAA Docs 1 and 2. All submissions received by PPV were shared with EPA.
- 2.6 The submissions were made available for viewing by appointment at the following locations:
- EPA, Level 3, 300 Victoria Street, Carlton VIC 3053
  - Planning Panels Victoria, Ground Floor, 1 Spring Street, Melbourne VIC 3000
  - DELWP, Level 8, 8 Nicholson Street, East Melbourne VIC 3002
  - Melton City Council Civic Centre, 232 High Street, Melton VIC 3337
- 2.7 Following the end of the consultation period on 15 July, PPV collated all the submissions for both applications and provided copies of the submissions to EPA for consideration in its assessment of the WAA.
- 2.8 The content of the submissions were reviewed and categorised to allow subsequent analysis of issues raised by the submitters, as set out below. Spatial analysis of submitter addresses was also undertaken to assist in identification of any spatial trends in where discrete issues were raised.
- 2.9 To prevent skewing of the analysis, distinction was made between 'individual' and 'proforma' analysis. The 'individual' consisted of unique submissions made by individuals; the 'proforma' was a standard, identical submission made by multiple individuals. All submissions have been given equal consideration by the EPA and EPA's primary consideration is on the technical nature of the issues raised in submissions, as opposed to the number of submissions.



2.10 Tables 1 and 2 below provide a summary breakdown of the submissions and Top Ten issues raised in the individual submissions.

**Table 1: Summary breakdown of submissions received**

<b>Total submissions</b>	3,962
Individual submissions	103
Proforma submissions	3,859
<b>Objection to the application(s)</b>	3,953

**Table 2 - Top ten issues raised in the individual submissions**

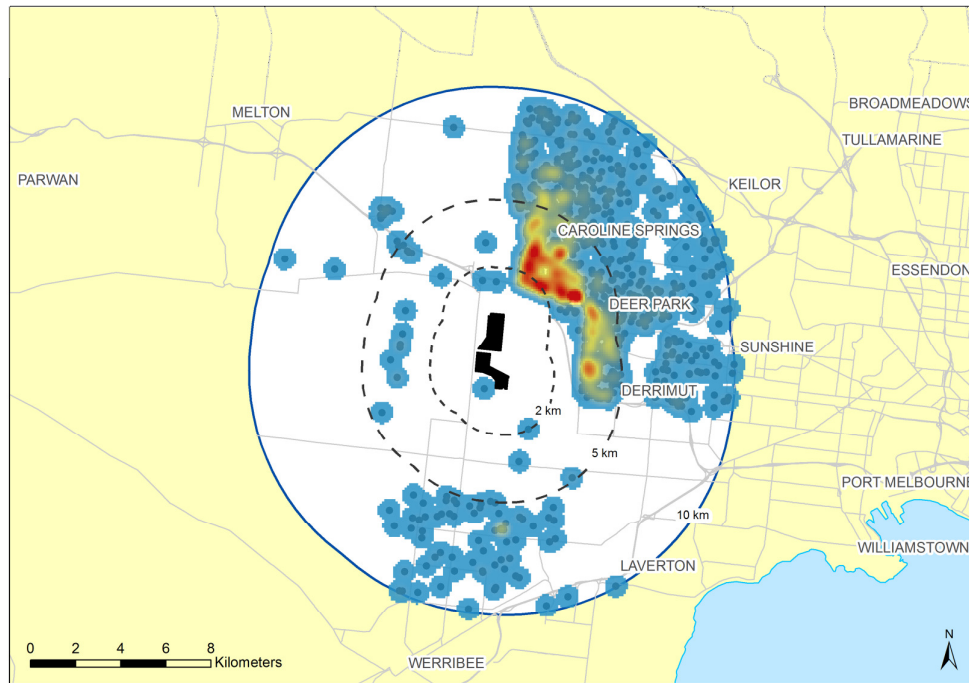
<b>Issue</b>	<b>per cent of submissions raising this issue</b>
Odour	63.1
Traffic & truck movements	45.6
Health	40.7
Off-site impacts on amenities	35.0
Compliance history & track record	31.1
Mud/litter	31.1
Buffers	30.1
Native flora & fauna	28.2
Scale of proposed expansion	24.2
Siting	24.3

2.11 Other issues raised in the individual submissions (all raised by fewer than 18 per cent of respondents) are listed (in order of frequency raised) in paragraph B.1 of Appendix B.

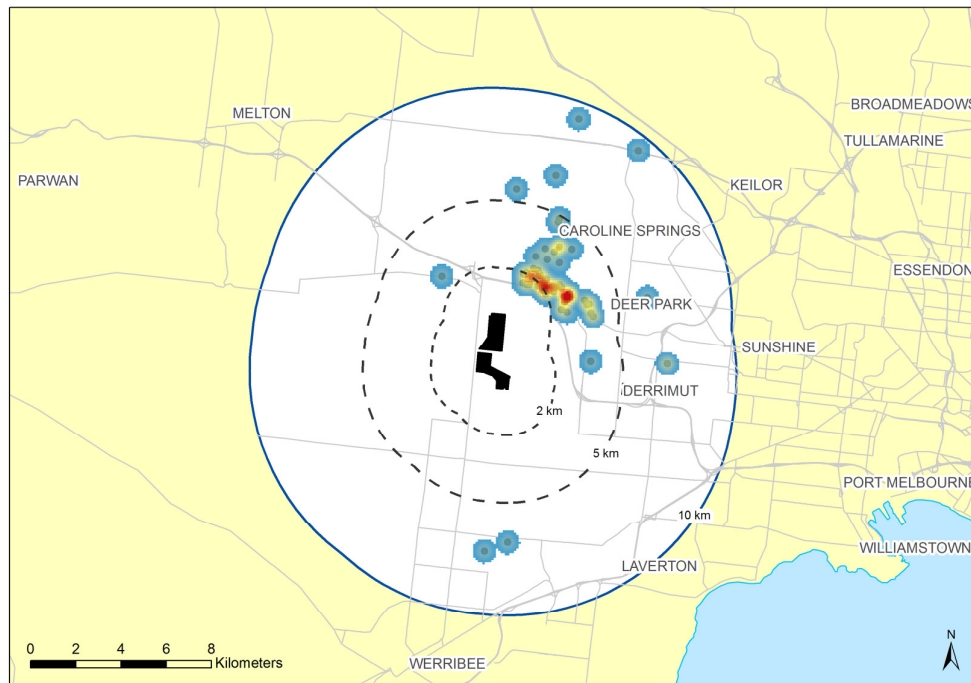
2.12 Issues raised in the proforma submissions, were:

- Compliance History and Track Record;
- Odour;
- Mud & Litter;
- Traffic and truck movements;
- Buffers;
- Scale of expansion;
- Timing and lifespan of permission sought;
- Off-site amenity;
- Alternative waste disposal technologies;
- Policy compliance;
- Noise;
- Extent of the timing and lifespan of permission sought; and

- Relationship with the Boral quarry.
- 2.13 Figure 11 below shows a heat map of the location of where submissions were received from. The warmer colours indicate a higher density of submissions. It is noted that the heat map only shows submissions within 10 kilometres of the proposed site. Submissions were received from further afield, as shown in Figure B.1 of Appendix B.
- 2.14 Appendix B shows the spatial distribution of key submission themes. Spatially the heat maps in Figures 11 and 12 below reflect the distribution of residential areas within 10 kilometres of the site, with less dense, agricultural and industrial areas generally in the white areas.



**Figure 11: the locations of all submitters (including proforma submissions) within 2, 5 and 10 km of the proposed site**



**Figure 12: location of individual non-proforma submissions within 2, 5 and 10 km of the proposed site**

- 2.15 The distribution of individual submissions is broadly consistent with proforma submissions.
- 2.16 The highest density distribution of submissions is a similar pattern to pollution complaints recorded by EPA, and wind patterns (see Figure B.2 in Appendix B).

### Referral body responses

- 2.17 Prior to formal acceptance of the WAA, SV were consulted to ensure the WAA was consistent with the SWRRIP and passed the section 50C threshold test. In their response of 18 April 2016 (see Appendix C.1) SV note that they consider that the “works approval application is broadly consistent with the directions of the State Infrastructure Plan and should not be refused by the EPA under Section 50C”.
- 2.18 The WAA was referred to statutory and non-statutory agencies. The full responses received are provided in Appendix C.1 to C.7 and are considered more fully in Section 4. Key comments are provided below:
  - SV responded directly to EPA on 29 July 2016 (see Appendix C.1). It is noted that SV has not objected to the WAA or PPA and indicates in its response that:
    - in relation to S50C of the EP Act, that the extension proposed in the WAA is not inconsistent with the SWRRIP
    - the extension meets metropolitan Melbourne’s medium-term need for landfill airspace
    - there are barriers and time limitations affecting the viability of alternative medium-term resource recovery or waste to energy infrastructure

- refusal of the WAA and/or the PPA would reduce the viability and capacity of the State's essential waste infrastructure
- refusal would mean that alternative locations with similar volumes of landfill airspace would need to be found
- separation or buffer distances can protect community and amenity
- the proposed 1,000 metres amenity and 500 metres LFG migration separation distances are considered to be consistent with EPA guidelines
- there is no requirement for the internalisation of separation distances and that internalisation of separation distances is contrary to planning practice and will impact on future industrial, resource recovery and extractive industries
- external separation distances are not considered 'sterilisation' of affected land for future development
- SV would welcome input on appropriate conditions to ensure best practice at MRL.
- DHHS provided its response on 15 July 2016 (see Appendix C.2). DHHS has not objected to the WAA or PPA on public health grounds. In summary, DHHS provided the following comments and recommendations:
  - recognised high level of community interest and concern focusing on amenity issues including dust and odour emissions
  - highlighted that part of the 500 metre LFG migration separation distance encroaches on an area of land west of Hopkins Rd that is designated for industrial use and in the future may contain buildings and structures
  - recommended EPA consider the wellbeing of people using future buildings or structures when assessing the WAA, in particular those in the buffer, and the management of potential nuisance dust and odour that may arise from the proposed MRL extension
  - recommended the applicant provides environmental controls to prevent adverse off-site dust and odour emission impacts
  - recommended that all separation distances are met
  - recommended EPA's WAA assessment consider a range of leachate, water and groundwater contamination issues and management.
- MCC provided a response via PPV on 14 July 2016 (see Appendix C.3). It is noted that MCC objected to the PPA due to a lack of information on a number of planning, environmental, and amenity issues. In summary, MCC provided the following relevant comments and recommendations for consideration by EPA:
  - major concern with traffic capacity and safety and the current road network with a major concern in the area. MCC does not believe that the current road network will be able to cater for the additional traffic anticipated
  - additional information is required for determining the impact on stormwater, overland flows or drainage infrastructure
  - final contour plan and landscaping should have a reduced visual impact
  - evidence of native offset obligations

- separation distances should be contained wholly within the boundaries of the site
- a separation distance with Caroline Springs of 3 kilometres should be established to bring it in line with similar changes made to the Burnside, Deer Park and Ravenhall areas
- in the event that the 500 metres LFG buffer not being internalised, an Environmental Audit (according to section 53V of the EP Act) should be conducted to determine the mechanisms to allow a reduction in this default buffer. This would allow development within the PSP land, and would determine the likely impact any off-site LFG migration with all recommendations to be complied with by the landfill operator
- the applicant should reinstate the community consultation group
- PPV should consider the MRL extension application prior to Mt Atkinson and Tameit Plains Precinct Structure Plan and consider any potential impact it may have on its future implementation.
- MWRRG provided a response via PPV on 14 July 2016 (see Appendix C.4). It is noted that MWRRG did not object to the WAA or PPA. In summary, MWRRG provided the following comments and recommendations:
  - the site is considered a strategically significant waste and resource recovery infrastructure site for greater Metropolitan Melbourne
  - the site has been planned as a long-term facility
  - the broader site is listed on the State Infrastructure Plan as an active hub of state importance
  - the landfill and broader site is scheduled in the Metropolitan Landfill Schedule (within the 2009 Melbourne Strategic Plan) until 2018 with a stated closure date of post 2040
  - a reduction of the planned capacity of hubs of state significance (such as that at Ravenhall) would be expected to impact on available waste capacity and resource recovery network serving metropolitan Melbourne
  - communities living near MRL expressed significant concern with operational impacts during the consultation on the MWRRIP. Concerns expressed related to proposed timelines, scale, impact on surrounding location, odour, dust traffic and litter
  - MWRRG supports EPA's position of a minimum 500 metres LFG buffer and due to the size of the proposed MRL, a 1,000 metres amenity buffer be identified to inform planning of sensitive receptors around the site
  - highlighted that submissions have been made to Mt Atkinson and Tarneit Plains Precinct Structure Plan panels to identify the need to retain separation distances and protection of the landfill buffers to safeguard the landfill.
- ERR (DEDJTR) responded via PPV on 15 July 2016 (see Appendix C.5) It is noted that ERR has not objected the WAA or PPA but noted that timing issues between the transition from quarry to landfill will be considered by EPA's licence process.
- Melbourne Water (MW) provided a response via PPV on 15 July 2016 (see Appendix C.6). It is noted that MW initially objected to the PPA and WAA, but then subsequently provided an updated response (on 21 October 2016, see Appendix C.6) in which they



removed their objection after receiving amended plans from Landfill Operations (see paragraph 2.34 below). MW main concerns were:

- lack of consistency with State Planning Policy Framework relating to floodplain and catchment management
- lack of consistency with the catchment management, river health, wetland and floodplain management strategy (Truganina Development Services Scheme) adopted by MW as the responsible floodplain management authority
- the proposal did not comply with MW’s Waterway Corridors, water management functions under S189 and regional drainage functions under S199(1A) of the Water Act (1989).
- DELWP provided a response via PPV on 19 July 2016 (see Appendix C.7). In their response, DELWP noted that parts of the proposed extension area are located within growth corridors subject to the requirements of a Part 10 approval granted for the Melbourne Strategic Assessment (MSA) program area (granted by the Commonwealth under the Environment Protection and Biodiversity Conservation Act 1999, Cth) [it is noted that this is contrary to statements given in WAA Doc 2 but that were corrected in submissions to the Panel Hearing]. DELWP also highlighted that:
  - habitat compensation obligations requirements must be met prior to the commencement of works
  - MCC should ‘re-refer’ any planning permit to the Department at the time of Statement of Compliance.

**Joint information session**

2.19 Early during the consultation period, a joint information session was held on 19 and 20 June 2016 at WestWaters Hotel and Entertainment Complex at Caroline Springs where members of the local community and the referral bodies could drop in and find out about:

- Landfill Operation's WAA and PPA that were before EPA and DEWLP
- how they could get involved in the process
- Landfill Operations current activities and licence (regulated by EPA)
- proposed WAA activities from EPA, DELWP, MWRRG, Landfill Operations and Stop the Tip.

2.20 The event was attended by 117 local residents and interested people. Key themes raised at the event were:

- need for a landfill extension
- why this location and not somewhere else
- alternative waste management options
- concerns over impacts from odour, LFG, truck, litter and dust
- concerns around the impact on wildlife and on waterways
- concerns over health effects (respiratory health, asthma) and what long-term studies are being used as evidence

- concerns over the adequacy of the local road network for the anticipated truck movements
- concerns over the size and scale of the landfill and the open tip face
- concern over EPA's current enforcement activities and what the EPA is doing about current odour issues - inadequate, EPA should not be approver and regulator, odour reporting fatigue (from local residents and the remand centres)
- questions on how EPA takes compliance history into account when making its decision on WAAs
- questions on how the planning process will occur, the role and independence of the Planning Panel Members
- questions on how EPA monitors what goes into the landfill.

### **Joint planning panel and section 20B conference**

2.21 Following a review of the responses received during the consultation process, a joint planning panel and section 20B conference ('section 20B conference', according to section 20B of the EP Act) was organised by PPV and held over 18 days at PPV's offices in Melbourne and at the WestWaters Hotel and Entertainment Complex in Caroline Springs in September and October 2016.

2.22 The event was administered by PPV and led by a Panel Chair, who was also nominated by EPA's Chairman to preside over the conference under section 20B(3) of the EP Act. The Panel's joint report details the concerns, key issues and possible options and solutions that were raised in written submissions and at the Joint Planning Panel Hearing and section 20B Conference.

2.23 In accordance with section 20B (4) of the EP Act, the discussions, resolutions and recommendations from the conference have been considered by the EPA in its assessment.

2.24 The full Panel Report is confidential at this time, however it does contain the following clear recommendations that have been considered by EPA in its assessment of the WAA:

EPA review the odour modelling to determine if further assessment is required including choice of model, landfill odour emission rates and sensitivity analysis to ensure model outputs are accurate and suitable for informing management responses [please see paragraphs 4.41 to 4.45 of this Assessment Report];

- EPA should review the adequacy of the airborne particulate assessment undertaken to date to ensure it is fit for purpose for the assessment and monitoring of landfill operation and whether any further assessment is necessary [please see paragraphs 4.24 to 4.32 of this Assessment Report]
- further modelling and investigation should occur to allow the long-term undisturbed groundwater level to be identified to inform the development of Cells 1 and 2 [please see paragraphs 4.160 to 4.192 of this Assessment Report] and
- the stormwater management system be subject to further detailed design to ensure compliance with EPA and Melbourne Water requirements [please see paragraphs 4.92 to 4.93 of this Assessment Report].

## **REQUESTS FOR FURTHER INFORMATION**

- 2.25 EPA reviewed the referral responses, submissions received and technical advice from EPA's in-house specialists. Following the reviews, EPA considered that further information was needed from Landfill Operations to enable a robust technical assessment to be completed.

### **Section 22 Notice**

- 2.26 Accordingly, EPA issued a formal notice on 7 September 2016 under section 22(1) of the EP Act to Landfill Operations (see Appendix D.1). The notice identified the further information EPA considered necessary and relevant to enable it to determine the WAA. The further information was categorised into three themes:

- Understanding the baseline environment
- Defining potential impacts
- Demonstrating environmental best practice.

- 2.27 After it had issued the section 22 Notice, EPA held technical discussions with Landfill Operations to clarify a number of points and to agree on what would constitute suitable responses. Landfill Operations provided further information on 23 September 2016.

- 2.28 To reflect these activities and clearly identify the information still required, EPA wrote to Landfill Operations on 21 October and 6 December 2016 (see Appendices D.2 and D.3).

- 2.29 Responses to the section 22 Notice were received on 30 November and 9 December 2016.

## **CONSULTATION & REFERRALS DECEMBER 2016 – JANUARY 2017**

### **Consultation on the further information received and second information session**

- 2.30 Following the section 22 Notice Requests for further information and receipt of further information from Landfill Operations, a second round of community consultation was held over a 44-day period (from 9 December 2016 to 23 January 2017).

- 2.31 In response to the public advertising of this additional information, 44 submissions were received, all objecting to the proposals. Of these, three commented on aspects of the submitted further information (one from Stop The Tip, and legal representatives for two local landowners).

- 2.32 The key themes from these submissions include:

- continued concerns over the adequacy, reliability and accuracy of the hydrology modelling and monitoring program
- concerns over road traffic and safety from truck movements
- issues with the WA assessment process – the timing of the consultation on the further information and the need for an information session to explain the technical information provided in the further information

- continued concerns with the adequacy of the LFG migration buffer distance and the application of buffer distances external to the site boundary
- concerns the proposal is not consistent with the Melton Planning Scheme and SPPF, including failure of the WA process to sufficiently consider social and community benefits
- concerns over the adequacy, reliability and accuracy of the odour assessment
- concerns about the long-term viability of the proposal due to the commercial arrangements between Boral and Cleanaway/Landfill Operations
- concerns the WAA lacks the necessary technical details to enable a robust assessment
- concerns the WAA contains too many technical uncertainties and that this poses increased risks to the surrounding areas
- concerns the proposal does not comply with the Landfill BPEM in terms of buffer distances, and that it is a mound landfill
- concerns not all information relating to the proposal was made accessible to the community
- concerns that technical conditions attached to any WA issued could be used to shift the WAA assessment to the post approval stage and limit community review of technical information.

2.33 Following requests made to EPA, a second information session was held on 16 January to explain why further information was requested and to share the information provided by Landfill Operations. The event was attended by 87 local residents and interested parties. Key themes raised at the event were:

- concerns over the proposed waste disposal options and why alternative waste management options were not being considered
- concerns over the proposed design and why EPA is considering a 'mounded' landfill when its own guidance advises against
- concerns around the impacts on wildlife and on waterways
- concern over EPA's current enforcement activities and what EPA is doing about current odour issues
- concern over the potential fire/explosion risks to the nearby high pressure gas transmission pipelines
- concern over what happens if the experts are wrong
- queries over whether the assessment will consider climate change, and its implications for the integrity of fractured basalt in which the landfill is housed
- queries over the effect of quarrying and blasting on the local geology and hydrogeology, and potential to create new source-pathway-receptor linkages along fault lines
- technical questions about groundwater, such as what happens if a sump fails?
- questions about the Works Approval process, such as how is the information submitted to EPA by Cleanaway independently verified?

## Referral Agencies

- 2.34 Following the receipt of further information under the section 22 Notice, the additional information was also referred to the statutory and non-statutory agencies to establish if it changed their views on the WAA and PPA. The following referral agency comments were received, with the full responses provided in Appendices E.1 – E.3:
- DHHS provided its response on 17 January 2017 (see Appendix E.1), which confirmed that the Department does not object to this application on public health grounds, provided EPA is satisfied that relevant SEPP and environmental guidelines will be met. Their response also highlights that a literature review jointly commissioned by EPA and DHHS in 2016 confirmed the findings of RMIT's 2013 review, which concluded that:
    - living near a non-hazardous waste landfill is not associated with any adverse health effects
    - some gases and compounds may be odorous and can affect the wellbeing of nearby communities.
  - SV provided a response on 12 January 2017 (see Appendix E.2). The response confirms that following a review of the further information, SV have no issues of concern. Their response acknowledges that, in summary, the recommendations of the Environmental Audit require MRL to:
    - upgrade the groundwater monitoring network
    - revise the monitoring program.

SV considers that this will aim to ensure the quality of the ground water in the area.
  - MW provided a further response on 7 February 2017 (see Appendix E.3). Their response includes the following points:
    - After MW desktop investigation, the appropriate siting of the landfill does not indicate that any of the following are located within the proposed landfill site:
      - (a) any wetlands of international significance
      - (b) areas of significance for spawning, nursery, breeding, roosting and feeding areas of aquatic species, and fauna listed under the China Australia Migratory Bird Agreement and Japan Australia Migratory Bird Agreement, the Convention on Migratory Species of Wild Animals (Bonn, Germany, 1979) and under the *Flora and Fauna Guarantee Act 1988*
      - (c) any proclaimed water supply catchment areas
      - (d) any areas of water supply protection.

The response also stated that desktop investigations indicate the possible presence of listed Flora and Fauna (*Flora and Fauna Guarantee Act, 1988*) on the MRL site with a recommendation for EPA to contact DELWP for more detailed information. With regard the latter it is noted that DELWP had as per paragraph 2.18 already responded on this last point.
    - MW initially objected to the application as it was not in accordance with the Truganina DSS. Further information was submitted to MW on the 14 September 2016 by the Landfill Operations team to meet the requirements of the Truganina DSS.



- consistent with MW's letter to the Planning Panel on 21 October, 2016, MW would have no objection to the application based on further information submitted. The submitted information addressed the key issues of the constructed waterway (i) and stormwater outfalls (ii) above. The draft planning permit conditions provided by MW to the Planning Panel will ensure the application meets the requirements of the Truganina DSS.
- prior to the commencement of works, detailed calculations and drawings must be submitted to MW for approval. The requirements are detailed in the draft permit conditions for the proposed Ravenhall Landfill Expansion (31 October, 2016).
- MW would not object to the proposed application subject to draft permit conditions dated 31st October, 2016.

## **PEER REVIEW PROCESS**

### **Internal EPA Assessment and Peer Review**

- 2.35 The WA Assessment and this Assessment Report has been undertaken by EPA Development Assessment Unit staff (Senior Project Manager, Works Approvals), with support from EPA's Applied Science Group, Specialist Regulatory Services and Metropolitan Region:
- Senior Applied Scientist – Land & Groundwater / Principal Expert – Land & Groundwater
  - Senior Applied Scientist – Principal Expert Inland Waters
  - Senior Applied Scientist – Air & Odour / Principal Expert – Air
  - Senior Applied Scientist – Air Emissions Management
  - Specialist Applied Scientist – Air & Noise
  - Specialist Applied Scientist – Noise Management
  - Environment Protection Officer / Principal Expert – Odour
  - Senior Applied Scientist – Landfills
  - Senior Field Specialist – Landfills / Principal Expert – Landfill
  - Regional Manager – Metropolitan Region.
- 2.36 Internal Peer Reviews have been undertaken by Team Leader, Works Approvals and the Manager of Development Assessments Unit.
- 2.37 Additionally, to support the odour and hydrological assessment work, EPA commissioned external peer review advice from:
- Air Quality Professionals Pty Ltd on the Pacific Environmental Ltd odour modelling and assessment (including both the methods to derive odour emission estimations, and the odour impact assessment itself – see Appendix F.1 of WAA Doc 2)
  - Stormy Water Solutions on the stormwater modelling and management plan (see Appendix F.2 of WAA Doc 2).

- 2.38 Comments received from the peer review process have been considered in finalising this report.

### **Independent Landfill Expert Advisory Panel**

- 2.39 In response to the Recommendation 3 of the Victorian Ombudsman's 2009 report, 'Brookland Greens Estate– Investigation into methane gas leaks', an Independent Landfill Expert Advisory Panel (ILEAP) was established by the EPA.
- 2.40 The purpose of the ILEAP is to enable EPA to access expert peer review advice to assist the EPA in making decisions on complex landfill operations.
- 2.41 EPA sought and obtained peer review advice from ILEAP. ILEAP's brief, which set out the scope of the peer review, is provided in Appendix G.1. Their report containing their findings and recommendations is presented in Appendix G.2, with a summary table of the questions and their responses provided in Table 3 below. ILEAP's assessments and justification is provided in their report.
- 2.42 EPA is not obliged or required to adopt any of the findings and recommendations made by the ILEAP. However, the findings and recommendations have been fully considered by EPA in its consideration of the WAA and in its role as a referral authority to Planning Permit Application PAPA2016/5118. These are discussed in Sections 4 and 5 of this Assessment Report.

**Table 3: Summary Table of the Independent Landfill Expert Advisory Panel Findings and Recommendations**

Findings and Recommendations
<p>The WAA sought exceeds the period considered under the SWRRIP and suggests that the WA be only approved for the extent of proposed Cells 1 to 7 and associated site works, provided adequate planning controls are in place to ensure that buffers can be maintained for the full site, should Cells 8 to 16 be required.</p> <p><i>See paragraphs 4.146-4.1451, 5.2 and 6.3-6.6 of this Assessment Report.</i></p>
<p>Considers the lead in time excessive and that a lead in time period allowing for any planning or WA appeals of around 5 years would be appropriate.</p> <p><i>See paragraphs 4.273-4.275 of this Assessment Report.</i></p>
<p>Considers the need for an independent stakeholder liaison body to be convened and resourced to allow all major stakeholders to be informed on project progress, complaints and subsequent investigations, compliance with Licence conditions and auditor's reports. Recommends that the body be a stakeholder for the purposes of scoping any Section 53V operational environmental audits and that the body have appropriate technical resources to assist them in interpreting and commenting on the scopes for the operational environmental audits.</p> <p><i>See paragraphs 4.290-4.293 of this Assessment Report.</i></p>
<p>Of the view that for any new site, sufficient internal LFG buffer should be maintained to allow the landfill operator to effectively monitor and manage LFG migration risks for the life of landfill operations and throughout the aftercare period. For modern landfills, the internal LFG buffer could be substantially less than 500 m, provided;</p> <ul style="list-style-type: none"> <li>○ the proposed liner system is BPEM compliant and installation is managed under an appropriate CQA programme</li> <li>○ there is LFG extraction during filling of cells, as currently proposed</li> <li>○ a well-engineered LFG extraction system is progressively installed as soon as filling is completed in any part of the site</li> <li>○ there is a well-designed, BPEM compliant, LFG monitoring system installed at the site. Monitoring wells should be located both close to the landfill cells and at the boundary of the site</li> <li>○ regular monitoring during operation and aftercare is undertaken in the LFG wells.</li> </ul> <p><i>See paragraphs 4.61-4.75, 4.205-4.211, 5.8, 5.13 and 5.24 of this Assessment Report.</i></p>
<p>Considers the landfill geotechnical stability assessment by EPA as it relates to cells not buttressed against quarry walls to be incomplete. However, the panel agrees with the EPA that stability assessment should be conducted in the detailed design process and recommends the WA to contain conditions requiring detailed designs with supporting evidence of geotechnical stability before approval of all cell lining and capping designs. Recommends that material site specific testing for stability assessment be conducted as part of the detailed design and this should be a condition of the WA.</p> <p><i>See paragraphs 4.193-4.196, 5.8 and 5.13 of this Assessment Report.</i></p>

## Findings and Recommendations

Agrees with EPA's conclusion that the groundwater levels presented in the WAA cannot be considered as long term undisturbed groundwater levels. Notes that determination of long term undisturbed groundwater levels in a disturbed environment without long term pre-disturbance groundwater level records is difficult. Modelling methods may provide some understanding of the long term undisturbed groundwater levels but even this would only be an estimate rather than a definitive determination of long term undisturbed groundwater levels.

*See paragraphs 4.160-4.192 of this Assessment Report.*

Accepts EPA's assessment that the use of a blanket drainage layer 2m below the base of waste provides for additionality in compliance with Clause 16(2)(a) of the Landfill WMP. Furthermore, the Panel recommends:

- i. Where required, the drainage blanket be located 2 metres below the lowest leachate (also a waste) level (i.e. top of liner in the sump and top of the liner cell) rather than as illustrated in Plate 5 of Appendix 6 of the documents supporting the WAA. EPA has advised environmental auditors that leachate is a waste and therefore needs to be considered in compliance with the separation distance required by Clause 16(2)(a) of the Landfill WMP;
- ii. Unless the drainage blanket is placed beneath all cells, the proponent should agree a methodology with EPA for determining groundwater levels at the site to provide a basis for establishing the 2 metres separation distance;
- iii. The proponent should provide to EPA's satisfaction a plan which demonstrates that water drained from the under-drains can be managed appropriately for the life of the landfill operations and throughout the aftercare period.

*See paragraphs 3.24-3.25, 4.184-4.189, 5.13 and 5.24 of this Assessment Report.*

Notes that the WAA did not offer the proposed liner design as an alternative design to meet the requirements for additional design measures to satisfy Clause 16(2)(a) of the Landfill WMP. Assumes that EPA has considered the use of GCL as additional to the compacted clay liner (0.5m thick) as potential addition to the design. If this is the case, then the two following issues need to be addressed before considering additionality:

- i. There is a need to demonstrate that the alternative liner is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point.
- ii. There is a need to assess the water retention properties (i.e. unsaturated properties) of the CCL carefully to ensure that enough water will be available for the GCL to hydrate to the target water content set by the design.

*See paragraphs 3.24-3.25, 4.184-4.189 and 5.13 of this Assessment Report.*

Agrees with the EPA's assessment that groundwater in the area is not in Segment A. Examination of the MRL Assessment (AECOM 2016) and DELWP's Online Ground Water Resource Report for the locality provides confidence that ground water sampling over a period of time has identified the groundwater's characteristics as being within Segments B and C. WAA is therefore considered compliant with requirements of clause 13(3) of the Landfill WMP.

*See paragraphs 4.79-4.83 of this Assessment Report.*

### 3 THE WORKS APPROVAL APPLICATION

#### DESCRIPTION OF THE PROPOSAL

3.1 The proposed activities subject to this WAA are the:

- Extension of the existing Type 2 (municipal waste landfill) MRL to areas west and northwest of the current facility following Boral’s progressive quarrying of the site
- Construction of and subsequent filling, capping and rehabilitation of 16 new landfill cells distributed with 7 cells (Cells 1–7) in the South Portion and 9 cells (Cells 8–16) in the North Portion (see the Sequencing Plan Figure 13 and the quantities and durations for each landfill cell shown in Table 4);

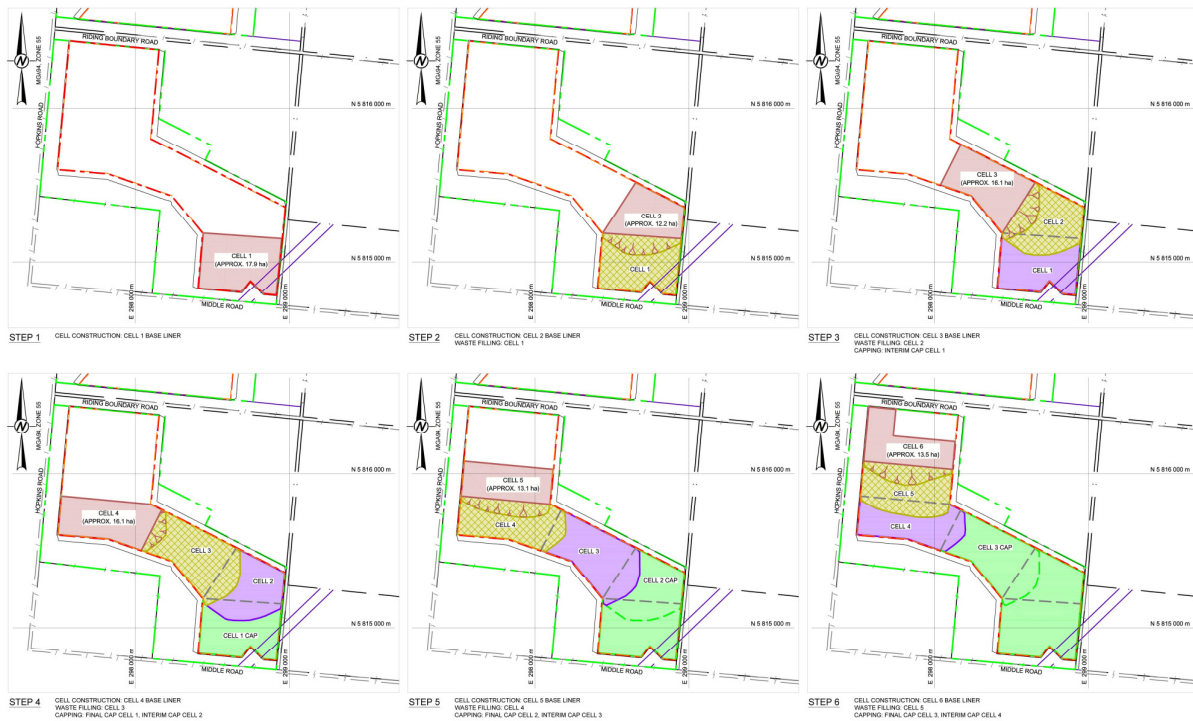


Figure 13: Proposed sequencing plan (rehabilitation steps 1 to 6)



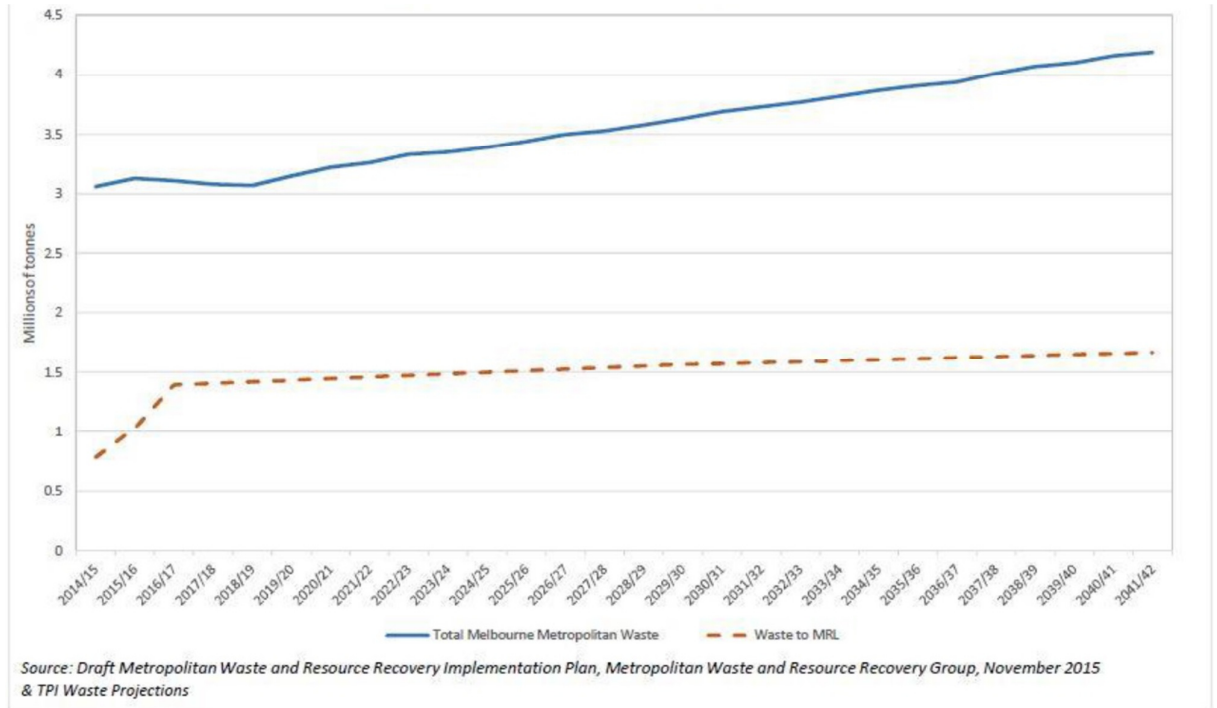
**Table 4: Proposed Landfill Sequence Plan**

Cell No.	Cell Area (Hectares)	Cell Volume (Million m <sup>3</sup> )	Cell Life (years)	Cell construct commence date (financial year ending)	Waste filling commence date (financial year ending)
1	17.9	3.3	1.9	Step 1 – 2025	Step 2 – 2026
2	12.2	3.8	2.2	Step 2 – 2027	Step 3 – 2028
3	16.1	3.9	2.2	Step 3 – 2029	Step 4 – 2030
4	16.1	3.2	1.8	Step 4 – 2031	Step 5 – 2032
5	13.1	3.6	2.1	Step 5 – 2033	Step 6 – 2034
6	13.5	3.4	1.9	Step 6 – 2035	Step 7 – 2036
7	7.0	2.2	1.2	Step 7 – 2037	Step 8 – 2038
<b>Sub-total South Portion</b>	<b>96</b>	<b>23.3</b>	<b>13</b>	<b>13</b>	<b>13</b>
8	11.7	1.7	1.0	Step 8 – 2038	Step 9 – 2039
9	15.0	3.8	2.2	Step 9 – 2039	Step 10 – 2040
10	22.1	3.6	2.0	Step 10 – 2041	Step 11 – 2042
11	9.6	3.1	1.8	Step 11 – 2043	Step 12 – 2044
12	10.4	3.9	2.2	Step 12 – 2045	Step 13 – 2046
13	10.4	3.6	2.0	Step 13 – 2047	Step 14 – 2048
14	10.8	2.7	1.6	Step 14 – 2049	Step 15 – 2050
15	11.5	3.6	2.1	Step 15 – 2051	Step 16 – 2052
16	11.7	3.7	2.1	Step 16 – 2053	Step 17 – 2054
<b>Sub-total North Portion</b>	<b>113</b>	<b>29.7</b>	<b>17</b>	<b>17</b>	<b>17</b>
<b>TOTAL NORTH AND SOUTH PORTION</b>	<b>210</b>	<b>53</b>	<b>30</b>	<b>30</b>	<b>30</b>

- Landfilling with a total airspace volume of 53 million cubic metres;
- Landfilling for a life span of 30 years, with landfilling beginning in 2025
- Continuing the receipt of the same types of waste MRL currently receives.

3.2 MRL is expected to receive waste from across Cleanaway’s metropolitan transfer station network and will include waste transferred from the South East Melbourne Transfer Station (SEMTS).

3.3 The quantity of Melbourne's waste to be deposited at MRL is anticipated to increase by over 500,000 tonnes to just under 1.5 million tonnes per annum between 2015 to 2017. The landfill would then continue to increase at a gradual rate from 2017 to the end of life of the proposed extensions (see Figure 14 below).



**Figure 14: Projection of waste to MRL from plate 3 WAA DOC 2**

3.4 The WAA states that the proposed extension and acceptance of waste from South East Melbourne will result in a combined heavy vehicle volume of 1,130 vehicle movements per day by 2035. This will be a net increase of 320 movements per weekday from current operation levels.

## WASTES TO BE DISPOSED

3.5 Landfill Operations is proposing the continued acceptance of the following waste streams:

- solid inert waste
- putrescible waste
- pneumatic tyres shredded into pieces less than 250 millimetres
- Category C contaminated soil (waste code N121).

3.6 Waste sources include:

- municipal solid waste, including wastes received directly from the public and from kerbside collection
- commercial and industrial waste
- construction and demolition waste
- waste from private waste companies and industries.

## **CONCEPT DESIGN**

3.7 The design of the proposed landfill is described in the WAA and illustrated by a figure set (see Appendix B of WAA Doc 2). Its design, construction, operation and ongoing maintenance is based on the principles of the Landfill BPEM. Additional measures to meet the requirements of the Landfill WMP (Clauses 13 and 16) were provided in the subsequent response identified in paragraph 3.24-3.25 and 3.28. Key elements of the design include:

- progressive sequencing of landfill cell construction and filling following quarrying activities, in accordance with a sequencing plan and being dependent of quarry activities (in particular blasting)
- sizing of the landfill cells and active tip face to minimise potential generation of odour, leachate and LFG escape, and to increase the capture efficiency of the LFG collection system
- constructing the base and the sides of the landfill cells with appropriate liner systems, including leachate collection and LFG collection systems within quarried voids
- containment of the wastes through a variety of liner and capping measures to prevent and reduce leachate and LFG from escaping the cells – combined with leachate and LFG collection systems;
- ensuring adequate batter and side walls to maintain the stability of the landfill cells as they are filled and subsequently capped and rehabilitated, as well as other safety features
- capturing stormwater runoff for reuse on-site for dust suppression and minimise leachate generation and wheel wash activities
- avoidance of the power line easements that cross the site.

3.8 It is noted that the proposed landfill is both an ‘Area’ and a ‘Mound’ Landfill, with the proposals filling an existing or to be excavated quarry (i.e. an Area) and also rising above pre-quarrying ground level (i.e. a Mound). In such circumstances, it is highlighted that whether the proposed extension is an area method landfill or a mounded landfill is not critical to EPA’s assessment of the proposal, rather than the WAA’s proposed design, operation and rehabilitation meets the Landfill WMP and BPEM.

## **SITE LAYOUT AND ASSOCIATED AND ANCILLARY INFRASTRUCTURE**

3.9 Figure 15 overleaf shows the basic layout of the proposed landfill the cells.

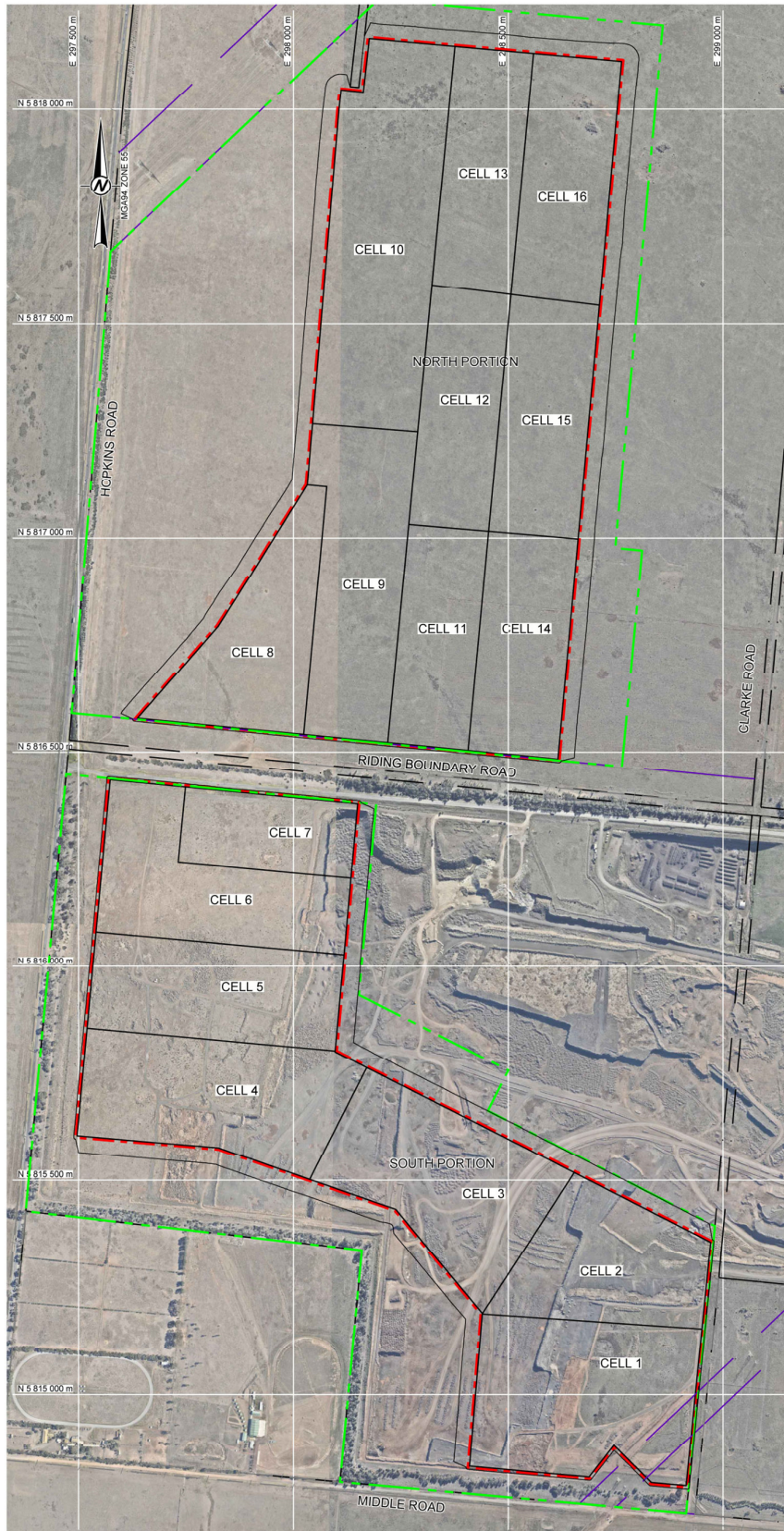


Figure 15: Proposed landfill layout



- 3.10 In addition to the construction of the landfill cells and the necessary management systems required to manage the landfill as wastes decompose, associated and ancillary infrastructure are also needed and proposed:
- leachate storage ponds; two evaporative ponds are proposed, one for each portion
  - leachate collection sumps, extraction and transmission pipework, extraction pumps and compressed air supply to power pumps
  - LFG collection wells, transmission pipework, vacuum extraction equipment and condensate management equipment
  - LFG engines and electricity generation plant (waste to energy) including standby flares
  - LFG monitoring bores along the site perimeter
  - groundwater monitoring bores
  - six stormwater storage ponds and 16 discharge ponds
  - access & weighbridges: MRL is currently accessed via Christies Road on the eastern boundary of the premises. As part of the proposed extension, a new access point will be created along Riding Boundary Road. This will serve as an access point for both the North and South Portion of the extensions and include weighbridges with gatehouse. The site will be surrounded by wire mesh fence to restrict public access Wheel wash facility
  - internal haul roads
  - facilities: existing offices, parking, education centres and access roads will be maintained;
  - public transfer station: a public transfer station will be constructed in the south-east corner of the site and accessed from Christies Road
  - litter screens: will be installed around the perimeter of the extension, up to maximum height of 12 metres.
- 3.11 The existing offices, parking areas and education centre will be maintained.

## **CONSTRUCTION OF LANDFILL CELLS & LICENCE AMENDMENT APPLICATIONS**

- 3.12 Sixteen individual cells and two leachate ponds are proposed and each cell is expected to provide approximately two years of filling capacity.
- 3.13 Each landfill cell and the leachate pond needs to be designed and constructed appropriately to comply with EPA requirements. This involves the preparation and submission of detailed design documents (plans, technical specifications and construction quality assurance plan documents) for individual cells and leachate ponds for EPA approval. These design documents must be assessed by an environmental auditor prior to submission for EPA approval before construction commences. This process applies to all cells and the leachate pond. This is to ensure that the design documents comply with the Landfill BPEM.
- 3.14 While preliminary designs are accepted at the works approval stage, detailed designs are required prior to starting construction. The detailed designs should provide more details



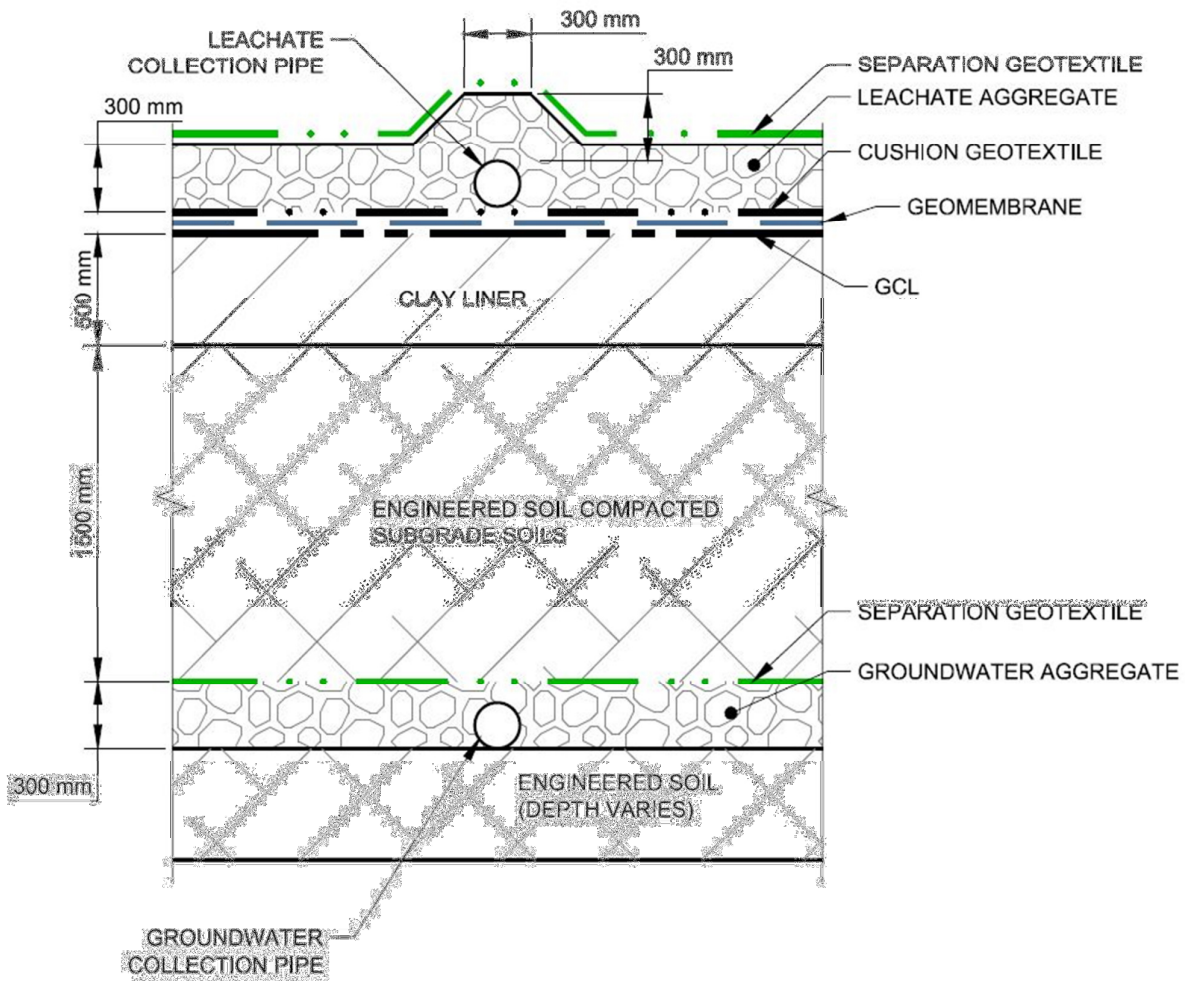
- on aspects including site characteristics at landfill cell level, dimensions of individual cells, material types and specifications, test methods, construction quality control and construction quality assurance details and environmental auditing. Furthermore it is noted that as the Landfill BPEM evolves to stay current with international landfilling best practices, it is likely that EPA's requirements at the time of construction may be higher and more stringent than the requirements at the time of works approval.
- 3.15 Once the designs for the first cell and the leachate pond are approved by EPA, construction of those structures can commence. At this stage, an environmental auditor must be engaged by the landfill operator to verify that the construction is in accordance with EPA approved design documents.
  - 3.16 On completion of construction, the operator submits a licence amendment application (in accordance with section 20 of the EP Act), with an environmental audit report prepared by the auditor who verified the construction meets approved design documents (in accordance with section 53V of the EP Act). Once the audit report is reviewed by EPA, the licence is amended to include the newly constructed cell or leachate pond.
  - 3.17 A landfill operator can only start to fill a new cell with waste (or operate a new leachate pond) after EPA has granted the licence or the licence amendment.
  - 3.18 Should the landfill operator wish to construct new cells or a leachate pond, they must notify EPA and submit detailed design documents, as for the first cell or leachate pond. EPA reviews the plans and ensures they meet the relevant best-practice requirements that exist at that time, and that the designs meet any future landfill design improvements.
  - 3.19 The plans will provide all the design details for the barrier system and leachate collection system (pipes, leachate sump, conveyancing infrastructure, plan views, cross sectional views, etc.).
  - 3.20 The technical specifications will provide the details of specifications for all the materials that will be used in the cell (or the leachate pond) construction.
  - 3.21 The Construction Quality Assurance Plan, will provide details on:
    - compliance of materials with design specification
    - methods of construction
    - inspection and testing parameters and frequency
    - supervision
    - hold points (auditor and independent testing) during construction.
  - 3.22 Typical plant involved in the construction of the cells will include: bulldozer (1); grader (1); haul trucks (2); front end loader (1); flat drum roller (1); pad foot roller (1); water cart (1); tele-handler (1) and excavator (1).
  - 3.23 Following the end of quarrying activities, the base of the quarry void will be prepared with subgrade materials prior to the installation of the liner and leachate collection systems.

### **Base liner**

- 3.24 The following liner configuration (from bottom to top) for the base of the cells is proposed:
  - engineered compacted subgrade

- low permeability compacted clay layer (0.5 thick) – compacted to a coefficient of permeability of less than  $1 \times 10^{-9}$  metres per second
- geosynthetic clay liner (GCL) – reinforced multi-layered system will comprise of two layers of geotextile encapsulating a layer of dry sodium bentonite
- geomembrane liner – a high-density polyethylene (HDPE) geomembrane liner will be used for the base and sidewall liner. A linear low density polyethylene (LLDPE) geomembrane liner will be used for the landfill cap.
- cushion geotextile – comprising of non-woven geotextile of a specific mass and puncture strength appropriate to its application
- leachate collection layer (aggregates, pipes, leachate sump, etc.) consisting of:
  - geocomposite drainage layer: geocomposite drainage layer will be of HDPE geonet with a layer of filter geotextile thermally bonded to both sides. This will be installed progressively to limit ultra violet exposure time and provide protection to the underlying LLDPE geomembrane liner.
  - leachate collection pipes: leachate collection pipes will be of perforated HDPE pipes.
  - leachate drainage aggregate: a leachate drainage aggregate will be of with hydraulic conductivity greater than  $1 \times 10^{-3}$  metres per second and a minimum thickness of 300 millimetres
  - LFG collection pipes: LFG collection pipes will be of perforated HDPE pipes that direct LFG to solid wall HDPE pipes with a sizing of 80–100 millimetres
- Separation geotextile – comprising of non-woven geotextile of a specific mass and puncture strength appropriate to its application.

3.25 A groundwater collection gravel layer, with associated collection pipes is also proposed to be placed between the liner system and the quarry floor as a management measure to achieve compliance of Landfill WMP Clause 16(2). This is for cells whose bases are less than 2 metres above the top of the long-term undisturbed groundwater table. The groundwater collection layer comprises of collection pipes surrounded by drainage aggregates, which is to be covered by a separation geotextile as shown in Figure 16, with a groundwater collection layer placed below the liner system.



**Figure 16: Groundwater collection layer below the liner system**

### Sidewall liner and batters

3.26 The sidewall liner proposed will contain the following as shown in Figure 17 below:

- low permeability compacted clay liner (0.5 metres thick)
- geosynthetic clay liner
- geomembrane liner
- cushion geotextile
- leachate collection drainage layer (0.3 metres thick) with pipes etc.
- separation geotextile layer.

3.27 Due to the distribution and placement of cells within the quarry void, Cells 4, 5, 6 and 7 will be constructed adjacent to the quarry walls and the other cells (1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15 and 16) will be away from the quarry walls.

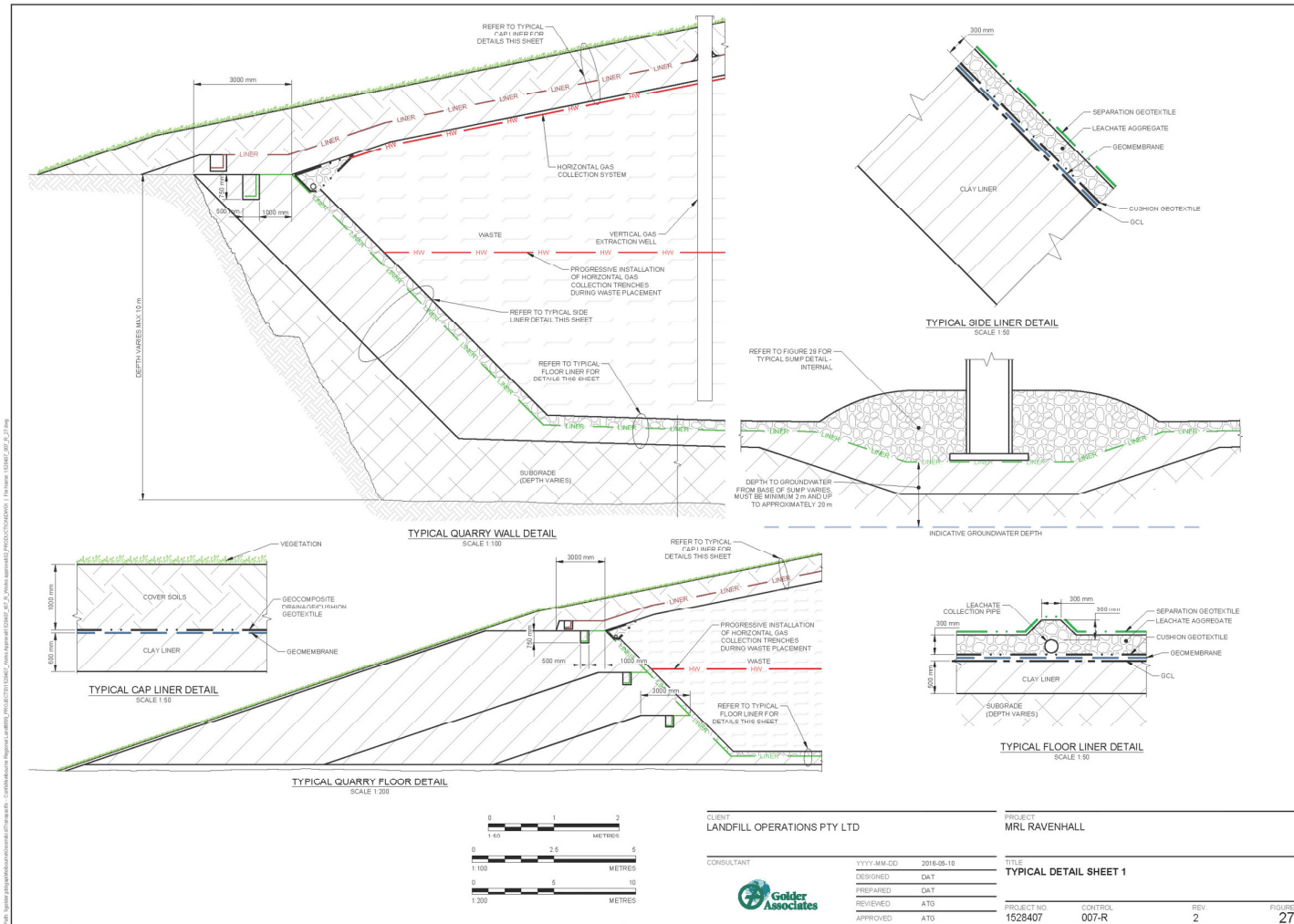


Figure 17: Cells with side wall placed adjacent to the quarry wall and side wall placed away from the quarry wall

- 3.28 Following EPA's request for more information through the section 22 Notice process (see paragraphs 2.25–29), the following additional design information was provided to address concerns over the geotechnical stability of the liner walls:
- Sidewall batter-cell base geometric layout developed with adequate offset to account/allow for sidewall batter grade of 1V to 3H.
  - Groundwater level assessed to determine if the sidewall batter will be subjected to potential pore pressure build-up.
  - Prior to commencement of earthworks, the quarry face is visually assessed and checked for fractures and disjoints where the sidewall batter adjoins the quarry wall.
  - The liner-system interface design with the batter will be assessed against slip failure, friction angle and stresses that will be imposed by the proposed batter grade and waste profile.
  - A stability assessment was also undertaken using the SLOPE W model. A cross section from both the South and North Portions were included and incorporated deep seated analysis, assessment of liner interface, and seismic assessment. The assessments were used to estimate three factors of safety for both the North and South Portion. Details of all assumptions used in these assessments can be found in the Appendices 5 and 6 of WAA Doc 6.

#### **Landfill cap:**

- 3.29 The following capping profile is proposed in line with Type 2 landfill criteria as per the Landfill BPEM (from top to bottom).
- Top soil and sub soil layers to a combined thickness of 1 metre
  - Geocomposite drainage layer
  - Geomembrane (LLDPE) liner
  - Compacted clay layer (CCL) – 600 millimetre thick with hydraulic conductivity less than  $1 \times 10^{-9}$  metres per second.

### **PROPOSED DESIGN CONTAINMENT MEASURES**

- 3.30 The WAA (Doc 2) sets out the proposed containment measures associated with the proposal. These are:
- a) a landfill liner with appropriate barrier system (described above)
  - b) a leachate collection and management system
  - c) a stormwater management system
  - d) a LFG management system, incorporating collection and treatment.

#### **Leachate collection and management system**

- 3.31 The landfill liner system will consist of a leachate collection system containing a leachate drainage aggregate layer placed above the liner, and leachate collection pipes with a sump for its collection and removal. Once leachate is collected in the sump, it is continually removed from the sump and is contained in the leachate ponds on the landfill



premises. As the leachate is continually generated and removed, the amount of contamination in the leachate lessens over time, reducing the ability of the contaminants to move through the landfill liner. Removed leachate is partially treated via evaporation from the storage ponds and if required, leachate is disposed off-site via a tanker system or by discharging it into a sewer under trade waste agreement for further treatment.

- 3.32 Water balance and leachate generation modelling has been undertaken using HELP software, and various rainfall events and different scenarios have been considered. The model has been run with the scenarios of 'open landfill', 'interim cap' and 'final cap' and for long-term simulation period of 30 years. Based on this modelling, Landfill Operations have estimated that approximately 11,150 cubic metres of leachate would be generated from short-term storm events in two consecutive years with above-average rainfall (90th percentile).
- 3.33 Based on the above estimates, two leachate storage ponds are proposed, each with a 1.7 hectare footprint. One pond is to be located in the South Portion and the other is to be located in the North Portion.

### **Stormwater management system**

- 3.34 The proposed Stormwater Management System will comprise of a series of open channel stormwater swales to drain the final and interim caps, and stormwater ponds around the perimeter. Stormwater will be collected and managed to ensure that uncontaminated stormwater flows are kept away from contaminated (waste) areas and contaminated stormwater is contained within the site and is treated along with leachate. Collected stormwater will be used either on-site by Landfill Operations and/or Boral, or will be discharged to off-site stormwater network after sediment is appropriately removed. Rainfall from external catchments upstream of the site will be diverted around the site and will connect up to Skeleton Creek to the south of the South Portion.

### **Landfill gas management system**

- 3.35 LFG is to be collected using an active extraction system. This applies suction (vacuum) to the waste to remove the gas.
- 3.36 During the filling of each landfill cell, LFG will be collected using a series of horizontal (sacrificial) gas collection wells. The purpose of these wells is to reduce odour.
- 3.37 Once each cell is filled, LFG will be collected using vertical wells to extract LFG to engines where it is combusted to generate electricity. LFG flares are provided to enable continued extraction when an engine is being serviced or repaired or if electrical generation has to temporarily stop. The net effect of the extraction is the depressurisation of the waste to significantly reduce the movement of gas out of the landfill into the surrounding environment, so that LFG emissions meet the Landfill BPEM gas action levels required by the EPA licence. Vertical wells will be installed to around 5metres up from the cell liner and will be connected to manifolds at the surface where they are regularly balanced (vacuum adjusted) to achieve efficient gas collection. Where horizontal sacrificial wells remain operational, they will continue to be used in addition to the vertical wells which are drilled into the full cell.
- 3.38 The horizontal and vertical wells are proposed to be installed progressively, and will be matched by increasing engine capacity, electrical interconnection and flaring capacity as gas action levels increase during the filling of the cell. The increases in capacity are based

on gas generation modelling, which has been validated by the gas extraction system performance at the existing MRL site.

## **PROPOSED OPERATIONAL MEASURES**

### **Waste acceptance**

- 3.39 As stated previously, the proposed landfill will accept the same types of waste it currently does. Signage at the MRL entrance will be used to advise which types of waste are accepted at the site.
- 3.40 The proposed new weighbridge facility and gatehouse will be located at the entrance to the extended landfill and will manage waste recording and inspection. Random inspections of incoming waste loads will be undertaken and recorded. Vehicles carrying prohibited materials will be declined entry and vehicle details recorded and reported to EPA.
- 3.41 Following inspection, vehicles will be weighed and issued a pre-receipt. The waste will then be taken directly to the active landfill area, and vehicles weighed again when exiting the site to provide an accurate estimate of the weight of the deposited waste.

### **Waste placement and cover**

- 3.42 A designated active tipping face will be established during landfill operations. The size of the active tipping area will be kept as small as possible and will be no larger than 1,800 square metres to minimise amenity impacts such as odour and to better control litter and pests. 1800 square metres was identified as the minimum workable tipping area size based on the site's waste acceptance volumes and associated vehicle movements.
- 3.43 The waste will be placed and compacted into approximately 5 metres lifts across the cell in a manner that ensures the stability of the waste batters and retains cover material. Daily cover will be continually placed over the waste during the filling of each cell with only the active tipping area exposed.
- 3.44 The waste will be further compacted once daily filling is completed, and a subsequent 300 millimetre thick daily-cover layer will be placed over the last active tipping area at the end of filling during each night or day shift. Inspection of the cover layers will be undertaken, and any damage or cracks will be rectified. The material used for the daily cover will be primarily sourced from on-site quarry scalps (basaltic clay with basalt fragments), with alternative sources to be considered, subject to availability, material quality and EPA approval at the detailed design and cell approval stages.
- 3.45 When the landfilling is complete within a cell, the waste will have an intermediate cover layer placed over it. To comply with EPA licence conditions, the intermediate cover layer consists of 500 millimetres of compacted clay or clay-rich soil.
- 3.46 After a period of time set by EPA in a specific licence condition, each completed cell must be capped with a final cap that is in compliance with Landfill BPEM requirements.
- 3.47 The cap has the following purposes:
  - minimises infiltration of water to the waste, which therefore minimises leachate generation
  - reduces emissions of LFG and aids efficient LFG extraction

- minimises wind and water erosion
  - allows for settlement of waste during degradation.
- 3.48 All vehicles entering the site pass through an automatic truck wash prior to leaving the landfill.
- 3.49 Disposal activities are proposed to occur 24 hours a day, 7 days a week, excluding public holidays.
- 3.50 Plant typically expected to be used in the landfilling operations includes: compactors (2), bulldozers (2), haul trucks (3), front end loader (1), excavators (2) and a water cart.

### **Leachate collection and management**

- 3.51 Leachate levels within cells are to be monitored, with pumping undertaken when required to remove leachate from the drainage layer. The collected leachate is removed to the leachate storage/evaporation ponds and is subjected to aeration by aerators installed in the ponds. Similar to Landfill Operators' existing leachate pond, aerators will be used to reduce odour generation from the leachate ponds, which will also increase the evaporation of leachate from the ponds. Pumping rates are adjusted to maintain leachate levels at a minimum head of less than 300 millimetres on the base liner in accordance with EPA licence conditions.
- 3.52 The primary leachate disposal method is mass reduction by evaporation as described above. Leachate may also be used for dust suppression on haul roads within active landfill cell.
- 3.53 Other leachate management options, such as a leachate treatment plant, may be proposed at a later stage by Landfill Operations if necessary and subject to appropriate approvals.

### **Landfill gas monitoring and management**

- 3.54 Continual feedback on the gas extraction system performance will be provided by LFG monitoring at the surface of each cell and at the landfill perimeter from the sub-surface LFG monitoring bores. LFG monitoring forms part of the environmental monitoring program for the site – this is verified by an EPA appointed environmental auditor during each audit. Landfill Operations has produced a gas management plan, which contains practicable measures to meet the gas action levels and how to respond when gas action levels are exceeded, or if LFG odours cause amenity issues.

### **Litter control**

- 3.55 Litter screens with a maximum height of 12 metres will be installed around the perimeter of the proposed landfill site. These are designed to contain the movement of windborne litter from the active landfill cells and the general site. Inspection of the fencing will be carried out to check the screening integrity and collect litter. Mobile litter fences are also used on the tipping area – these can be moved by the compactors and can quickly be repositioned when the wind direction changes.
- 3.56 Other methods of litter control to be undertaken include:
- haul trucks will be required to cover their waste loads when driving through the site

- stormwater litter traps will be installed over drains
- the area of the active tipping face will be minimised
- additional control measures will be implemented during extreme wind events such as:
  - Shutdown of facility
  - Temporary operation of a second, more protected tipping face.

### **Fire prevention & management and hotspots**

3.57 The following control measures will be implemented for fire prevention:

- inspection of incoming loads for 'hot' waste or burning materials
- use of spark arrestor on landfill operation machinery
- inspection of waste for ignition sources such as hot coals, car and marine batteries
- enforcement of no smoking requirements for personnel and visitors
- highly combustible materials such as timber will be buried as soon as practicable at the landfill active face
- waste loads will be covered daily to prevent air intrusion and reduce the risk of spontaneous combustion
- use of non-combustible cover materials
- the composition of LFG will be frequently monitored for indicators of hotspots in the waste. The EPA licence contains conditions for the prevention, detection and extinguishing of hotspots.

3.58 Basic fire-fighting equipment will be stored on-site, and water will be available from the stormwater storage ponds. The CFA will be immediately notified in the event of a fire. Burning waste will be excavated and extinguished where possible. For deep-seated established landfill fires, the area will be capped with a low permeable material to limit oxygen intake. The LFG collection system in the affected area will be shut down using isolation valves.

### **Vermin and disease vectors**

3.59 The following operational control measures will be implemented to contain disease vectors (vermin, flies, mosquitoes, and birds):

- minimise ponding water at the site through the implementation of effective site drainage systems to reduce the number of mosquitoes
- on-site storage ponds will be monitored for the breeding of mosquitoes
- the area of the active tipping face will be minimised with daily covering to reduce access to food waste
- creation of a disruptive environment to discourage birds on-site, such as pyrotechnics (or poppers and screamers), propane cannons, reflective flash tapes and irritating sound devices.

3.60 The proposed Environmental Management Plan, which is will be a condition of planning permission, will include a section on vermin control with a specific Vermin Management

Plan. Both plans would require approval by the Responsible Authority, and would be subject to review (and possibly revision) every five years.

### **Noxious weed control**

- 3.61 The following operational control measures will be implemented to minimise the presence of noxious weeds:
- staff training in the identification of noxious weeds
  - inspections of incoming loads containing fill and vegetation
  - regular landscape inspections to identify possible noxious weed infestations
  - eradication programs involving spraying or physical removal of outbreak areas.

## **PROPOSED LANDFORM RESTORATION**

- 3.62 The proposed final landform will consist of contoured land designed to meet the following criteria:
- Planning Permit requirements
  - Clause 8 of the *Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2010*
  - Landfill BPEM
  - a rehabilitated surface that is:
    - stable and resistant to wind and water erosion
    - suitable for revegetation
    - consistent with the surrounding land features and pre-quarry topography
    - suitable for use as public open space.
- 3.63 The WAA contains a pre-settlement top of cap contour plan for both South and North portions of the landfill site, as shown in Figure 18. The highest contour in the North Portion is 140 metres AHD and in the South Portion is 110 metres AHD.
- 3.64 Cell design, construction and operation is to commence from cell 1 and then continue up to 7 in the South Portion; and from cell 8 up to cell 16 in the North Portion. Capping and rehabilitation is to be undertaken as cells are filled. Interim capping plans for all the cells (1 to 16) are also provided within the WAA. The staged cell filling and construction is such that at any one moment in time, there would be a maximum of three unrehabilitated cells – one ‘active’ cell that is being filled; one cell having its intermediate cover installed; and one cell having its final cap installed (see Figure 13 above).

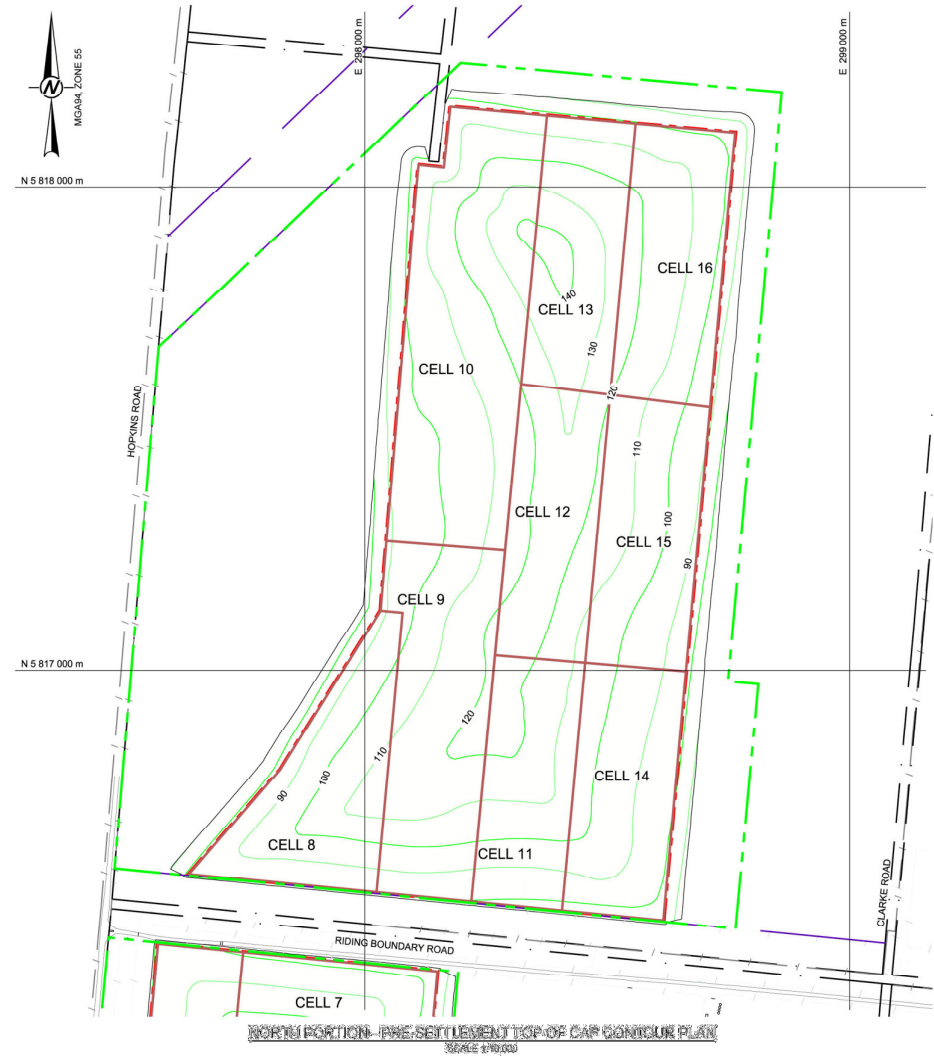


Figure 18: Pre-settlement Top of Cap Contour Plan



- 3.65 The extent of the landfill extension and cell layout is shown in Figure 15. Landfill Operations states that each landfill cell is designed to be filled with waste within approximately 2 years, and that they will plan to commence new cell construction one year before waste acceptance starts. The staged approach to cell construction will involve the construction of two leachate ponds, one for each portion of the landfill, as well as a staged application of intermediate cover and final capping. Progressive rehabilitation of the landfill is also a statutory requirement in any EPA Licence for the site.
- 3.66 Cross sections of the proposed cells are shown in Figures 19 and 20 below.

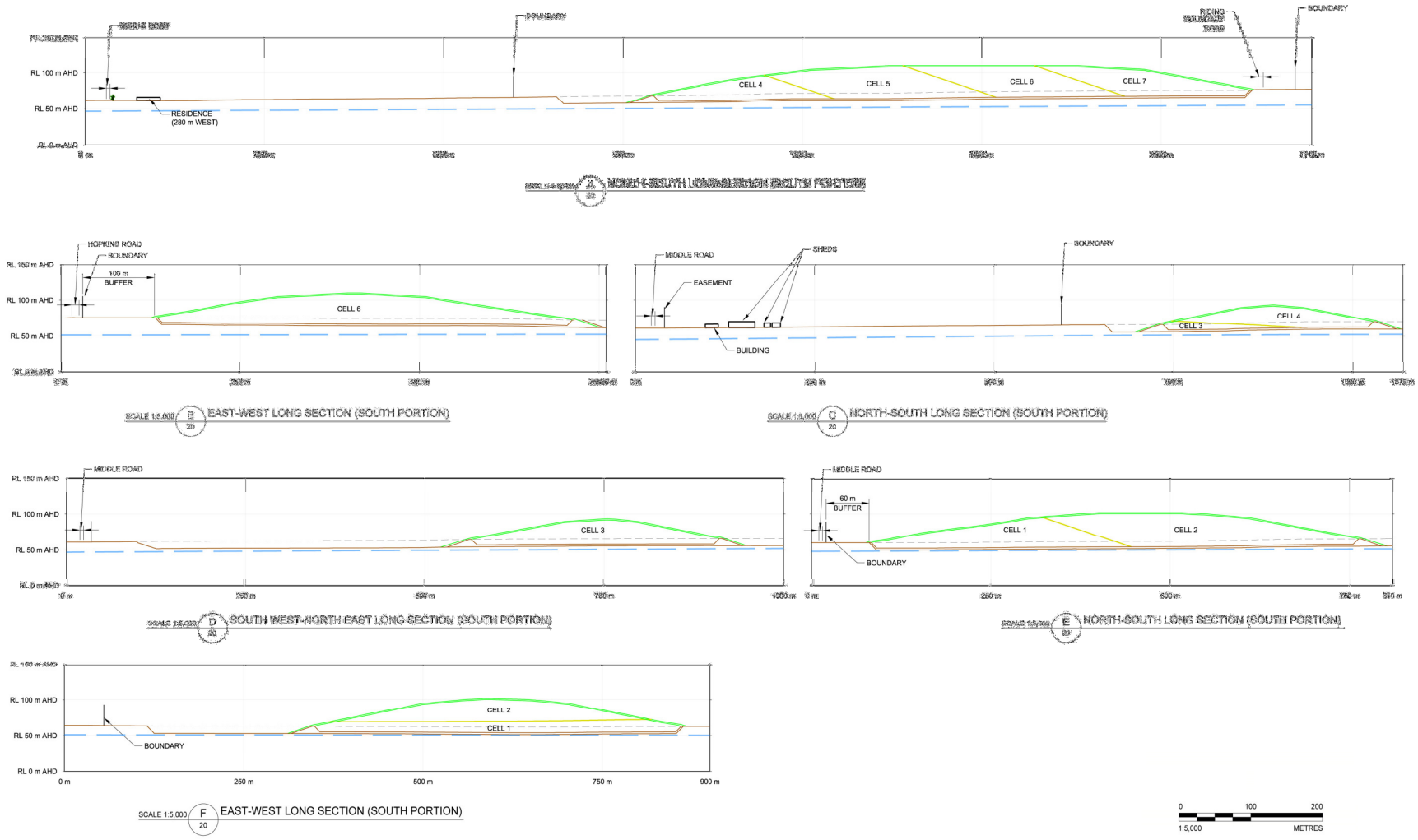


Figure 19: Cross-sections of South Portion landfill cells and surface capping layer

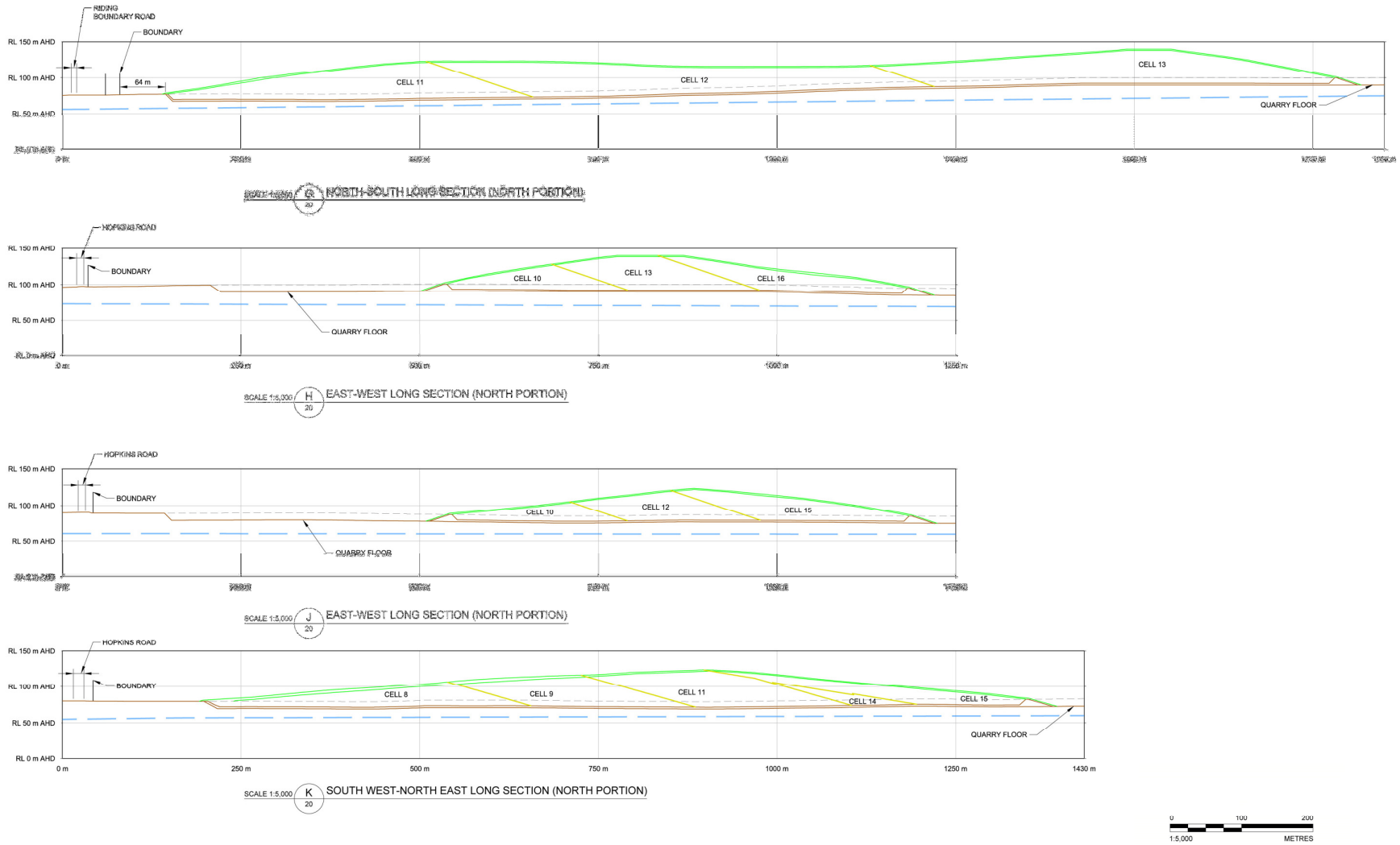


Figure 20: Cross-sections of North Portion landfill cells and surface capping layer

## **PROPOSED CLOSURE AND AFTERCARE MANAGEMENT**

- 3.67 If a Works Approval is granted, conditions will be attached to the Works Approval and any subsequent licence, which would require that:
- the landfill to be constructed and filled in accordance with the Rehabilitation Plan and approved drawings;
  - the landfill cells would be progressively rehabilitated in accordance with Best Practice Environmental Management, Siting, Design, Operation and Rehabilitation of Landfills (EPA Publication 788);
  - an independent annual survey would be conducted for each landfill cell which would confirm that cell heights are less than the approved pre-settlement contour plan;
  - each landfill cell would be managed so that its final contour (including the landfill cap) prior to settlement is not higher at any point than the pre-settlement contour plan included in the licence.

Failure to adhere to such licence conditions could result in EPA enforcement actions.

- 3.68 As closed landfill cells continue to generate LFG and leachate for many years, LFG extraction and leachate extraction systems will continue to operate after all cells are filled. The cap integrity and all ancillary systems supporting LFG and leachate management will also to be managed during aftercare. A Landfill Aftercare Management Plan and Monitoring Program has been included in the WAA. If a WA and subsequent licence is given EPA will regulate the aftercare phase of the landfill by issuing a Post-Closure Pollution Abatement Notice (PC PAN) to Landfill Operations, which will remain in force until EPA assesses that the landfill no longer poses a risk to human health and the environment. Once the PC PAN is in force, the licence to operate the landfill is revoked.
- 3.69 The Landfill Aftercare Management Plan and Monitoring Program included in the WAA are working documents and will be required to be revised and updated throughout the operating and post-closure life of the landfill. This will be regulated by EPA through the PC PAN.
- 3.70 Landfill Operations propose that the site post landfill closure will be used as public open space, noting that much of the land surrounding the proposal has been designated for future development.

### **Financial Assurance**

- 3.71 As set out above, EPA requires landfill operators to rehabilitate landfills in accordance with EPA's guidelines – EPA Publication 1594: Financial assurance for licences and works approvals (2016) and EPA Publication 1596: Calculation of financial assurance for landfills, prescribed industrial waste (PIW) management and container washing (2016). In the case that a landfill site is left abandoned prior to the satisfactory completion of rehabilitation, EPA also requires a Financial Assurance (FA) to be submitted by landfill operators that would be used to reimburse the State for clean-up costs incurred by EPA Victoria.
- 3.72 To date, EPA has never drawn on a FA in association with any landfill and has not incurred clean-up costs in association with a landfill.

- 3.73 EPA requires the amount of FA to be reviewed and updated to reflect any changes to the future cost of rehabilitating the landfill. Progressive rehabilitation of the landfill helps to ensure that the required amount of FA is minimised, whilst the monies held in the FA would not be released back to until the EPA determines that the site no longer poses a risk to human health or the environment.
- 3.74 The FA guidance for landfill operators also includes criteria which must be met by landfill operators seeking to progressively reduce their aftercare FA. These act to encourage good landfill and aftercare management and rehabilitation.
- 3.75 In regards to MRL, EPA holds a FA for the current landfill and will require this financial assurance to be updated for any extension of landfill activities at the MRL. As part of the WAA submission, Landfill Operations have submitted a FA calculation in Appendix C of WAA Doc 2. The amount of FA is considered to be commercial-in-confidence information. Landfill Operations and Cleanaway are not required to publicly disclose the amount that it has set aside for rehabilitation of the MRL. Landfill Operations has provided a FA calculation which will require assessment and agreement as per a suitable condition. This should occur prior to the granting of any Licence and acceptance of waste.
- 3.76 As the proposed MRL facilities is owned and operated by a privately limited company, the clean-up costs in the case of abandonment would be met by the FA held by the EPA and not by the local community through increased rates.



## 4 CONSIDERATION OF KEY ISSUES

### LANDFILL OPERATIONS' AND CLEANAWAY'S TRACK RECORD

#### Why is Track Record a key Issue?

- 4.1 EPA is the environmental regulator in the State of Victoria and monitors industry to ensure it complies with the EP Act to achieve best practice environmental management to reduce potential air, noise, water and amenity impacts. EPA also investigates possible incidents of pollution, including those reported by the community. Where non-compliance is detected and proven, EPA has statutory powers to take various enforcement actions in line with the EP Act and EPA's Enforcement and Compliance Policy.
- 4.2 In the consideration of applications for Works Approvals and Licences, and transfers or amendments, section 20C(3) of the EP Act states that:
- *'The Authority may refuse to issue, transfer or amend an authorisation –*
    - (c) if the person applying for the issue, transfer or amendment is a corporation, and any director or person who is concerned in the management of the corporation –*
      - (i) has been found guilty of one or more relevant offences in the 10 years immediately before the date the Authority received the application; and*
      - (ii) as a result the director or other person, is in the opinion of the Authority, not a fit and proper person to be involved in a corporation holding the authorisation, or in the case of an application for amendment, holding the authorisation in the amended form'.*
- 4.3 Accordingly, consideration needs to be given in the assessment of the WAA of whether Landfill Operations and their parent company – Cleanaway Waste Management Ltd (and any predecessors) meet these requirements, noting that consideration under subsection (c)(ii) is only triggered if a relevant offence has occurred in the 10 years preceding the receipt of the WAA.
- 4.4 As Cleanaway operates a number of landfills throughout metropolitan Melbourne, Victoria, EPA considers it pertinent to consider Cleanaway's track record at these other facilities (as well as elsewhere in Australia) as part of this assessment.

#### What is a Relevant Offence and what types of Actions and Notices does EPA consider in assessing track record?

- 4.5 EPA's *Guideline Works Approval Application EPA Publication 1307.10\** (2015) sets out the works approval application requirements with regard to Track Record. It requires a summary of an applicant's environmental performance for the existing operations at the premises (if applicable) over the past three years, including:
- a summary of any community concerns or public feedback
  - a list of any enforcement actions received from EPA, including any written warnings, penalty infringement notices or prosecutions
  - the steps taken to deal with any environmental issues
  - and an explanation of how the WA proposal will affect any existing issues.

- 4.6 Where applicable it also requires works approval applications to:
- summarise any relevant offences as defined in Section 20C of the EP Act
  - indicate whether the applicant have been found guilty of any relevant offences in the past 10 years
  - indicate the recent track record of any other operations in Victoria or interstate.
- 4.7 Section 20(C) (1) of the EP Act defines a relevant offence to include an ‘indictable offence’ and certain summary offences.
- 4.8 In considering track record, it is noted that EPA considers and draws distinction between:
- Pollution reports made by members of the public to EPA which are recorded and used to inform investigative work by EPA’s Authorised Officers
  - Remedial Notices<sup>1</sup> which include: Pollution Abatement Notices (PANs), Minor Works Pollution Abatement Notices (MWPAN) & Clean Up Notices
  - Penalty Infringement Notices (PINs)<sup>2</sup>
  - Prosecutions.

### **What is Landfill Operations and Cleanaway’s Track Record?**

- 4.9 As acknowledged in section 22.0 of WAA Doc 2, Transpacific Cleanaway Pty Ltd (a predecessor parent company of Landfill Operations Pty Ltd), was prosecuted in December 2008 and found guilty of licence breaches between November and December 2007 in connection with the unlicensed deposit of waste at their Tullamarine landfill. The offence, depositing of waste contrary to section 27(2) is a relevant offence. Accordingly, consideration needs to be given as to whether Landfill Operations and its parent company, Cleanaway, is a ‘fit and proper person’.
- 4.10 Section 22 of the WAA doc 2 also provides details of Cleanaway’s state and national compliance track record.
- 4.11 In considering whether Landfill Operations and its parent company – Cleanaway Waste Management Ltd (and any predecessors) are a fit and proper person, EPA has considered:
- a) if there have been any similar offences by Cleanaway (and its subsidiaries) since 2008;
  - b) notifications of non-compliance;
  - c) Cleanaway (and its subsidiaries) Track Record. EPA notes that Cleanaway (and their subsidiaries) has not been charged with any similar offences since 2008 in Victoria or

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<sup>1</sup> Remedial Notices<sup>1</sup> require works or activities to be undertaken such as conduct a clean-up, stop works, install controls, or change a process or activity. They are served to prevent or remedy a range of non-compliances or likely non-compliances.

<sup>2</sup> PINs are used by EPA for less serious breaches of the law where the impacts are not considered serious enough to warrant prosecution. Offences for which PINs may be applied are listed in Schedule 1 of the EP Act. A PIN imposes a financial penalty for breaches of the law. Payment of a PIN is not an acknowledgement of guilt.

interstate. There are no other relevant offences that have been disclosed in the application or that EPA is aware of.

- 4.12 The EPA has regulated the existing MRL facility at Ravenhall since 1999, which included recording pollution reports.
- 4.13 Since taking control of the current MRL site, Landfill Operations have notified EPA of three non-compliances against its licence conditions (two occurrences of litter escaping, one occurrence of surcharging the liner during landfilling).
- 4.14 Landfill Operations reported seven non-compliances in its Annual Performance Statement 2015. These non-compliances relate to: off-site offensive odours; litter escaping beyond the site boundary; LFG emissions; cell rehabilitation; and the management of leachate levels. In their 2016 Annual Performance Statement Landfill Operations reported two licence non-compliances. These relate to windblown litter and multiple LFG exceedances beyond the premise boundary.
- 4.15 EPA has conducted nine compliance inspections of the existing MRL facility since Landfill Operations took over operational control. These have resulted in four remedial notices (three PANs are still active).
- 4.16 Table 5 provides an overview of EPA’s enforcement and remedial actions at the site (noting the table only considers the Track Record of Landfill Operations and not the previous operator, Boral).

**Table 5 Summary of Notices issued to Landfill Operations at MRL**

Type of Notice	Outcome	Why or why not?
PAN 90007252	Notice served	This PAN relates to a licence breach related to LFG concentrations detected in service pits and boundary gas wells. The PAN requires upgrading of the current LFG extraction system and to implement a more stringent monitoring and maintenance schedule.
PAN 90007152	Notice served	This PAN relates to a licence breach. This breach is related to inadequate leachate extraction and storage infrastructure on-site and requires upgrading of the current leachate extraction and storage infrastructure.
PAN 90007030	Revocation in Progress	This PAN relates to LFG exceedances along Christies Road. The PAN required the creation of a LFG Risk assessment.
PAN 90006165	Revocation Served	This PAN related to dust which is a licence condition.
PIN 509008 for a licence condition breach	Fine paid	This PIN related to a licence breach for LFG emission breaches raised under section 27(2).
PIN 507764	Fine paid	This PIN related to a licence condition breach for failure to immediately notify EPA of the LFG breaches to EPA raised under section 27(2).

- 4.17 In considering pollution reports, EPA recognises that Landfill Operations only took control of the existing facility in March 2015 and many of the reports occurred before that time. A brief overview of EPA’s compliance and enforcement history of the MRL Ravenhall site for the period 2014– 2016 is provided below:
- residents in the local area have reported strong odours, litter and mud being transferred onto local roads
  - odour reports alleging Ravenhall landfill as the source have dropped to an average of less than 30 a month since May 2015. This is down from an average of 50 for the period July 2014–April May 2015, and over 75 (peaking at just over 450) in March 2014 when under Boral ownership and operation)
  - EPA has conducted 30 investigations following pollution reports made by the community (six of which have been since Landfill Operations took operational control of the existing landfill). No landfill odours could be confirmed during the six investigations undertaken whilst under Landfill Operations control. One investigation of the six resulted in a PAN being issued to Landfill Operations as per Table 5
  - EPA has conducted three odour surveillance monitoring programs, to a set protocol using Authorised Officers with 'calibrated noses<sup>3</sup>'. The 2016 program completed since Landfill Operations had operational control involved 263 odour checks. In total, 760 odour checks were undertaken over the three programs.
- 4.18 Following acquisition of MRL, Landfill Operations initiated landfill management improvements at MRL that have reduced odorous emissions including replacement of LFG extraction equipment, construction of a leachate treatment/storage pond and other environmental performance improvements (i.e. better tip face management). These have led to a decline in odour reports received by EPA.
- 4.19 Cleanaway operates and has operated a number of other landfills in Victoria for which PANs have been issued - Market Road, Brooklyn; Old Geelong Road, Brooklyn, Victory Road, Fraser Rd, Henry Street and Deals Rd. Two of the landfills have had their licences surrendered with PC PANs issued to the other landfills. Issues identified at Cleanaway operated landfills in the Clayton area by EPA have included:
- lack of leachate disposal infrastructure
  - excessive leachate levels
  - LFG emissions above Landfill BPEM action levels (surface and subsurface)
  - lack of progressive rehabilitation
  - litter
  - lack of daily cover
  - stormwater management
  - overfilling (breach of contour heights).

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<sup>3</sup> Calibrated nose - A person who’s odour sensitivity has been assessed as per Australian Standard AS4323.3

EPA served remedial sanctions and PANs in relation to the breaches at these landfills, but no relevant offences have occurred in relation to these landfills in the 10 years prior to receipt of the WAA in May 2016.

## Conclusion

- 4.20 Whilst EPA has received numerous pollution reports relating to Cleanaway and its subsidiaries' and issued Cleanaway and its subsidiaries with PANs and PINs as described above, other than the disclosed offence, there have not been any other relevant offences since 2008 in any Cleanaway operated landfills. Furthermore, it is considered that there has not been significant or systematic non-compliance at MRL. This is reflected in the revocation of PANs issued to the company and the lack of notices requiring further escalation. The company's track record since taking over at MRL has also demonstrated a commitment to improving environmental performance.

The conclusions of the assessment of Landfill Operation's and Cleanaway (and its subsidiaries) track record are that:

- while Transpacific Cleanaway was found guilty in 2008 for a relevant offence, EPA is not aware of any similar offences since then at any of their Australian landfills
- Landfill Operations and its parent company, Cleanaway, have been issued with PINs and PANs at MRL and other landfills in Victoria, but they have taken appropriate actions, which has resulted in the revocation of the notices
- Landfill Operations have initiated landfill management improvements at MRL increasing environmental performance at the site.
- EPA considers Landfill Operation and its parent company, Cleanaway, to meet the 'fit and proper person' requirements of S20(3)(b) of the EP Act.

## AIR QUALITY

### Why is Air Quality a key issue?

- 4.21 Landfills can pose a risk to air quality through LFG, odour and dust generation and transportation off-site. LFG and odour are a function of the decomposition of the wastes being landfilled and are considered in the relevant subsections of this assessment report. Dust can result from the movement of waste trucks and landfill equipment on internal haul roads, the active tip face and capping and rehabilitation activities. The remainder of this subsection considers the potential impacts of dust generation from the proposed works.
- 4.22 The MRL site is potentially of high risk for dust and airborne particle (primarily PM<sub>10</sub>) impacts due to unpaved road ways, earth movements (capping/excavations), earth stockpiles and high traffic movement.
- 4.23 The Protocol for Environmental Management (PEM) for Mining and Extractive Industries is commonly used to guide regulatory air quality assessment of high risk airborne particles/dust activities that are not mining or extractive industries, such as landfilling, where no alternative relevant guidance exists.



## Review of the WAA Monitoring & Modelling

- 4.24 Pacific Environmental Limited (PEL), on behalf of Landfill Operations, prepared an air quality assessment in support of the MRL expansion proposal. The assessment and regulatory model AERMOD was used incorporating the modelling parameters, inputs and scenarios set out below:
- a) the current air monitoring programs to assess air quality impacts from significant dust generating activities, such as mining and extractive activities, is primarily the monitoring of PM<sub>10</sub>, PM<sub>2.5</sub> and dust deposition for assessing nuisance dust impacts
  - b) the short-term air monitoring undertaken by PEL on behalf of Boral during 11–17 June 2014 around the current MRL landfill, and from 20 November to 6 December 2015 (contained in Appendix J, WAA Doc 3), on behalf of Landfill Operations at the Boral quarrying site, provides some data about general dust and particle levels around the landfill and gives some support of the modelling prediction. However, given the limited amount of information provided, it is inadequate to verify the modelling estimates
  - c) conventional general dust modelling methodology and the required regulatory inputs for airborne particles/dust dispersion modelling were used
  - d) regulatory model AERMOD, local representative meteorological data, terrain and topography inputs were used for dust modelling. Emission estimates for all the major PM<sub>10</sub> and dust deposition sources (loading and unloading activities; miscellaneous transfers; wind erosion; traffic on unpaved roads; combustion emissions from vehicle exhausts; and adjoining quarrying and asphalt plant operations) were estimated and used in the dust modelling
  - e) conventional dust estimation techniques and emission estimates and factors Published by USEPA Emission factors & AP 42 – Compilation of Air Pollutant Emissions Factors, NPI EET Manual for Combustion Engines for the major PM<sub>10</sub> and dust emissions
  - f) dust emission and dispersion estimations for past, current operations and future scenarios of operations of the landfill were undertaken
  - g) predicted dust depositions and PM<sub>10</sub> levels were estimated as required by the SEPP(AQM) and follow the PEM for Mining and Extractive Industries assessment requirements (dust deposition g/m<sup>2</sup>/month, PM<sub>10</sub> 24 hours) around the landfill site, adjoining area and representative receptor sites
  - h) the estimated annual dust emissions from the Landfill Operations determined the majority of the dust emissions were from wheel-generated dust from haul roads for each of the scenarios. These are calculated to be as 98 per cent of TSP and 94–95 per cent of PM<sub>10</sub>. Undertaking best-practice management controls and practices for wheel-generated dust is critical and if not accounted for appropriately, can markedly affect emission factor estimates which will increase the uncertainty in the modelling estimates.
  - i) the PEL assessment concluded that predicted cumulative levels of airborne PM<sub>10</sub> and dust estimates are expected to meet the regulatory guideline specified in the PEM for Mining and Extractive Industries for both dust deposition and PM<sub>10</sub>.
- 4.25 The MRL site has implemented a number of best-practice management and control measures for wheel-generated dust. There is no evidence that the comprehensive Dust Management Plan for the Boral Deer Park Quarry Plant Replacement (contained in

Appendix J, WAA Doc 3), and the anticipated dust emissions reduction is appropriately accounted for in the air dispersion modelling. The Boral Dust Management Plan includes continuous air monitoring that triggers dust management practices to be implemented during dust events. Therefore, the air quality assessment based on the air dispersion modelling estimates is considered to be conservative given that the recent dust controls at Boral were not factored into the modelling.

### **EPA's overall air & dust impact assessment**

- 4.26 Two sets of the SEPP(AQM) (under which sites the PEM for Mining and Extractive Industries) assessment criteria were used for the dust impact assessment at selected receptor sites. The criteria used for dust deposition is incremental 2 g/m<sup>2</sup>/month or cumulative 4 g/m<sup>2</sup>/month and the criterion for PM<sub>10</sub> was 60µg/m<sup>3</sup> over 24 hours).
- 4.27 Overall, the dust (PM<sub>10</sub> and deposited dust) impact assessment and risk assessment are considered appropriate. Conventional general dust modelling methodology and required regulatory inputs for dust dispersion modelling are used. Predicted cumulative levels of dust and PM<sub>10</sub> estimations are predicted to meet the regulatory guideline specified in the Protocol for Environmental Management (PEM) for Mining and Extractive Industries for both dust deposition and PM<sub>10</sub>. The limited air monitoring over six days in June and 18 days in Late November and early December 2015 is generally consistent with predicted modelling estimates.
- 4.28 Further supporting EPA's confidence in the risk assessment is the current dust management practices at the current MRL site. This has been verified by observations made by EPA's Principal Air Expert, Principal Expert for Landfill and Principal and Associate Experts for Odour at the MRL site during inspections of the landfill. These observations confirm that Landfill Operations are using best practice dust management practices and appear to be working but there is no monitoring data to verify are working effectively.

### *Management practices and controls*

- 4.29 The dust management practices for wheel-generated dust observed by EPA officers on a site visits in 2016 listed below are considered to be best-practice dust control measures:
- brush-vacuum street sweeper operating on the road and car park area
  - water cart spraying water on unsealed operational areas and roadways
  - speed limits and traffic management controls in place
  - aggregate capping on some of the unsealed roads
  - wheel wash in place for trucks entering and exiting the site
  - gate entrance/exit, car park, maintenance, and office areas are sealed.
- 4.30 The dust mitigation measures were working as no significant dust levels were observed by EPA officers on the day of the site visit. EPA observations align with the independent EPA appointed Auditor's observation at a site audit in 2016 "*The Auditor did not note any significant dust emissions at the site during the Site visit on 7 March 2016*". (Environmental Audit of Landfill Operations (s. 53V) (EPA Ref CARMS 64171-15; SO No. 8004950) available on EPA's Audit Report EPA Interaction Portal).

- 4.31 Although there are a number of effective airborne particle and dust management practices, there is no evidence of a formal dust management plan for the site to manage all of the high-risk areas and high airborne particle/dust events in place or air monitoring program evident. The lack of plan was also confirmed by Environmental Auditor<sup>4</sup> in the Environmental Audit of Landfill Operations (s. 53V) (EPA Ref CARMS 64171-15; SO No. 8004950) available on EPA's Audit Report EPA Interaction Portal.
- 4.32 In the event that WA is issued, it is recommended that a Dust Management Plan incorporating Dust Monitoring Program and Dust Deposition be implemented to monitor and manage dust and particulate matter. This should be secured by a suitably worded condition see paragraph 5.23 and WA\_R4, be agreed with EPA, and include:
- i) implementation of best practice airborne particulate and dust control measures that also includes adaptive operational practices to respond and control dust events on site
  - ii) real time PM<sub>10</sub> air monitoring that enables an assessment of air quality impacts and triggers reactive management practices to be implemented during dust events on site
  - iii) dust deposition monitoring that enables an assessment of nuisance dust impacts
  - iv) a review of the effectiveness of the particulate and dust control measures in light of the monitoring data produced from (ii) and (iii) above and the relevant standards for the control of airborne particulate and dust
  - v) provision of surveillance or monitoring records to the Community Consultation Committee, the Responsible Authority and the Environment Protection Authority
  - vi) the approved Dust Management and Monitoring Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.

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<sup>4</sup> Draft Environmental Audit of Landfill Operations (s.53V) Melbourne Regional Landfill, 1100-1152 Christies Road, Ravenhall, Vic 3023, 28 October 2016, section 12.3.3 p.80

## Conclusion

The conclusions of the review of potential effects on the air environment are that:

- the estimated air quality impacts meet the assessment criteria specified in the SEPP(AQM)- Protocol for Environment Management (PEM) for Mining and Extractive Industries
- no significant impacts from dust are expected with the proposal considered to meet SEPP AQM and the Landfill BPEM
- current dust controls are best practice and limited observations indicate they appear to be working but there is no air monitoring to verify they work all year round and during adverse conditions that are conducive to offsite dust impacts. There is no formal dust management plan with air monitoring trigger levels to activate dust contingencies and control practices to manage adverse dust events
- a formal best practice comprehensive dust management Plan is required. The dust management plan needs to also include an air monitoring program comprising of two components; (1) air program consisting of real time monitoring (PM<sub>10</sub>/PM<sub>2.5</sub>) to assess air quality impacts and initiate reactive management practices to respond to dust events; (2) air monitoring program to measure dust deposition for assessing nuisance dust impacts
- the proposed design and operational management practices are considered unlikely to cause any significant pollution or hazard to the air segment.

## ODOUR

### Why is Odour a key issue?

- 4.33 Odour is the single most frequent pollution report for the EPA, with more than one third of total pollution reports received relating to odour impacts on the community.
- 4.34 The operation of landfill facilities are known to produce odour emissions even when the facilities are operated at best practice. Accordingly, controlling odour emissions and mitigating the residual odour emission impact on the local community are key issues associated with urban landfill planning and operation.

### Climatology

- 4.35 Local climatology has a major influence on odour impacts on the area surrounding the landfill. In particular, it influences the direction and degree of atmospheric dispersion of the landfill odour emissions. Prevailing winds, atmospheric stability/turbulence, seasonality and inter-annual variability all need to be considered, specifically in reference to the range of potential landfill odour sources.
- 4.36 The prevailing winds at the MRL site (based on EPA data collected at Deer Park air monitoring station and which is considered as a representative site) are from South Westerly direction (South to West), which would transport air masses with any entrained landfill odours towards residential areas at Caroline Springs, Deer Park and Derrimut. In contrast, Easterly winds that are likely to transport odour towards the proposed Mt Atkinson precinct, are not as prevalent as there is very little wind from the East (2 per cent). The highest winds likely to transport odour from the proposed expanded landfill to

the proposed Mt Atkinson precinct are south east (10 per cent) and north east (8 per cent) winds.

## **Odour Impact Site Assessment**

### *Odour risk assessment criteria and supporting data and information*

- 4.37 The key considerations for the odour risk assessment are:
- i) State Environment Protection Policy (Air Quality Management) ((SEPP(AQM)) criterion (1 odour unit concentration) is used for the odour impact assessment at representative receptors
  - ii) analysis of current operations impacts including assessment of local odour reports by local residents, on and off-site odour surveys, past and current management practices
  - iii) assessment of proposed best practice odour controls as required by clause 18 (SEPP(AQM)).

### *Review of the WAA's Odour modelling and assessment*

- 4.38 Pacific Environmental Limited (PEL), on behalf of Landfill Operations, prepared an air quality assessment in support of the MRL expansion proposal. The regulatory model AERMOD was used incorporating the modelling parameters, inputs and scenarios set out below:
- a) local representative meteorological data from Deer Park (2008-2012) (within 5 kilometres)
  - b) local representative terrain and topography input file
  - c) odour emissions from the major landfill odour sources: fresh waste tipped in active cell, fresh waste covering, intermediate covered cells, fully capped cells and leachate storage ponds
  - d) a number of future modelling scenarios were used based on the assumption that “a high standard of odour management will be in place”. These scenarios indicating a low or negligible odour risk at almost all of the nominated sensitive receptor sites in the model. The modelling study proposed no odour will be detected in the surrounding Ravenhall fringe suburban area, indicated by a number of the model receptors R15 to R19 (P84 MRL Air Quality Assessment) with projected odour impacts to be well below 1 odour unit
  - e) the odour emission rate for the highest odour source, the active tipping face whilst based on representative odour measurements was determined to be 150 ou/m<sup>2</sup>/s and then derived to be 3.3 ou/m<sup>2</sup>/s by applying a correction factor of 0.022. PEL made the argument that using the measured data is not representative because the predicted “detectable odours from the landfill at distances well over 100 km, which is unrealistic, so adjustments must be made for realistic modelling”. The adjustment comprises of three factors, a profile factor of 0.59 to account for variation in vertical profile during sampling, other source contribution of 0.84 and an equation used to account for the effect of wind speed and turbulence on the odour flux/emission resulting in a factor of 0.043. Downwind odour observations and adjusted modelled estimations are compared for the odour reviewing model performance and verifying the model predictions



- f) odour emission and dispersion estimations for past, current and future operation scenarios of the landfill were undertaken
- g) predicted odour levels were estimated as required by SEPP(AQM) odour assessment requirements (99.9 percentile, 3-minute average) around the landfill, at representative receptor sites in local residential and commercial areas surrounding the landfill.
- 4.39 The PEL modelling predicts compliance with the SEPP requirement of one odour unit as it predicts that no odour will be detected in the surrounding Ravenhall fringe suburban area, indicated by a number of the model receptors R15 to R19 (Appendix J of WAA Doc 2)) with projected odour impacts to be well below 1 odour unit.
- 4.40 Landfill Operations additionally commissioned an Air Quality Expert Report from Todorski Air Sciences Pty Ltd which was presented to the Joint Planning Panel Hearing and s 20B Conference, and included in WAA Doc 5. The key purpose of the work, was to undertake a peer review of the PEL Air Quality Assessment and Addendum to the Air Quality (provided in WAA Doc 3) and, as part of the peer review to re-run the odour modelling undertaken by PEL. Key conclusions of the Todorski report include that:
- indicates that despite some technical issues, the odour and dust assessment set out in the Report PEL (2016) overall presents reliable findings
  - a re-run of the model, found only a minor difference in the odour risk assessment at the surrounding receptors with the re-run model showing some lower and some higher odour effects at specific receptors, but overall a generally low level of odour risk
  - the assessments presented by PEL and based on the re-run modelling results are consistent and arrive at essentially the same conclusions
  - the assessment of the base case scenarios (i.e. for the 2014, 2015 landfill operations) are commensurate with the EPA surveillance of 760 odour observations conducted over the same period
  - the assessment shows that there would be nil or low risk of offensive odour impact other than at one or two isolated dwellings to the south west where there may be a moderate risk of odour impacts for a limited period of time
  - a site inspection indicates that the proposed extension would have a large separation distance to the existing residential areas and corrective services facilities, but that there are a few isolated dwellings to the south west in relatively close proximity. This would decrease landfill odour at receptors to the east and south east of the proposed extension, but would for a period increase odour effects at the few isolated receptors to the southwest. As the proposed extension moves north as per the proposed landfill sequence odour impacts at the isolated receptors would cease
  - there are some parts of the PEL work that are only partially agreed with, however these issues do not affect the final outcome of the PEL assessment, which are agreed with
  - the results indicate no tangible odour impacts would arise in the PSP land to the west of the site.

*EPA review of the odour modelling and assessment*

- 4.41 Modelling odour from large area sources the size of MRL is complex and associated with high uncertainty. Air pollution dispersion modelling of landfill odour emissions is inherently challenging due to the complexity of quantifying odour emissions and their impact, and the

range of model assumptions required, in particular choosing representative emission source rates. Modelling simulations of landfill odour impacts require adequate sensitivity analysis and ground truthing with appropriate direct observations for verifying model outputs.

- 4.42 EPA reviewed the modelling approach taken by PEL, including commissioning an independent review of the PEL report (undertaken by Air Quality Professionals see Appendix F.1), and concluded that the assumptions and modelling methodology used in this study, are not adequate to realistically simulate the landfill odour emissions, and that the simulations lacked appropriate verification. This is based on fundamental inconsistencies between the simulation results with the actual EPA odour surveillance data from the existing landfill operations. The review concluded "*This disparity brings the credibility of the model results for the future MRL development into question.*" The review identified numerous issues with the key modelling inputs selected, particularly with the odour flux sources and rates, including that the:
- odour sources from the landfill cell area were represented as a volume source rather than an area source
  - odour flux rates were derived using a method with a "high degree of uncertainty"
  - odour flux rates and model inputs were not subjected to any sensitivity analysis.
- 4.43 In addition, issues with elements of the meteorological methodology were queried, including the absence of conditions with calm winds and winds less than 0.5 m/s in the simulations, which represent atmospheric conditions that are not conducive for odour dispersion.
- 4.44 In response to the Planning Panel's recommendation that EPA review the odour modelling to determine if further assessment is required (see paragraph 2.24 above), EPA considers that despite the uncertainty with modelling estimates further modelling with CALPUFF or another model with sensitivity analysis with multiple runs is unnecessary for the following reasons:
- the CALPUFF model is also associated with high uncertainty and further modelling with CALPUFF will not necessarily produce better representative odour impact assessments. The use of CALPUFF theoretically is considered to be better suited for emissions during night under stable atmospheric conditions when the greatest odour impacts tend to occur. The CALPUFF model is preferred on the basis that AERMOD tends to overestimate because it does not adequately take into account all of the dispersion factors. Therefore it is plausible the CALPUFF will estimate lower odour impacts than AERMOD.
  - although EPA has identified CALPUFF as being more suitable than AERMOD for modelling broiler farm odours, EPA has changed this position since AERMOD was updated to deal with low/stable conditions for low level area sources. A comparison of the CALPUFF modelling estimates and updated AERMOD estimates for broiler farm odours were consistent, illustrating the low wind/stable conditions in AERMOD had been addressed.
  - as described below EPA considers, that it a better approach to assessing the overall odour risk assessment is based on the odour surveillance and odour impact monitoring, complemented by the modelling to gain an understanding of the local odour dispersion and transport.

- 4.45 Relying solely on the odour dispersion modelling estimates to evaluate the odour impact assessment is contentious given the uncertainty in the modelling estimates. Therefore the odour impact assessment needs to include an odour risk assessment based on current odour impacts.

### **EPA Analysis of current operations**

- 4.46 The existing MRL site provides a valuable indication of likely odour emissions and associated odour impacts from the proposed site, because the operations and climatic conditions will largely be the same. The EPA has extensive odour surveillance monitoring and odour assessment data around the MRL site and surrounding residential area to provide empirical evidence for an odour risk assessment.

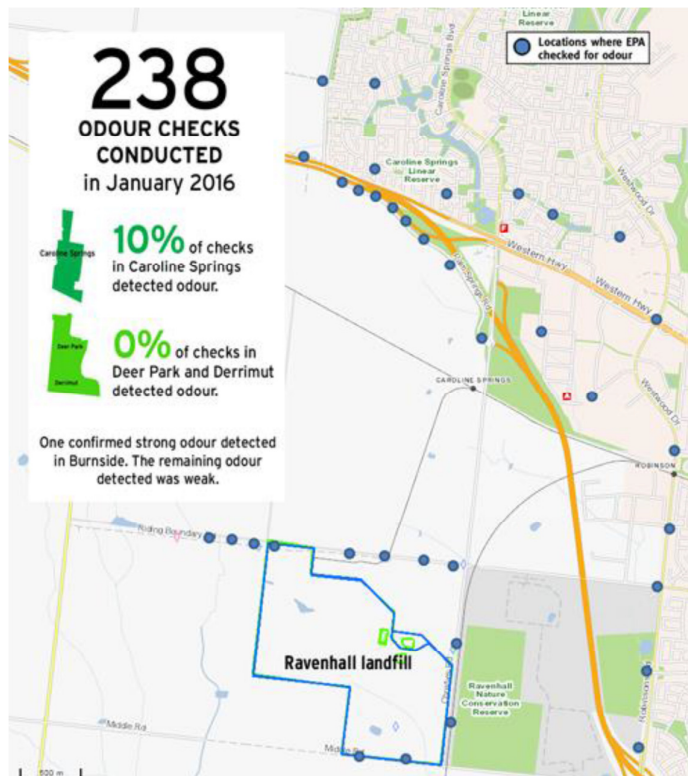
### *EPA pollution reports*

- 4.47 EPA has continued to receive a large number of pollution reports from residential areas surrounding MRL at a distance of up to 3 to 4 kilometres. Residents in Ravenhall, Deer Park, Derrimut and Caroline Springs have been reporting odour issues since January 2014, allegedly from the MRL site. EPA has received more than 450 community odour pollution reports since January 2015. Analysis of these pollution reports indicates:
- a) odour impacts are frequently received from up to and beyond 1,000 metres from the facility
  - b) reports are dispersed geographically throughout the surrounding residential areas and not confined to any one particular location
  - c) a combination of reports which do or don't allege the pollution source
  - d) pollution reports continued following the closure and exit of Pinegro organic composting facility from their Truganina site off Riding Boundary Rd October 2015).

### *EPA odour surveillance studies*

- 4.48 To investigate odour impacts in an area in a consistent and systematic way, EPA conducted structured odour surveillance studies using trained EPA officers under the guidance of EPA odour experts. This method includes attribution of the odour source (to differentiate between landfill and composting and other odour sources) and odour strength (weak or strong).
- 4.49 EPA conducted three odour surveillance studies from residential areas surrounding MRL in 2014 – 2016. The surveys were conducted during periods at which EPA received high numbers of reports, i.e. during the warmer months and when prevailing winds tend to be light and in the direction of the residential areas. Odour surveillance was conducted by EPA Authorised Officers in February to March 2014, in February to April 2015 and January 2016. In total EPA conducted 760 odour tests as part of these programs. Analysis of these results showed that detections of strong odours attributed to landfill origin:
- represented 50 per cent of the total odour observations made at a distance less than 500 metres from the tipping face
  - showed a significant decrease in frequency at a distance greater than 1,000 metres from the tipping face, with a sharp decline in the 1,000 metres to 1,500 metres range
  - were generally limited to a distance within 1,500 metres of the tipping face

- were rare and highly variable beyond 1,500m
- 4.50 Of most relevance to the WAA is the odour surveillance study conducted post-closure of the Pinegrove composting facility, in January 2016. EPA officers detected odour on 31 occasions out of a total of 238 odour checks during this odour surveillance (see Figure 21 below). This assessment was undertaken around the boundary of the existing landfill, on the fringe of the surrounding suburban area and within the suburban area. The major part of the surveillance program was undertaken during high risk periods, when South, South Westerly winds prevail, and would be expected to transport any odour emissions from the existing landfill to the surrounding residential area in Caroline Springs, Burnside and Deer Park. Other odour checks were also undertaken during the year in response to odour reports. Most strong landfill odours were detected around the boundary of the landfill and a limited number on the fringes of the residential areas in the Ravenhall area between the landfill and the suburban residential area. One of the ten strong odours detected in the residential suburban area was identified as being from the landfill, with the others suspected as being from other sources such as asphalt, manure and a sewer leak. There were no odour related regulatory sanctions issued by EPA during 2016.



**Figure 21 EPA odour surveillance (January 2016), location and number of odour checks conducted by EPA Authorised Officers**

- 4.51 In addition, EPA undertook a further odour surveillance program designed to rapidly respond to public odour reports. EPA officers were located at the Country Fire Authority station in Caroline Springs in February 2016 (7am to 10 pm) to enable them to immediately investigate odour pollution reports. Of the 17 odour reports received in February 2016, no odour was detected by EPA officers at the locations where the odour was reported.

4.52 In summary, EPA odour checks during investigations in response to public odour reporting have rarely confirmed strong landfill odours. The odour surveillance monitoring program shows strong odours from the landfill were rarely detected and tended to be confined to boundary of the landfill the Ravenhall area between the landfill area and on the fringe of the community residential area. The odour detected in the community residential area was typically weak and infrequent. This indicates the odour management practices in place with the accompanying separation distances are working to manage odour impacts. The current operations are resulting in the occasional detection of odour beyond the boundary of the premises which is consistent with landfills generally.

### **EPA Assessment of proposed best practice odour controls**

4.53 Key best practice odour control at the site includes:

- appropriate separation distances
- restricting tipping face of the landfill to an area of 1,800 square metres, covering and compacting daily waste promptly after being deposited, completing daily, interim and final capping as per the best practice standards.
- implementing and operating best practice LFG extraction and management system as per best practice requirements
- actively installing (sacrificial) horizontal gas wells in newly covered areas of the cells
- operating waste gas to energy system as per best practice requirements
- undertaking odour impacts assessments around the landfill to guide and trigger odour mitigation activities as required.

4.54 As stated in paragraph 4.80 below EPA considers that the proposed measures do meet odour management best practice, such that they meet Clauses 18 and 19 of SEPP (AQM).

### **EPA's Overall Odour impact assessment**

4.55 Given there is evidence of occasional odour detection in the area beyond 1.5 kilometres this would indicate, the risk of odour impacts is more consistent with a low to medium risk rather than the low risk arrived at in the PEL odour dispersion modelling. The risk of odour impact is increased with a reduction of separation distance with the highest risk most likely to be associated with cells 10, 13 and 16 where their separation distances are significantly reduced to 1.5 to 2 kilometres, compared to the 3 to 4 kilometres associated with the current operating cell.

4.56 In the event that WA is issued, it is recommended that an odour impact assessment program be implemented to monitor and manage odour. This should be secured by a suitably worded condition see paragraph 5.24 and WA\_R4, be agreed with EPA and include:

- the submission and approval by EPA of an Odour Management and Monitoring Plan which should detail the odour management controls and monitoring regime to be undertaken during the life of the landfill including but not limited to:
  - a) Identification of potential odour sources and receptors

- b) Specifying the odour mitigation measures and procedures to manage the odour impact off-site of the various potential odour sources and to mitigate the off-site odour impacts
- c) Comprehensive monitoring practices, including surveillance by independent and appropriately trained personnel
- d) Procedures for addressing the odour source if a report is verified, including consideration of any mitigation measures or operational changes that might be required
- e) Provision of surveillance or monitoring records to the Community Consultation Committee, the Responsible Authority and the Environment Protection Authority
- f) Incorporation of a requirement to assess new odour management technologies or tools on a regular basis.

The approved Odour Management and Monitoring Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.

## Conclusion

The conclusions of the review of potential odour effects on the environment are that:

- The odour assessment concludes the proposed landfill extension complies with the SEPP(AQM) requirements of one odour unit at sensitive receptors
- Odour dispersion modelling estimates used to evaluate the odour impact assessment is associated with significant uncertainty and therefore the odour impact assessment was supplemented by an odour risk assessment based on observed odour impacts to verify the overall odour risk assessment.
- The odour risk assessment based on current odour detections (landfill operation activities for 2016) concluded that the detections were consistent with landfills that operate with best practice odour controls.
- Odour modelling is showing that the variability in odour levels is generally consistent over five years, indicating that the odour detections of the extension is likely to be similar to the odour observed from the current landfill during 2016.
- Based on recent experience with MRL, the proposed extension will require an odour buffer of 1 to 1.5 kilometres to manage residual odour emissions and this needs to be formally captured in the planning scheme.
- A works approval condition, requiring an odour management plan based on a robust monitoring program that includes triggers for odour mitigation practices when needed, is recommended.

## LANDFILL GAS

### Why is Landfill Gas a key issue?

- 4.57 Landfill gas (LFG) is an asphyxiant and potentially explosive when mixed with air. It also contains potent greenhouse gases. LFG can be emitted to atmosphere and/or migrate through the geology and underground service structures surrounding the landfill. For these reasons, LFG requires rigorous management and monitoring. Internationally, best practice landfill management and monitoring is well established and the WAA meets best



practice. The impacts of the proposed LFG management hazard reduction are considered in this section. LFG has odourous components that are also managed as part of this process.

### **Review of the WAA's Landfill Gas Risk Assessment and EPA's Assessment**

- 4.58 In accordance with the requirements of the Landfill BPEM, a site-specific LFG Risk Assessment has been prepared and presented as part of the WAA. The LFG Risk Assessment is contained within the LFG Management Plan in Appendix H of WAA Doc 2.
- 4.59 The LFG risk assessment is based on a conceptual model of the site that accounts for the site size and topography, cell liners, waste types, LFG generation, leachate generation and the progressive rehabilitation plan. The model then sets the site characteristics in its geological, hydrogeological, hydrological, air quality and human and environmental receptor context. A quantitative and qualitative risk assessment, that is partly based on the existing MRL, is then derived from the model.
- 4.60 The LFG risk assessment for on-site receptors is considered appropriate, includes monitoring and meets BPEM requirements.
- 4.61 The LFG risk assessment for off-site receptors is only based on the existing conditions where a 500m buffer from the edge of the proposed landfill cells is maintained. Landfill gas management practices and systems to mitigate risks to human receptors, with a buffer in place, are well established and are in use at many Cleanaway sites in Victoria. The WAA proposes these such practices which accords with the BPEM.
- 4.62 It is noted that the risk assessment has omissions related to the proposed future development of the Mt Atkinson and Tarneit Plains PSP (as outlined). Notwithstanding this future development proposal, best practice LFG controls are proposed in the WAA based on existing receptor conditions. Ensuring the requirements of the Landfill BPEM (i.e. best practice) are met is the basis for EPA's WAA assessment.
- 4.63 The LFG risk assessment does not document the proposed commercial/industrial areas on the eastern portion of the proposed Mt Atkinson and Tarneit Plains PSP. Some of this area will be ~200 metres from the proposed landfill extension; a significant encroachment of the 500 metres buffer. As such, this proposed commercial/industrial area will likely be affected by off-site odour and amenity impacts and by LFG migration. While the commercial/industrial uses are generally not considered sensitive receptors to LFG odour and amenity impacts (albeit, they are impacted), any structure in this area is a sensitive receptor to any subsurface LFG migration that might occur should the development proceed.
- 4.64 The proposed commercial/industrial areas of Mt Atkinson and Tarneit Plains, at ~200 metres from the proposed landfill extension, present a higher risk scenario for LFG migration impacts than any that are considered in the LFG risk assessment. The landfill liner will retard LFG migration but LFG can still penetrate the liner. The geology presents a moderate amount of attenuation of LFG migration, as movement is only possible through fractures that exist in the Basalt. However, these fractures are highly heterogeneous, resulting in varying risk profiles depending on the degree of interconnectivity between fractures. The scoria and paleosol strata also present areas of higher (than Basalt) permeability for gas migration. If the commercial/industrial estate is permitted within the 500 metres buffer, the LFG gas risk assessment would need a significant review. LFG controls and monitoring beyond best practice would need to be considered.

- 4.65 However, it is recognised that undertaking a LFG risk assessment on land development and proposed landfill cells, which are not constructed or operational is difficult. EPA considers that such a LFG risk assessment would contain levels of uncertainty which would require overconservatism.

#### *Landfill Gas Management*

- 4.66 In accordance with the requirements of the Landfill BPEM a site-specific LFG Risk Assessment has been prepared and presented as part of the WAA, contained within the LFG Management Plan in Appendix H of WAA Doc 2.
- 4.67 LFG management practices must demonstrate all practicable measures to meet the LFG action levels (emissions limits) stipulated in Landfill BPEM, this requirement is further specified in standard licence condition L5 (You must take all practicable measures to prevent emissions of LFG from exceeding the action levels specified in Table 6.4 of the Landfill BPEM), as such the WAA has been compared against the normal LFG management practices used to comply with L5.
- 4.68 The WAA proposes standard practices of drilling LFG wells into filled cells which are connected to transmission pipework which in turn is connected to vacuum extraction and LFG combustion equipment. The Landfill BPEM LFG hierarchy is met by the combustion of LFG in engines with connected electrical generators. The assessment of LFG control from filled cells should be read with that for progressive rehabilitation (paragraph 4.224-4.229) as effective LFG control to meet Landfill BPEM LFG action levels cannot be achieved if proper progressive rehabilitation isn't undertaken. Active LFG extraction will be installed in each completed cell in the phasing plan soon after filling has ceased and intermediate cover has been placed. This will reduce odours significantly from those completed cells. Sequential final capping of each cell will follow the intermediate cover, this further reduces odourous emissions by increasing the cap thickness which allows improved LFG collection efficiency. The proposed LFG well spacings are 40 – 50 metres which is considered appropriate. The rest of the LFG well, pipework, condensate control, manifold, blower, engine and flare details are considered appropriate and industry standard.
- 4.69 The LFG generation modelling is considered appropriate and the model outputs are intended to be continuously validated with on-site LFG flows. This is important so that the installed extraction system is expanded in line with LFG generation forecasts and observations and is always able to extract and combust the required amount of LFG to meet the Landfill BPEM gas action levels. The LFG wells will be regularly balanced (this is currently monthly at the existing site) to increase LFG collection efficiency to meet the Landfill BPEM LFG action levels and reduce odours.

#### *Landfill Gas Monitoring*

- 4.70 In accordance with the requirements of the Landfill BPEM a LFG Monitoring Program has been prepared and presented as part of the WAA, contained within the LFG Management Plan in Appendix H of WAA Doc 2. This will be verified by an EPA Auditor.
- 4.71 The monitoring program will be an extension of that currently operated at the existing MRL and for LFG comprises monitoring of sub-surface geology, surface emissions and buildings and structures on-site and off-site in immediate surrounds.

- 4.72 This monitoring program will be used to provide feedback to the operation of the gas extraction system. The two major triggers for investigation are a breach of the Landfill BPEM gas action levels and odour. Recommended spacings for the perimeter LFG monitoring bores (monitoring for sub-surface LFG migration) is contained within Landfill BPEM, the WAA does not make a commitment to these spacings, instead saying the recommended spacings will be considered when agreeing spacings with EPA. This is considered appropriate as the boundaries of the landfill present differing configurations and risk scenarios with respect to air gaps and quarry walls between receptors and differing receptor distances. Given the potential for future development to occur within the 500m LFG buffer and the heterogeneity of the site geology, it is considered appropriate that the density of the LFG monitoring bores located around the perimeter of the landfill within the buffer is significantly increased over that required in the Landfill BPEM.
- 4.73 Accordingly it is recommended that a condition of any works approval issued includes for the preparation of a LFG Monitoring and Management Program. This should be submitted for approval to the EPA prior to the construction of the Cell 1 and should include the following:
- details (numbers and locations) of landfill gas perimeter monitoring bores consisting of an inner and outer network located within the premises between the landfill cells and premises boundary to be monitored monthly. The inner network should be at least 20 metres distant from the edge of the waste and the outer layer should be at the premises boundary. The landfill gas perimeter monitoring bore spacings must meet the recommended spacings in Table B.2 of BPEM
  - the sequencing for the design and installation of the landfill gas extraction system in each cell
  - the sequencing for the design and installation of the horizontal gas wells in each active cell
  - the sequencing for the approval and installation of gas engines, gas flares and ancillary equipment including increases in the electrical interconnection for the gas engines
  - a program of inspection and maintenance of landfill gas extraction and monitoring infrastructure including provision of standby equipment
  - a schedule of landfill gas well balancing frequency and condensate management.
- 4.74 It is noted that the monitoring program, LFG risk assessment and operational audits form a continuous cycle whereby the monitoring program is updated after the risk assessment is reviewed and re-verified at each environmental audit. Monitoring frequency, type and locations are increased or decreased according to the ongoing risk assessment.

#### *Landfill Gas Odour Control*

- 4.75 The WAA proposes extraction of LFG from each active cell using horizontal (sacrificial) gas collection wells. This is recognised best practice and is noted in Landfill BPEM. This measure reduces LFG odour from the active cell but does not prevent it. Other than daily cover the active cell is open to atmosphere and emissions of significant odours from it is the nature of landfilling, hence why a sufficient amenity buffer must be maintained.

## Conclusion

The conclusions of the review of the proposed LFG management measures are that:

- best practice LFG management and monitoring is proposed in the WAA and can be expected to be reinforced by EPA licence conditions. The proposed management and monitoring represents expected practicable measures to achieve the Landfill BPEM LFG action levels and aligns with the LFG risk assessment.
- the LFG risk assessment has omissions but consideration of these omissions would not change the proposed LFG management practices as these already represent best practice and comply with BPEM and the Landfill Waste Management Policy.
- if the commercial/industrial estate ~140 metres to the West of the proposed landfill extension is not permitted, the proposed LFG management measures represent best practice to reduce LFG migration and amenity risks as far as practicable
- if the commercial/industrial estate ~140 metres to the West of the proposed landfill extension is permitted the Landfill WMP may not be met as the BPEM required outcome for buffers would not be met dependent on the result of an updated LFG risk assessment. This required outcome states *'Provide buffers in accordance with Table 5.2 and Table 8.2; where these are unavailable, demonstrate that risks are mitigated to the same standard.* EPA assesses that these buffers are currently met and recommends formalisation of required odour and LFG buffers in the planning scheme.

## GROUNDWATER

### Why is Groundwater a key issue?

- 4.76 Groundwater is a segment of the environment which has a wide range of interactions with other parts of the environment. Groundwater discharges into surface environments and in many cases contributes a significant proportion of the base flow of streams. Ensuring that groundwater quality does not adversely affect surface water ecosystems is integral to the protection of these ecosystems and other beneficial uses of surface environments such as drinking water and recreation uses. The SEPP (GoV) is an important aspect of Victoria's regulatory framework for protecting and improving Victoria's groundwater, by providing clear and relevant standards and legal obligations. This includes protecting environmental values and human activities from the effect of pollution and waste.

### Review of the WAA's the Groundwater Assessment and EPA's Assessment

- 4.77 The assessment of groundwater information provided in the WAA was compared against the EP Act and SEPP (GoV) which are discussed in paragraph 1.61 (the EP Act) and paragraph 1.65 (SEPP (GoV)) above. In particular, the definition of pollution in Section 4 of the EP Act was considered in conjunction with Section 39 (1) of the EP Act regarding what constitutes "pollution of waters".
- 4.78 In reviewing the WAA, SEPP (GoV) was referenced to confirm what was considered to be the baseline regional and site-specific groundwater conditions. Key sections of SEPP (GoV) that were considered as part of the review were:
- Section 4 - Definitions, specifically "background levels"

- Clause 8 - Segments of the groundwater environment
- Clause 9 - Beneficial uses
- Clause 10 - Groundwater quality indicators and objectives
- Clause 21 – Rising water-tables.

4.79 Further information was requested to confirm:

- classification of groundwater segment - The site-specific information presented in the WAA included bores that had lower TDS concentrations than Segment C and the segment classification seemed to be based on average concentrations of TDS across the site (BH01 TDS was measured as 2400mg/L). Further justification was provided to confirm the appropriate groundwater segment classification, noting that BH01 was located in the deeper aquifer (Werribee Formation and Palaeozoic bedrock) and is not representative of the basalt aquifer in connection with the current landfill. It is also noted that SEPP (GoV) requires that the appropriate temporal and spatial data is required for EPA to make this assessment. Through further discussion with the consultant hydrogeologist, and review of the 2014 53V environmental audit, the groundwater segment classification was able to be confirmed as Segment C in accordance with SEPP (GoV)
- protected beneficial uses - The beneficial uses that were originally considered in the WAA and Appendix D of WAA Doc 2 were restricted to stock watering and therefore the groundwater quality objectives included also appeared to be quite restricted. Further information, review and consultation with EPA's Inland Water Expert were completed to confirm whether Maintenance of Ecosystems was a protected beneficial use. It was considered that given the distance to the nearest surface water receptor, while Maintenance of Ecosystems was a protected beneficial use, it was unlikely to be impacted as groundwater and any potential impact from the site would not directly discharge into the tributary of Skeleton Creek. Further information regarding surface water impacts is included in paragraphs 4.86-4.89 below and should be read in conjunction with this section
- information on the groundwater bore usage in adjacent off-site areas and the potential impact on regional groundwater levels - It was unclear in the WAA what the closest down-gradient bore is used for to the southeast of the site, so further available information was requested to resolve potential risks to down-gradient off-site groundwater users. It was also noted that groundwater is extracted from bores on-site. Further information was requested to confirm how this may affect regional "undisturbed" groundwater levels. Further information and resolution of this issue is provided in paragraphs 4.156 to 4.164 of this Assessment Report
- understanding of groundwater quality - Following the review of the WAA, further information about data and information was requested to assess the interpretation of background levels (e.g. sulphate and nitrate concentrations) and current groundwater quality conditions at the site (e.g. increases in concentrations of manganese in groundwater) and how this compared to the surrounding region. Additional information was provided in Appendix 4 of WAA Doc 6 that confirmed the current groundwater conditions and the interpretation such that baseline groundwater conditions are understood prior to the landfill development.

- 4.80 This assessment of the WAA considered the 53V environmental audit that was completed in 2014 and identified that several of the issues that EPA had asked for further information on were recommendations of the 53V environmental audit completed in 2014. Further information in Appendix 3 of WAA Doc 6 (the current draft environmental audit) was provided to confirm how the auditors' recommendations from the 53V environment audit (2014) were being addressed. This additional information was reviewed (noting that it was an extract from the greater report which was not provided) with it considered that the current auditor's (Anthony Lane) assessment and recommendations were sufficient to meet the request.
- 4.81 Throughout the review process and the requests for further information, a telephone conversation with David Ife and the meeting on 30 November 2016, issues identified in the initial WAA relating to the classification of the groundwater segment, protected beneficial uses and information on off-site bore usage were able to be resolved. Either additional information was provided or the risk to human health and the environment were considered to be low based on the nature and limited extent of elevated concentrations of potential contaminants e.g. sulphate, nitrate and manganese.
- 4.82 In regards to the characterisation of the current groundwater quality at the site and in the region, as well as potential background levels, EPA recommends that a condition is included on the approval that reflects the 2014 environmental audit and the auditor's conclusions and recommendations regarding the groundwater quality information. Key issues identified in the environmental audit were superseded by those considered in the environmental audit finalised in early 2017, summarised below in paragraph 4.84).
- 4.83 The draft 2016 environmental audit (Cardno) Appendix 3 of WAA Doc 6 (which was finalised in early 2017) had similar recommendations to the 2014 environmental audit which relate to characterisation of groundwater quality at and upgradient of the site. The intention of a condition in the approval would be make clear that auditor's recommendations regarding groundwater quality characterisation are implemented.



## Conclusion

The conclusions of the review of potential effects on the groundwater environment are that:

- throughout the review process and the requests for further information, issues identified in the initial WAA relating to the classification of the groundwater segment, protected beneficial uses and information on off-site bore usage were able to be resolved. It was concluded that groundwater at the site was classified as Segment C in the aquifer that the landfill was in connection with
- the potential risk to human health and the environment were considered to be low based on the nature and limited extent of elevated concentrations of potential contaminants in groundwater e.g. sulphate, nitrate and manganese
- the WAA, Appendix D and supplementary information provided were considered to comply with SEPP (GoV) such that the WAA is not expected to adversely affect the interests of any person other than the applicant
- the WAA is not expected to adversely affect the quality of the groundwater nor cause any pollution or environmental hazard as the proposed works are assessed to be in accordance with the Landfill BPEM
- to support future assessment of groundwater conditions in regards to the characterisation of the current groundwater quality at the site and in the region, as well as potential background levels a condition requiring implementation of the 2014 environmental audit and the auditor's conclusions and recommendations regarding the groundwater quality information and further monitoring and management that should be completed (detailed below in paragraph 4.84).

## Groundwater Monitoring and Management

4.84 In regards to the characterisation of the current groundwater quality at the site and in the region, as well as potential background levels, it is considered that a suitably worded condition should be included in any WA issued – see paragraphs 5.22 and WA\_W8 and 5.24 and WA\_R4. Such a condition should reflect the 2017 environmental audit of the existing MRL and the auditor's conclusions and recommendations regarding the groundwater quality information and need for further monitoring and management. The relevant recommendations from the 2017 environmental audit (WAA Doc 6 Appendix 5) relating to groundwater monitoring include the following:

- updating the Conceptual Site Model to illustrate the hydrogeology, surrounding land uses and receptors more comprehensively
- completion of a groundwater bore network performance audit and undertaking of any remedial repairs, if required
- installation of additional groundwater monitoring bores in both the Lower and Upper NVAs
- preparation of and maintenance of a groundwater bore network register where a summary tabulation of groundwater bore construction, describing the condition of each bore, the aquifer monitored, and the registered bore ID that is recorded in the WMIS are kept

- improved groundwater quality sampling, testing and monitoring to additionally include groundwater depth
- setting of appropriate trigger points and actions, should exceedances occur.

## **SURFACE WATER**

### **Why is Surface Water a key issue?**

- 4.85 Surface waters, in the form of creeks, wetlands and estuaries, support important environmental values such as fish, frogs and other wildlife, as well as providing valuable places for both passive and active recreation by people. These waterways in turn depend on the catchments that feed them with catchment runoff being a key factor in determining whether a waterway is healthy or not. The more contaminants in the runoff, the more likely that a waterway will be adversely impacted.

### **Baseline Surface Water Characteristics**

- 4.86 Skeleton Creek lies in the Werribee river catchment to the west of Melbourne. Basalt plains dominate the regions geology and the landscape varies from steep sided hills and gorges to flat plains. Rainfall varies from about 1000 millimetres per year to as low as 450 millimetres per year in the southern plains (MW, Regional River Health Strategy).
- 4.87 The regional importance of Skeleton Creek, as rated by MW, is low; its current condition is moderate and its target under the Regional River Health Strategy is also moderate. The highest values for the creek are located where it discharges to Port Phillip Bay where significant wetlands for migratory birds exist. The key risks to the creek are described as poor water quality (probably from increasing urban developments) and the poor quality of streamside vegetation. The main opportunities for improving the stream condition are focussed on its lower reaches. Prospects for environmental improvement are noted by MW as being low due to the heavily modified condition of the creek.
- 4.88 There are two unnamed tributaries in the area of the landfill. Both are described in WAA Doc 2 Appendix L as intermittent and are likely to be first order streams. As a result, they will contain water for only short periods after rain
- 4.89 Surface water can replenish groundwaters in recharge zones and can be maintained by areas of groundwater discharge. The site it is not in an area of potable quality groundwater, it is not located in a groundwater recharge area or an area identified by the *Water Act 1989* as a Groundwater Supply Protection Area. Data on groundwater quality collected from the site over a 17-year period (1998 - 2015) show that the groundwater is generally brackish, with an average TDS value of 6,342 milligrams per litre. Due to this salinity, any groundwater discharging to surface waters is likely to have detrimental impacts to aquatic life.

## **Review of the WAA's the Surface Water Assessment and EPA's Assessment**

### *Potential Impacts on Surface Water*

- 4.90 No significant water issues are anticipated as most of the rain that falls onto the site is captured within the pit and used in various ways, and less stormwater will leave the site due to the smaller catchment area. In addition, there have been no pollution reports for

the existing landfill regarding surface waters nor have there been compliance issues or breaches of licence conditions with regard to surface waters.

- 4.91 SEPP (Waters of Victoria) requires that any discharge as a result of a development meets the water quality objectives in the policy or if these are already exceeded, meet the existing background conditions. There is no information on the existing water quality of the waterways in the area of the landfill but given the existing landuse, it is expected that when water is present within the streams, the SEPP objectives are unlikely to be met. This is typically the case for streams in an agricultural setting such as this, where nutrients and turbidity usually exceed the SEPP objectives. These would be contributors in MW's low importance rating for this part of the catchment, with more important values further downstream. If stormwater is managed as proposed, it is likely that existing water quality will be met (possibly even improved) and not adversely affect other downstream users.

#### *Stormwater Management Plan Review*

- 4.92 Appendix L: Stormwater Management Plan of WAA Doc 2 was assessed by EPA's Principal Inland Water Expert and (through a peer review) Stormy Water Solutions, with the following points noted:
- a section of a first order tributary of Skeleton Creek intrudes into the 100 metre buffer around the landfill. In the context of streams, a buffer refers to the land immediately adjacent to the stream which provides protection from the surrounding catchment. Buffers act to filter out contaminants (such as nutrients and sediment) potentially carried into the stream via overland flows. This is an intermittent stream (i.e. holds water only occasionally). The environmental risks are low as the waterway itself is not in the area of proposed landfill and the remaining buffer is still quite substantial and likely able to provide most of the functions the buffer is intended to provide. This is also an issue raised by MW as being inconsistent with the Truganina Drainage Scheme, the relevant scheme for the area. As per paragraph 2.34 further information and discussions between Golders (on behalf of Landfill Operations) and MW, MW confirmed that they are satisfied with the current design, albeit they recommended planning conditions to the Planning Panel
  - discharge from sediment ponds – peak discharge rates could be clarified to ensure that the sediment ponds are sized appropriately to cope with large rainfall events. However, the sediment ponds will collect water from the catchment area as currently exists but less the area developed as the landfill, which will now drain into the storage ponds at the base of the landfill. Thus the runoff collected in the ponds and subsequently discharged to the waterway will be less than current volume of runoff, at least during the active life of the landfill. After closure, when the landfill is capped and the 'natural' catchment area is restored, then stormwater flows will be larger than current. Modelling will be more informative at a latter point in the life of the landfill but given the long time before capping, there is little value in this at this stage
  - information on the post-closure use of stormwater could be improved, although any commitments made now should be regarded with caution due to the long timeframe involved
  - the Independent peer review by Stormy Waters Solutions (SWS) made the following comments:

- the modelling used in regard to formulation of the internal SWMP is generally applicable for the applications proposed, however the reporting of input parameters and output results is not completely transparent
- relevant "required or equivalent outcomes" of the Landfill BPEM are not completely transparent in the SWMP
- many of the concept designs are conservative in regard to sizing and land take, but there is sufficient area both on the cap and in the quarry areas to ensure system sizes can increase if required
- SWS consider that there is enough detail, and site area available to ensure appropriate legislation/policy/guidance requirements are met in that the SWMP details a concept design proposal in line with the Landfill BPEM
- the MW DSS reserve requirements for Skeleton Creek has been allowed for, but further investigations are required at the detailed design stage to clearly show no increase in off-site flood levels, on-site flood velocities or no loss in flood storage will occur
- as the design process proceeds, it is expected that "required equivalent outcomes" will be shown to be fully met via completing the investigations and calculations as suggested in the peer review (or equivalent investigations or calculations as required by MW)
- in line with the SWMP, a detailed inspection and maintenance schedule for each drainage asset (as it is commissioned) should be implemented
- by completing detailed calculations, modelling and site analysis, SWS considers that "fit for purpose" attributes will be completely shown to be met as the design process develops. However, in meeting these requirements additional land take for drainage assets (in addition to what is shown in the current SWMP) may be required.

4.93 It is recommended that should a WA be issued, a suitably worded condition should be included requiring the provision of additional design information at the detailed design stage— see paragraph 5.13 and WA\_W1.

## Conclusion

The conclusions of the review of potential effects on the surface water environment are that:

- no significant impacts from stormwater are expected with the proposal considered to meet requirements of SEPP WoV and the Landfill BPEM
- no significant impacts are expected on the surface water segment
- further information provided to MW showing a diversion to the Truganina DSS, a tributary of Skeleton Creek has satisfied MW who do not object to the WAA
- the proposed design and operational management practices are considered unlikely to cause any pollution or hazard to surface waters
- the SWMP will require further development to address issues raised by SWS but this can be done at the detailed design stage.

## Surface Water Monitoring and Management

- 4.94 In the event that WA is issued, ongoing physical and chemical surface water monitoring will be required at where the sediment ponds discharge to the environment in order to ensure no contamination due to leachate or sediment. The implementation of this monitoring should be secured through suitably worded conditions – see paragraph 5.24 and WA\_R4.

The Surface Water Monitoring and Management Plan should include but not be limited to;

- sampling of water at retention points prior to discharge to the environment and downstream of the site in Skeleton Creek
- visual inspection of sediment and erosion control facilities and other potential sources of contamination
- a sampling plan and methods consistent with those in EPA publication IWRG701
- routine testing of stormwater for, but not limited to, the following physico-chemical parameters: total phosphorus and nitrogen, turbidity, electrical conductivity, pH, and dissolved oxygen with occasional testing for heavy metals and indicators of leachate. The sampling frequency and reporting is to be agreed with EPA as are the action levels for each parameter.

## NOISE

### Why is Noise a key issue?

- 4.95 Excessive noise can adversely impact on sleep and domestic activities. Noise levels that protect the environment for these uses are set by the SEPP (Control of Noise from Commerce, Trade and Industry) No. N-1.

### SEPP and Guidance Requirements

- 4.96 Noise from commercial and industrial premises within the Melbourne metropolitan area such as a landfill must meet the requirements of SEPP(N-1). The policy sets the mechanism for determining the permissible noise levels that apply at any noise affected sensitive location (usually a residential location). The permissible noise levels are determined by the planning zoning using around the sensitive location as adjusted by application of Schedule B of the SEPP.
- 4.97 EPA Publication(s) 1254 “Noise Control Guidelines” and 480 “Environmental Guidelines for Major Construction Sites” provide requirements that apply to construction noise. In summary, the requirements are that noise is minimised during the daytime period and a number of “best practice” options provided. The noise should not be more than 10 dB above background during evening and weekends if construction is less than 18 months. Works that are unavoidable are permitted at any time. “Unavoidable works” are the activities that can only be undertaken outside the daytime period for safety or other reasons.

## Review of the WAA's Noise Assessment and EPA's Assessment

### *Baseline*

- 4.98 As a result of applying the adjustment method in Schedule B of SEPP (N-1), different locations may have different permissible noise limits. The range for daytime levels is 50-56 dBA, evening 44-53 dbA and 40-48 dBA for the night period. The noise limits are specified in WAA Doc 2, Appendix K Table 3. It is considered that these noise limits have been calculated correctly.
- 4.99 Under SEPP(N-1) the background is measured in the absence of any industrial noise and the permissible noise limit is the sum of all industrial noise and not just the new or altered source.

### *Review of the WAA Modelled Noise Emissions*

- 4.100 Expected noise from the landfill has been modelled using the ISO 9613-2:1996 Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2). This modelling is expected to be conservative as the model assumes favourable noise propagation in the direction of the receiver due to a low wind speed. This model has an expected accuracy of  $\pm 3$  dB. EPA considers that this model is appropriate for assessing the noise from the proposed landfill.
- 4.101 The model included noise from the adjacent quarry (using published Boral data) in assessing the impact of the proposed landfill and included the effect of topography.
- 4.102 Inputs of the model have either been measured from equipment proposed to be used or extracted from the relevant Australian Standard (AS2436:2010). Any measurements have been compared to typical equipment noise spectrums that are published in the relevant Australian and British Standards (Australian Standard AS 2436:2010 Guide to noise and vibration control on construction, demolition and maintenance sites (AS 2436:2010) and British Standard BS 5228–1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1:2009)). The inputs used in the model are considered appropriate.
- 4.103 Scenarios and activities that are likely to maximise the noise from the premises at the nearby sensitive locations have been modelled.
- 4.104 The results of the model have been adjusted to include the effect of reversing beepers by applying a 2 dB adjustment to the predicted noise levels.

### *Review of the WAA Noise Assessment and EPA's Assessment*

- 4.105 The noise assessment report accompanying the WAA is that following the implementation of a number of noise abatement actions the proposed landfill will meet the permissible noise levels calculated in accordance with SEPP(N-1).
- 4.106 The adjustment of 2 dB to account for the tonality of reversing beepers is consistent with EPA expectations.
- 4.107 Further general noise abatement actions proposed in the WAA are:
- customer trucks with tonal reverse alarms will not be accepted on-site during the night-time period. All third party trucks accessing the site during the night-time will be fitted with broadband reverse alarms;



- category D8 and D9 dozers will only be used during the day time period. Operations will need to be controlled to ensure that only Leibherr PR736 dozers<sup>1</sup> are used during the evening and night-time period; and
  - additional silencing of mobile plant as specified in WAA Doc 2 (Appendix K Table 7). EPA considers that the values proposed are reasonable and able to be achieved.
- 4.108 Prior to the filling of Cell 4, a 4 metre high berm (earth barrier) will be constructed to abate the noise at receivers to the south west that could be affected by the noise during this phase of the landfill.
- 4.109 It is noted that night time Low Frequency Noise (“LFN”) may be experienced at the nearest receptor, even if the noise mitigation measures are implemented and compliance is met. LFN is difficult to abate due to its characteristics and needs to be avoided at source. It is also difficult to predict.
- 4.110 The lower level of activity of the mobile plant proposed in the WAA during the night time period will ensure that the risk of LFN noise at night is minimised and should not result any night time adverse impacts.
- 4.111 In the event that WA is issued, it is recommended that the implementation of the noise barriers within the design and operational noise mitigation measures identified in the WAA and which have been relied upon to achieve the predicted noise levels are secured through suitably worded conditions – see paragraphs 5.18 WA\_W8 and 5.24 WA\_R4.
- 4.112 It is further recommended that noise measurements be undertaken prior to any subsequent cell commencing to confirm the assumptions in modelling. This will also confirm the effectiveness of the noise abatement (including barriers) being applied. The undertaking and reporting of the results of the noise modelling and confirmation of the effectiveness of the abatement measures should be secured through a suitably worded condition – see paragraph 5.13 WA\_W1.

## Conclusion

The conclusions of the review of potential noise effects on the environment are that:

- noise with the abatement proposed will meet the permissible noise levels set in SEPP(N-1)
- noise permissible noise limits in the application have been calculated in accordance with methods in SEPP(N-1)
- noise generation from the trucks have been assessed. Noise from the trucks, low frequency rumbling, may have an impact on premises close to the South West corner
- EPA has concluded on the basis of the WAA that the risk is minimal if all mitigation measures are adhered to, including earth berms to the South and West of MRL’ boundaries
- Low Frequency Noise may be a problem that will need to be managed but is considered a low risk that is minimised by the lower level of onsite activities during the night time period
- noise measurements should be undertaken to confirm the assumptions and effectiveness noise abatement are undertaken at each step in the landfill staging plan.

## GREENHOUSE GAS EMISSIONS

### Why is Greenhouse Gas Emission a key issue?

- 4.113 The SEPP (Air Quality Management) seeks as one of its aims to support national and state measures to address the “enhanced greenhouse effect”<sup>5</sup>. This effect along with the control of ozone depleting substances are identified as international issues addressed by SEPP (Air Quality Management) requirements. Global warming caused by the enhanced greenhouse effect poses a risk to the environment.

### Review of the WAA GHG Emissions and EPA’s Assessment

#### *Expected GHG emissions from the proposals*

- 4.114 Expected Greenhouse Gas (GHG) emissions consist of the products of combustion from the use of fuel (“diesel”) in equipment used to manage the landfill. The use of fuel is potentially variable and has been assessed depending on the type of equipment used and duration of operation.
- 4.115 The assessment in the WAA has assumed that the diesel engines in equipment are Euro Class IV. Euro Class IV are the most efficient available diesel motors. The use of fuel has been estimated and used to calculate the equivalent carbon dioxide emissions from the exhaust emissions. This is set out in Section 19.17 of the WAA Doc 2. It is also likely that over the life of the landfill that more energy efficient equipment will become available.
- 4.116 The expected emissions are set out in the table in Appendix F (WAA Doc 2) and will be between 3,900 and 7,400 tonnes of carbon dioxide equivalent.
- 4.117 Emissions for LFG estimated as being between 3400 to 28,800 tonnes carbon dioxide equivalent have been assessed using the modelled LFG generation and assuming a 75 per cent collection efficiency. This is the nominal figure applied under national greenhouse and energy reporting required by the national clean energy regulator (the National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines for the estimation of emissions by facilities in Australia August 2016). It is expected that an efficient LFG extraction system will achieve a higher collection efficiency of around 85 per cent. ‘Efficient’ means quick installation of gas extraction systems in completed cells with intermediate cover, regular balancing of those wells, condensate control, well field maintenance, intermediate cover maintenance, final capping within 2 years of placement of intermediate cover and gas engine and electrical interconnection expansions in line the LFG generation model validated by field gas flow measurements.

#### *Energy Use Best practice Requirements and Non Energy GHG Emissions minimisation*

- 4.118 Section 6 of WAA Doc 3 includes a Fuel Use Minimisation Plan which suggests that it may be possible to use alternatives to reduce GHG emissions by measures including using fuels such as biodiesel and hybrid powered vehicles. Also given the life of the landfill it is likely that there may be improvement in the energy efficiency of diesels. The section also

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<sup>5</sup> State environment protection policy (Air Quality Management) Clause 6.

- suggests a process that will be used to assess the practicability of these and any other options. This proposed process is consistent with EPA's expectation of how best practice is determined.
- 4.119 This provides a framework that Landfill Ops will use to evaluate equipment choices over the life of the landfill although the WAA assumes that the landfill will commence using the most efficient diesel equipment available (Euro IV).
- 4.120 In the event that a WA is issued, it is recommended that a suitably worded condition be included to secure the implementation of the Fuel Use Minimisation Plan – see paragraph 5.24 and WA\_R4, such as:
- Prior to commencement of any commissioning, a Fuel Use Minimisation Plan to seek more efficient use of energy during construction and operation of the landfill should be submitted to EPA for approval including but not limited to consideration of alternatives such as:
    - vehicle and equipment use;
    - LFG collection and treatment;
    - Promotion of waste minimisation programs;
    - use of alternative fuels and engines; and
    - improved driver training and fleet maintenance.
- 4.121 The control of GHG from the LFG is achieved by the measures that will be used to control LFG. The assessment of these measures is undertaken in paragraphs 4.73-4.73 and 4.113 – 4.120 of this Assessment Report. It is considered minimising LFG emissions through the burning of methane to convert it to carbon dioxide is best practice.

## Conclusion

The conclusions of the review of potential effects of greenhouse gas emissions on the environment are that:

- the capture and minimisation of the emissions of LFG will reduce the emissions of GHG from the landfill by converting methane in the LFG to carbon dioxide by combustion.
- will be minimised by the adoption “best practice” vehicles with diesel engines and an efficiency equivalent to at least Euro IV standard.
- the landfill operator has proposed a Fuel Minimisation Plan to ensure that fuel usage is minimised.
- the landfill operator has proposed a framework to evaluate future equipment and fuel choices that is consistent with the determination of “best practice”.

## WATER RESOURCE USE

### Why is Water Resource Use a key issue?

- 4.122 Victoria is particularly vulnerable to the adverse effects of climate change, including increased frequency and severity of droughts such that effective management of water

resources is crucial. Clause 40 of SEPP (WoV) requires that water-saving practices be implemented to ensure a sustainable water supply.

- 4.123 Furthermore, the water needs to be readily available to assist in the construction and operation of the proposed landfill.

### **Review of the WAA Resource Water Use and EPA's Assessment**

- 4.124 Water used on-site will be sourced from Boral's existing groundwater extraction bores and from rainwater harvesting with collection of stormwater in a series of open channel stormwater swales and stormwater ponds. Depending on rainfall rates, additional water may be trucked in in times of drought.
- 4.125 Rainfall falling on waste filling areas will be kept separate from runoff from elsewhere within the premises and will be collected in the leachate sumps at the base of each landfill cell. Stormwater runoff will be classified according to the rehabilitation stage the stormwater is collected from, with any sediment washed off the capping layer allowed to dissipate out prior to reuse on-site by Landfill Ops or Boral, or discharge to the off-site stormwater network.
- 4.126 Subsection 12.3 of WAA Doc 2 reports on the anticipated water use associated with the proposals, namely:
- water use for dust suppression (estimated at 21 megalitres per year)
  - wheel/water use for truck washing (utilising recycling technologies - estimated at 12 megalitres per year)
  - moisture conditioning of clay in the construction of compacted clay layers (6 megalitres per year).
- 4.127 Accordingly the proposed activities are estimated to use 39 megalitres per year.

### **Conclusions**

The conclusions of the review of potential effects on the water use are that:

- 39 megalitres per year will be required and used during the disposal phase, reducing to zero once capped and vegetation is established; and
- such water usage rates are so low as to be considered negligible.

## **CLIMATE CHANGE**

### **Why is Climate Change a key issue?**

- 4.128 Victoria is particularly vulnerable to the adverse effects of climate change with state government recognising the risks and the need for urgent action through the recent passing of the Climate Change Act 2017. The act is not yet in force such that the Climate Change Act 2010 (CC Act) is still the key legislative instrument.
- 4.129 Under the requirements of section 14 of the CC Act, climate change must be considered in WA decisions. EPA notes however that there are no published guidelines on how applicants or EPA should assess potential impacts on climate change.

### **EPA's assessment of potential climate change impacts**

- 4.130 Taking into account the location of the site, potential influences of climate change on the proposed landfill are considered to be primarily that of more extreme weather events such as more drought conditions, higher average temperatures and more extreme storms.
- 4.131 Further consideration of the potential impact on climate change given in the WAA was explored through questioning at the Planning Panel Hearing and section 20B Conference where it was noted that in the absence of guidance and agreed climate changes effects that need to be considered, limited consideration had or could be given to potential climate change impacts on the proposals or impacts of the proposals on climate change.
- 4.132 With regards to the potential contribution the application will have to greenhouse gas emissions, EPA has considered this in paragraphs 4.114-4.121 above. In particular it is noted that through the decomposition of wastes within the landfill the greenhouse gases methane will be produced. The WAA proposals include a LFG collection system to capture these gases such that they can be burnt in gas engines to produce electricity. This capture and conversion minimising LFG emissions (by converting the more greenhouse intensive methane to carbon dioxide) is considered by EPA to be best practice and will assist in reducing climate change impacts.

### **Conclusions**

The conclusions of the review of potential effects on the climate change are that:

- potential influences of climate change on the proposed landfill are expected to be limited to more extreme weather events
- the decomposition of wastes within the proposed landfill will generate greenhouse gas emissions but that the LFG collection will convert these gases into electricity and reduce the GHG.

## **SOIL RESOURCES & LAND**

### **Why is Soil Resources and Land a key issue?**

- 4.133 The beneficial uses of soils are protected as outlined in SEPP (PMCL). This requires that contamination of land must not adversely affect produce quality or yield.

### **EPA's assessment of potential impacts on soil resources and land**

- 4.134 As described in paragraphs 1.4-1.7 the current site is a combination of quarried mine void (where top and subsoil resources) have already been stripped and removed, and poor pasture that will be quarried by Boral regardless of whether the proposed MRL extension occurs or not. Accordingly it can be considered that any beneficial uses from soil resources and mineral resource will already have been extracted prior to landfilling commencing.
- 4.135 Further it is noted that the proposed activity is a waste repository which fill a mining void with waste ultimately leading to a rehabilitated mine void.
- 4.136 The deposition of waste in a void is in effect creating an authorised and licensed parcel of contaminated land, however as described elsewhere in this Assessment Report, the proposed landfill location and containment measures are fully considered. Accordingly,

the overall technical assessment of the WAA focuses on impacts on other segments of the environment.

- 4.137 Potential impacts to soil resources and land were considered by having regard to:
- the current land uses (as described in paragraph 1.39) – the proposed site is a zoned quarry. Accordingly, when the landfill cells are constructed they will be an industrial site that has already been heavily disturbed by the quarrying activities and subsequent disposal of waste
  - the composition of the waste and other materials that have already been deposited, treated or stored in the Ravenhall precinct (existing MLR and, the former Pinegro composting site) and are proposed to be deposited into the proposed landfill cells, the protective measures and their leachability
  - the best practice assessment of the proposals and compliance with Landfill WMP and Landfill BPEM as described in paragraphs 4.153-4.246 which were developed to prevent amongst other things impacts on soil resources, land and groundwater pollution.

### Conclusions

The conclusions of the assessment of potential effects on soil resources and land from the proposals are that:

- prior to any landfilling the soil resources and land will have already been significantly altered by the Boral quarrying operations such that the beneficial uses from soil resources and mineral resource will already have been extracted prior to landfilling commencing
- the proposed activity is a waste repository which fill a mining void with waste ultimately leading to a rehabilitated mine void
- the proposals will create an authorised and licensed parcel of contaminated land, albeit in a suitable location with containment measures that meets best practice requirements.

## HEALTH

### Why is Health a key issue?

- 4.138 As previously stated in 2.10 and Table 1 of this WAAAR, 40.7 per cent of non-proforma submissions highlighted community members' concerns about potential health effects from the proposed landfill. Where submitters provided more detail on the nature of their health concerns, the issues of greatest concerns were respiratory diseases (asthma), heart disease and lung cancers.

### EPA's assessment of potential health impacts

- 4.139 In accordance with Regulation 19B(3) of the Environmental Protection Act, the original WAA and the further information received from in response to the section 22 notice were referred to the Secretary of Health at the DHHS. Clause 19B(5) then requires the EPA to:



*“(a) take into account any replies, reports, comments and information received under subsection (4), (4A) or (4B)*

*(b) where the Secretary to the Department of Health submits a written report objecting to the issue of a works approval on the ground that the public health is likely to be endangered if a works approval is issued, refuse to issue a works approval;”*

4.140 DHHS’ referral responses are provided in full in Appendix C.2 and Appendix E.1:

- In their response of 15 July 2016 (Appendix C.2) DHHS recommends that *“EPA ensures that in relation to buffer distances:*
  - *all required buffer distances of the proposed MRL extension are met*
  - *the planning panel addresses requirements of required environmental audits to be carried out for any buildings and structures with enclosed spaces that people will enter that may be affected by the extensions of the MRL*
  - *the proponent has measures in place that ensure that no unacceptable off-site dust and odour emissions occur.”*

The DHHS goes on to recommend EPA consider the following in its overall assessment of the WAA in *“relation to management of on-site leachate and stormwater:*

- *a contingency plan in the event that leachate collection rates exceed evaporation rates*
- *periodically monitoring any off-site discharge of water to either land or a waterway to prevent potential off-site release and possible public exposures*
- *to monitor the same set of parameters for leachate and groundwater to determine the relationship (i.e. potential impact) of the leachate on groundwater*
- *seek rationale from the proponent for heavy metal monitoring in leachate*
- *EPA must be satisfied that the proposed development complies with the relevant SEPPs and environmental guidelines, especially with respect to odour, gas and dust emissions.”*
- In their response of 17 January 2017 (Appendix E.1), DHHS state that the *“Department does not object to this application on public health grounds provided EPA is satisfied that relevant SEPP and environmental guidelines will be met by the proponent”* and *“A literature review jointly commissioned by EPA and the Department in 2016 confirmed the findings of the RMIT (2013) review, that available data and published studies does not show that living near a non-hazardous waste landfill is associated with adverse health effects”.*

4.141 DHHS’ recommendations have been considered in EPA’s technical assessment and development of WA conditions.

4.142 With regards to DHHS’ reference to the literature review, it is noted that the review was published in December 2016 and is available on EPA’s website at <http://www.epa.vic.gov.au/our-work/publications/publication/2016/december/1645>. The review, Air Emissions from Non-hazardous Waste Landfills, is an update on a 2013 RMIT literature review, which was also commissioned to determine whether there were any reported links between air emissions and the health of residents living near these landfills.

The independent updated literature review was commissioned by EPA and DHHS to provide a current understanding of published research on potential human health impacts from air emissions from non-hazardous waste landfills has been published.. The key conclusion of the updated literature review confirmed the findings of the 2013 RMIT review, that the assessment of all available data and published studies shows that living near a non-hazardous waste landfill is not associated with any adverse health effects. The review did, however, acknowledge that some gases and compounds released from non-hazardous waste landfills may be odorous and can affect the wellbeing of the local community. The review also included recommendations for the development of future monitoring programs around non-hazardous landfills - these have been considered in the setting of the WA conditions.

- 4.143 EPA and DHHS noted that the independent updated literature review found one study that reported a link between living near a non-hazardous landfills and health effects - the *Mataloni et al 2016* study referenced in some of the community members' submissions. The literature review assessed this study against the Bradford Hill criteria, a well-established set of guidelines used to ascertain the validity of a relationship between an assumed cause and an effect. In this case, the criteria was used to establish if there was a scientifically valid cause and effect relationship between living near non-hazardous landfills and the reported diseases in that study. The review stated that *“Overall the conclusions of the Mataloni et al (2016) paper cannot be supported. When reviewed in detail the paper does not show that living near non-hazardous waste landfills is associated with increased incidence of lung cancer or hospitalisations for respiratory disease.”*

## Conclusion

The conclusions of the assessment of potential health effects from the proposed landfill are that:

- potential health effects are a significant concern for some members of the community
- DHHS do not object to the WAA on public health grounds provided EPA is satisfied that the relevant SEPP and environmental guidelines will be met by Landfill Operations and that the requirements for necessary buffers are met
- the key conclusion of an updated independent literature review jointly commissioned by EPA and DHHS were that living near a non-hazardous waste landfill is not associated with any adverse health effects but that some gases and compounds released from non-hazardous waste landfills may be odorous and can affect the wellbeing of the local community.

## COMPLIANCE WITH SECTION 50C OF THE EP ACT

### Why is Compliance with Section 50C a key issue?

- 4.144 In accordance with section 50C(1) of the EP Act, the Authority may refuse to consider an application for a WA in relation to a waste management facility if the operations of the facility would be inconsistent with the SWRRIP or relevant RWRRIP or the applicant is in breach of a schedule of existing and required waste and resource recovery infrastructure within a RWRRIP.

- 4.145 In accordance with section 50C(2) of the EP Act, the Authority must refuse to issue a WA for a new landfill if the landfill is not provided for in the proposed sequence for the filling of available landfill sites in the relevant landfill schedule.

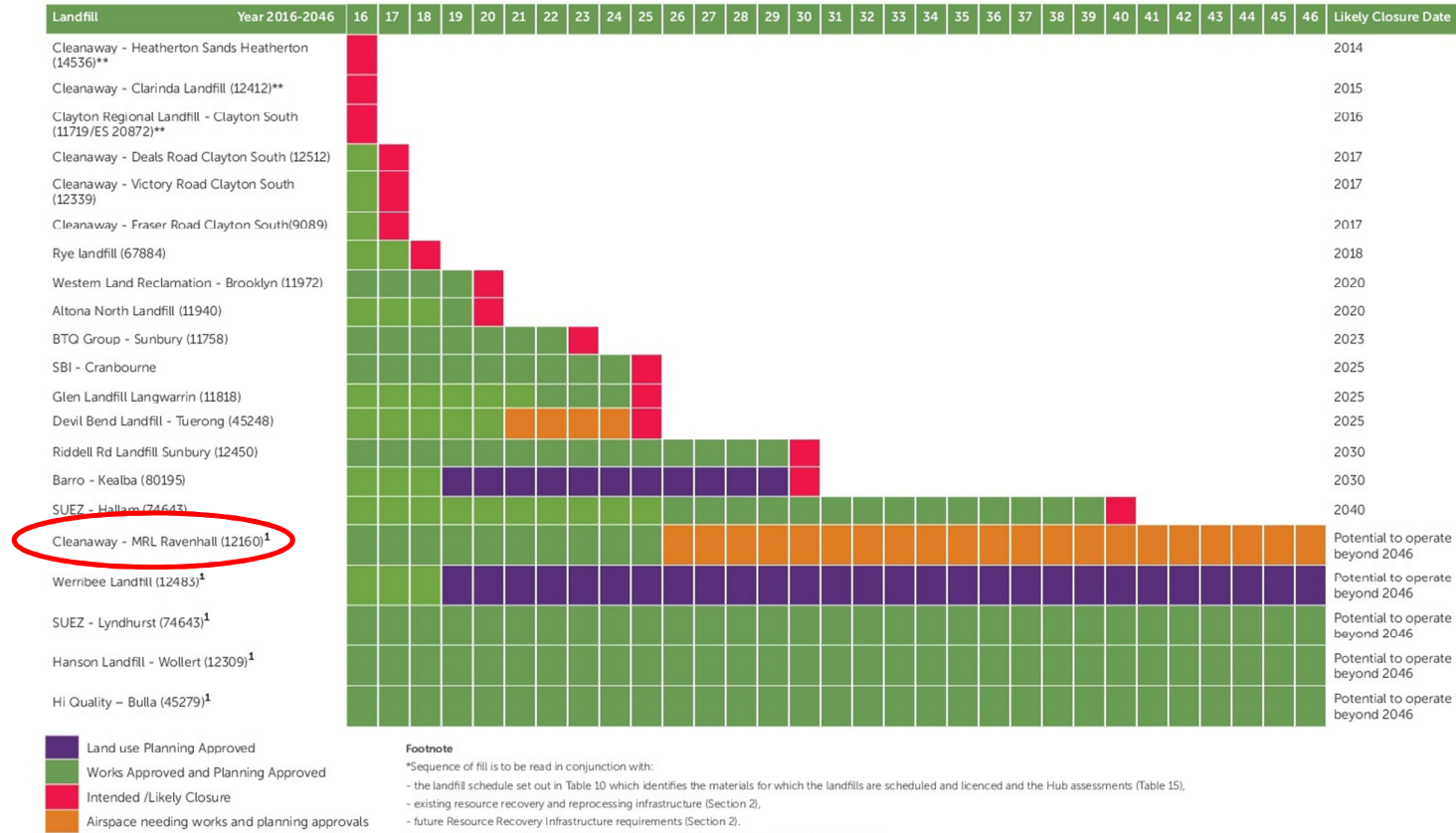
### **EPA's Assessment of Compliance with Section 50C**

- 4.146 As described in paragraph 2.18 SV responded directly to EPA on 29 July 2016 (see Appendix C.1). In their referral response SV stated that in relation to Section 50C of the EP Act *"SV does not consider the operation of the facility would be inconsistent with the Statewide Plan. However, this advice does not infer that the application should be approved"*.
- 4.147 Accordingly it is considered that the proposal is consistent with the SWRRIP and that it meets the threshold test in section 50C(1).
- 4.148 The Metropolitan Waste and Resource Recovery Implementation Plan (MWRRIP) 2016 is the relevant Regional Waste and Resource Recovery Implementation Plan applicable for the proposed landfill site. This Plan finalised in October 2016 and includes a landfill schedule. This schedule is a list of landfills identified and assessed by the Metropolitan Waste Resource Recovery Group as being required for the Metropolitan Melbourne for the next 30 years. Cleanaway's MRL Ravenhall Landfill (the proposed landfill site) is listed in the Landfill Schedule of the MWRRIP. Furthermore it also identifies that the Ravenhall Landfill (i.e. the existing landfill) has landfill capacity until 2025 within the approved area and further capacity for over 20 years but subject to necessary approvals (Works Approval and planning permit etc.). Their referral response Appendix C.4 provided before the finalisation of the 2016 Plan states *"the Ravenhall Landfill is scheduled in the Metropolitan Landfill Schedule, which forms part of the 2009 Metropolitan Plan. The site (referred as "Boral, Riding Boundary Rd, Truganina") is scheduled until 2018, with a likely closure date post 2040 stated. MWRRG regards the Ravenhall Site as a strategically significant waste and recovery facility. The Ravenhall Site, similar to other metropolitan waste and resource recovery hubs of state significance, has been planned as a long term facility"*. This is the area subject to the current application. See Figure 22 below which shows the Melbourne Metropolitan landfill schedule sequence.
- 4.149 Accordingly it is considered that the proposal is listed in the landfill schedule of the MWRRIP 2016, noting that the currency of the Plan is 2016-2046. Under such circumstance, it is considered that the proposed new landfill development complies with section 50C(2) of the Act.
- 4.150 Beyond 2046, which is the end date for government waste management policy (the SWRRIP covers 2015 – 2044), currently the plans do not identify the need for landfilling at the MRL although the MWRRIP does identify that waste and/or resource recovery activities may continue beyond 2046 and that during the 30-year life of the MWRRIP there will be changes in the need and ability of sites such as MRL to undertake resource recovery and disposal activities.
- 4.151 As per Table 3 of this Assessment Report, it is noted that the ILEAP also finds that the WAA sought exceeds the period considered under the SWRRIP, with the ILEAP going onto suggests that the WA be only approved for the extent of proposed Cells 1 to 7 and associated site works, provided adequate planning controls are in place to ensure that buffers can be maintained for the full site, should Cells 8 to 16 be required.

## Conclusion

The conclusions of the assessment of compliance against the threshold tests in 50C are that:

- the proposed landfill facility is considered to be consistent with the SWRRIP for the purposes of considering the application, albeit it is noted that the proposed lifespan of the WAA until 2055 is beyond the duration of the SWRRIP (2015-2044)
- the proposed landfill facility is identified on the MWRRIP landfill schedule for the purposes of considering the application, albeit it is noted that the proposed lifespan of the WAA until 2055 is beyond the duration of the MWRRIP (2016-2046).



**Figure 22: Metropolitan landfill Schedule Sequence of fill – reproduction of Table 11**

The above figure is reproduced from Table 11 of the Metropolitan Waste Resource & recovery Implementation Plan. Note 1 reads Landfills have potential to operate beyond 2046. It is acknowledged that due to their size and potential long term capacity, some waste and/or resource recovery activities may continue beyond the current landfill schedule. In addition it is expected that, during this 30 year period and beyond, there will be changes in the need and ability of these sites to undertake resource recovery and disposal activities.

## COMPLIANCE WITH THE LANDFILL WASTE MANAGEMENT POLICY & LANDFILL BEST PRACTICE ENVIRONMENTAL MANAGEMENT

### Why is Compliance with Landfill WMP and Landfill BPEM a key issue?

- 4.152 As per section 20C of the EP Act, the EPA may refuse to issue a WA if policy is not met. As described in paragraphs 1.69-1.77 the Landfill WMP and Landfill BPEM of particular relevance.

### Compliance with clause 15(3)(a) of the Landfill WMP

- 4.153 Clause 15(3)(a) of the Landfill WMP requires applicants for a WA to comply with the Landfill WMP and all other relevant SEPP and waste management policies.
- 4.154 The WAA included several documents containing supporting information addressing various aspects. Based on the initial assessment of the information provided, further information and clarification were also requested under s.22 of the Act (via s.22 notice).

### Compliance with clause 13(3) of the Landfill WMP

- 4.155 Clause 13(3) of the Landfill WMP requires that new landfill sites must not be established or extended into any area where an aquifer contains Segment A groundwater, unless the:
- landfill operator satisfies the Authority that sufficient additional design and management practices will be implemented
  - the Authority determines that regional circumstances exist that warrant the development of a landfill in the area.

### *Groundwater Segment*

- 4.156 A hydrogeological investigation report prepared by AECOM (AECOM, 2016), was submitted as part of the WAA (Appendix D of WAA Doc 2). It discusses the hydrogeological aspects of the area around the proposed development site.
- 4.157 The AECOM report states that:
- the area consists of several geological units including:
    - Quaternary age new Volcanics consisting of basalt with interbedded sand/clay layers
    - Tertiary age Brighton Group and Fyansford Formation sediments including sands, silt, silty clay with minor limestone and coal
    - the Werribee Formation comprising sands, sandy and silty clay
    - Ordovician and Silurian basement rock.
  - some drilling found the sandstone and siltstone of the Brighton Group occurring between 56 and 70 metres depth, overlying the Fyansford Formation clays and ligneous clays with some sandy clay and clayey sand occurring between 70 and 141 metres depth



- groundwater quality is generally brackish, with an average total dissolved solids (TDS) value of 6,342 megalitres per year based on the data collected from the site over a 17-year period (1998 - 2015). It also provides the following data in Table 6 as a summarised result of major ions and total dissolved solids (TDS) of groundwater quality in the area.

**Table 6: Concentrations of major ions and TDS in groundwater (AECOM, 2016)**

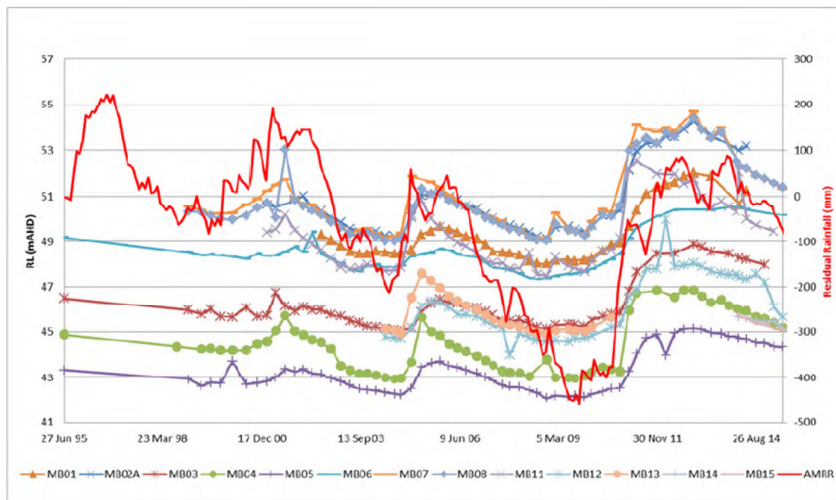
Analyte	Maximum (mg/L)		Minimum (mg/L)		Average (mg/L)
	Value	Location/Date	Value	Location/Date	
TDS	24,600	GW08 May 2014	920	MB12 Aug 2012	6,342
Chloride	13,000	GW07 Apr 2014	210	MB12 Aug 2012	3,026
Sulphate	1,900	MB01 May 2012	110	MB07 May 2011	557
Bicarbonate as CaCO <sub>3</sub>	1,900	MB06 May 2015	58	MB03 May 2006	465
Sodium	7,200	GW08 May 2014	270	MB12 Aug 2012	1,492
Potassium	92	GW06 May 2014	7	MB12 Aug 2012	22
Calcium	170	GW01 May 2015	3.2	MB07 Feb 2014	38
Magnesium	1,990	MB)1 Aug 2010	14	MB12 Aug 2012	451

- 4.158 For groundwater to become Segment A (A1 or A2), the total dissolved solid concentration should be less than 1,000 megalitres per year, as per SEPP (Groundwaters of Victoria). As discussed above, the average TDS concentration in groundwater around this site is 6,342 megalitres per year. Accordingly, groundwater in the area is not classified as Segment A and therefore, the compliance of Clause 13(3) is not applicable for this proposal.
- 4.159 EPA's assessment of the WAA was peer reviewed by the ILEAP. As noted in Table 3, they agreed with EPA's assessment that groundwater in the area is not in Segment A.

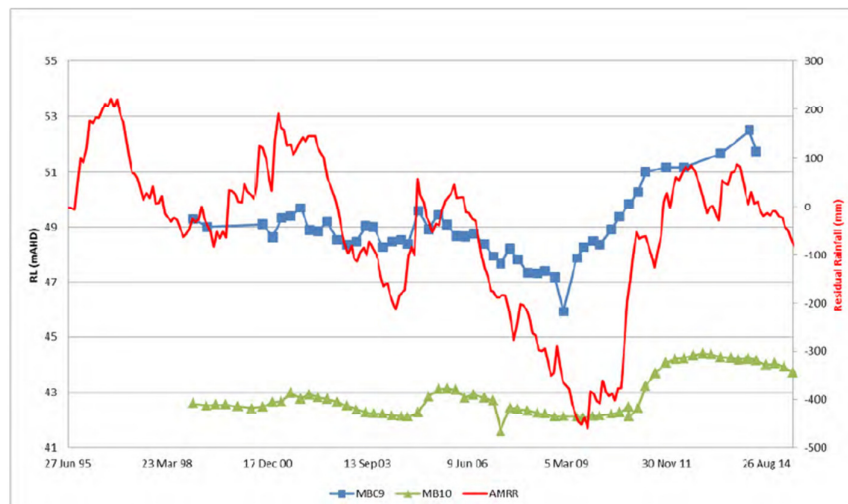
### Compliance with clause 16(2) of the Landfill WMP

- 4.160 Clause 16(2) of the Landfill WMP requires that all new landfill sites must deposit waste at least two metres above the long-term undisturbed groundwater, unless the:
- landfill operator satisfies the Authority that sufficient additional design and management practices will be implemented
  - the Authority determines that regional circumstances exist that warrant the development of the landfill.
- 4.161 Information provided in the WAA indicates that since 1995, over 30 groundwater monitoring bores have been installed in the area. The latest groundwater monitoring of all monitoring bores occurred in May 2015. It appears that some of the bores have been installed as part of a hydrogeological investigation only and have not been included in regular monitoring. Therefore, establishing a long-term time series analysis of groundwater level data is limited.

- 4.162 The depths of the majority of the bores vary from eight metres to 46.5 metres below ground level, with one bore drilled to 190.5 metres below ground level. It appears that the bores have been constructed in multiple aquifers, even though the aquifer levels have not been defined clearly. It is reported (AECOM report, chapter 5.3) that the average head difference between shallow and deep aquifers was found to be 0.19 metres for bores MB01 & MB09, and 0.39 metres for bores MB05 and MB10.
- 4.163 Water level measurements of all bores show similar trends reflecting some hydraulic connection. Figure 23 (taken from the AECOM Report) shows a plot of water level readings since 1995 for bores in shallow basalt formation in the area. While water level readings of only four bores are shown for the early period since 1995, readings from eleven bores are shown for the period since 2003. Figure 24 shows the water level in deep basalt formation bores for the same period. Accumulated Monthly Residual Rainfall (AMRR) is also shown in red colour.



**Figure 23: Water level readings in shallow basalt aquifers**

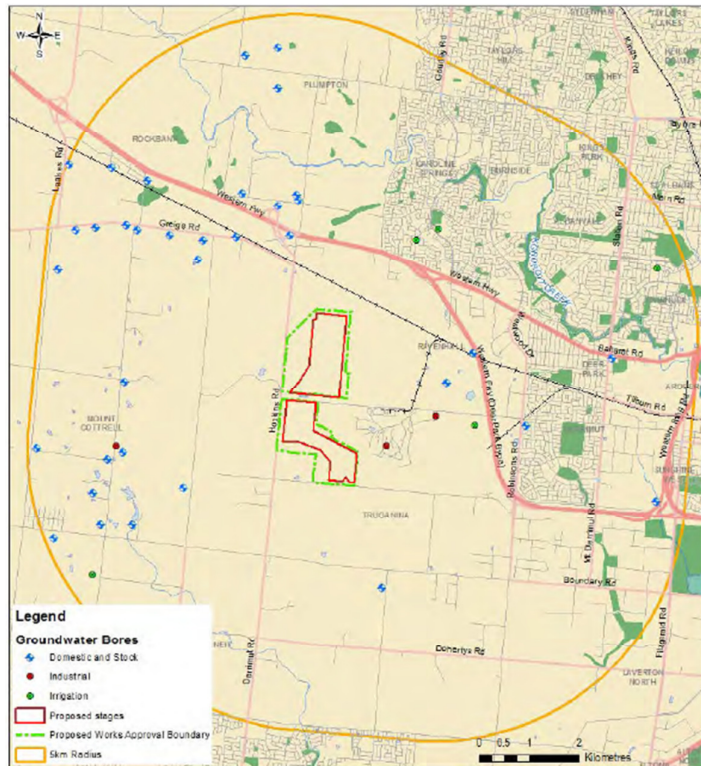


**Figure 24: Water levels in deep basalt aquifer**

- 4.164 It is further noted that groundwater in the area has been extracted for quarrying operations and the rates of groundwater extraction in recent years have increased and therefore the

data points used to infer long term groundwater elevations are unlikely to be an accurate representation of undisturbed groundwater [emphasis added]. This matter is further discussed later in paragraph 4.169.

- 4.165 The AECOM Report states that there are over 500 registered groundwater bores within a 5 kilometres radius of the landfill area. Of those, over 300 bores are identified as investigations and over 45 bores are registered as stock and/or domestic bores and some are for mixed use. The depths of those bores range from 24 - 100 metres, and the distribution of bores are shown in Figure 25.



**Figure 25: Groundwater bores within 5km of the site (AECOM, 2016)**

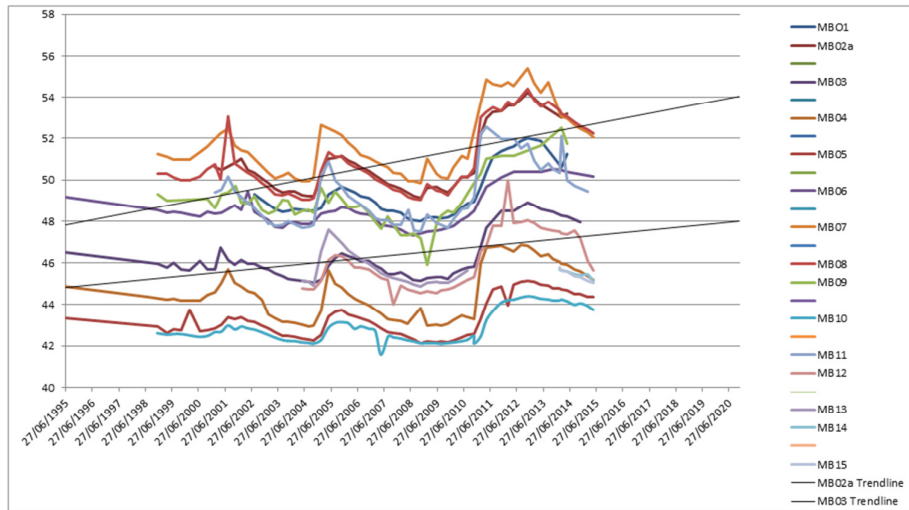
- 4.166 The three closest irrigations bore are located approximately 700 metres 1600 metres and 3 kilometres from the site.
- 4.167 Groundwater investigations have been carried in the area in 1995, 2005, 2008, 2012, 2014, and in 2015 by different environmental consultants for groundwater use for Boral's extraction activities. Several bores have also been drilled to varying depths ranging from 36 – 52 metres for that purpose. Bores have been purged and developed as would be required for groundwater extraction bores. It is reported (AECOM Report, Chapter 4.9) that Boral has been using groundwater for its quarry operations for a number of years, with its groundwater usage for the 2012-2015 period from four bores shown in Table 7.
- 4.168 Table 7 shows that from 2012 to 2014, over 180 ML of water has been extracted from the four bores. In addition, over 35 megalitres of groundwater has been extracted during the six-month period from Jan to June 2015. The AECOM report further states that Boral has sought permission from Southern Rural Water to increase the groundwater extraction licence from 91.7 to 400 megalitres per year (prior to 2008, the licence has had an extraction limit of 91.7 megalitres per year for a 12-month period).

**Table 7: Boral’s groundwater usage (KL) in the area**

Year	Bore 1	Bore 2	Bore 3	Bore 4	Bore 5
2012	24,594	10,241	26,994	1,345	63,174
2013	0	9,880	49,530	8,324	67,734
2014	601	9,099	35,716	3,975	49,391
Jan to June 2015	11,610	5,027	18,257	1,098	35,993

*Long-term undisturbed groundwater level:*

- 4.169 In order to show compliance with clause 16(2) of the Landfill WMP, it is necessary to establish the long term undisturbed groundwater level for the area. For this purpose, the Landfill Operations consultants (Golder Associates) considered the water levels measured and provided in the AECOM Hydrogeology Report. These water levels have also been shown as groundwater contours based on the measurements taken in April-May 2014 (AECOM, 2016). The water level contours, as shown in the AECOM Report, vary from 45 metres AHD at the south-west corner (in south portion) of the proposed landfill site to 85 metres AHD in the north-west corner (in north portion) of the site.
- 4.170 It is noted that rates of groundwater extraction in recent years have increased and therefore the data points used to infer long term groundwater elevations are unlikely to be an accurate representation of undisturbed groundwater levels.
- 4.171 Almost all the bores monitored and shown in Figure 23 and Figure 24 show an increasing trend in water level from 2004 to 2006 and also from 2009 to 2013. However, this increasing trend has been disturbed around the period between 2006 -2009 and also after 2013/14. This is quite likely to be due to groundwater pumping for Boral’s quarry operation. Because, as discussed before, over 180 ML of groundwater has been extracted from 2012 to 2014 and further 35 megalitres in six months from Jan to June 2015. Furthermore, around this time, Boral has sought permission from Southern Rural Water to increase the groundwater extraction allocation from 91.7 to 400 megalitres per year (AECOM Report). Therefore it is reasonable to conclude that groundwater levels in that area may have been impacted by groundwater extraction around that time. However, this impact has not been assessed or determined in the WAA. Despite this, the WAA has used the water levels measured in April-May 2014 as the long term undisturbed water levels, and subsequently used this to demonstrate that the required 2m separation exists between the long term groundwater level and the waste level.
- 4.172 Based on this lack of information EPA has conducted groundwater projections (Figure 26) based on the raw groundwater monitoring data provided by in the WAA to obtain an indication of water level trends to determine whether the proposed landfill expansion would be in a position to comply with Clause 16(2) of the Landfill WMP.



**Figure 26: Groundwater level projections**

- 4.173 Figure 26 presents groundwater elevations of monitoring bores on the site with greater than 10 years of data available over time. As monitoring bores in the vicinity of the extension are relatively new, they do not have sufficient data available to be presented in this figure. Assuming all other factors remain constant, linear progression (trend lines) for two monitoring bores; MB02a and MB03 have been extrapolated to 2020 (Figure 26). These bores were selected as they are on the western boundary of the current landfill operations and closest to the extension area.
- 4.174 These projections show an increasing trend despite some drops in some years, and the predicted water levels would be at much higher levels, closer to the surface. Under such circumstances, the required 2 metre separation is unlikely to be achieved for the purpose of compliance of Clause 16(2) of the Landfill WMP. This situation is likely to be applicable for the cells in the South Portion (i.e. Cells 1-7).
- 4.175 As stated in paragraph 4.171 above, over 200ML of groundwater amount has been extracted over a 4.5 year period January 2012-June 2015 and the allocation appears to have been increased up to 400 megalitres per year. It is not known how much has been extracted from the increased allocation. However, it is considered reasonable to expect that the water level measurements recorded and shown in Figure 23 and Figure 24 may have been affected by groundwater extractions. At least some of them should have been affected by groundwater pumping depending on the zone of influence of groundwater pumping bores. Despite this, water levels measured in April-May 2014 have been considered in the WAA as representative for long term undisturbed water levels without considering the impact of groundwater extraction.
- 4.176 Similarly, those water levels monitored in April-May 2014 have been used in the WAA as evidence to show that the 2 metre separation exists between waste and long term undisturbed groundwater level.
- 4.177 In summary, the water levels provided in Doc 2 of the WAA (i.e. the water levels measured in April-May 2014) cannot be considered as “long term undisturbed groundwater levels” because:
- groundwater levels shows an increasing trend since 2009



- there is evidence of an increasing trend of groundwater level had been disturbed (i.e. changed to decreasing trend or lowered) around 2006 -2009 and also after 2013/14
  - over 200 megalitres of groundwater has been extracted over a 4.5 year period from January 2012-June 2015 and the groundwater allocation has even increased from 91.7 to 400 megalitres per year (AECOM Report)
  - the groundwater levels measured in April-May 2014 are likely to have been impacted by groundwater pumping and therefore they cannot be considered as long-term undisturbed groundwater levels for the purpose of showing compliance of clause 16(2) of the Landfill WMP.
- 4.178 It is further noted that as per Table 3 of this Assessment Report, the ILEAP agrees with *“EPA’s conclusion that the groundwater levels presented in the WAA cannot be considered as long term undisturbed groundwater levels. The Panel notes that determination of long term undisturbed groundwater levels in a disturbed environment without long term pre-disturbance groundwater level records is difficult. Modelling methods may provide some understanding of the long term undisturbed groundwater levels but even this would only be an estimate rather than a definitive determination of long term undisturbed groundwater levels”*.

*Discussion at the Planning Panel Hearing and section 20B Conference*

- 4.179 At the Planning Panel hearing and section 20B Conference there was significant discussion around the long term groundwater level. As a result, a Conclave meeting of groundwater experts was held on 5 Oct 2016, with the following consultants represented:
- Mr John Nolan representing Melton City Council
  - Mr Philip Mulvey representing Mount Atkinson Holdings Pty Ltd
  - Mr David Ife of AECOM representing the Landfill Operations.
- 4.180 Mr Nolan and Mr Mulvey expressed concerns, raised an issue and expressed their views that the water levels measured and presented in Doc 2 of the WAA cannot be considered as the long term undisturbed groundwater levels due groundwater pumping and quarry extraction influences. Mr Mulvey’s view was that the water levels would be between 4 and 6m below the surface. While this view was not totally accepted by Mr Nolan, his opinion was that the water levels are likely to be between 0.3 -1.3 metres higher than the water levels presented in Doc 2 of the WAA.
- 4.181 In summary, all parties (including Landfill Operations consultant) agreed, among other things, that the long term undisturbed groundwater level should be 1.4 and 2.5 metres higher than that used in the WAA to take account of the disturbing influences of groundwater pumping, reduced evapotranspiration, reduced recharge from capped area and increased infiltration associated with storage ponds. They also agreed that longterm undisturbed groundwater level needs to be determined by groundwater modelling to account for the above factors. This should inform the detailed design levels for the top of liner system to accommodate the 2 metres separation and if this is not achieved, additional design and management measures would be required (Groundwater Conclave Memorandum from David Ife of ACOM, 05/10/2016).



*Additional design and management measures*

- 4.182 As discussed in paragraph 4.181 above, EPA's assessment is that the proposed landfill area is unlikely achieve a clear 2m separation between waste and the long term undisturbed groundwater level. Therefore, those cells not in compliance with Clause 16(2) of the Landfill WMP, it is necessary to consider whether:
- the landfill operator satisfies the Authority that sufficient additional design and management practices will be implemented
  - the Authority determines that regional circumstances exist that warrant the development of the landfill.
- 4.183 As a result of the determination above, a section 22 Notice requesting further information on additional design and management measures was raised (see Appendix D).

*Additional design measure*

- 4.184 The applicant's response to the section 22 Notice was that the designs provided with the Doc 2 of the WAA contains a GCL layer and a 0.5 metres thick compacted clay layer instead of 1m thick compacted clay layer only. The response stated that the GCL layer be considered as an additional design measure. This is considered acceptable, albeit it should be secured through suitably worded conditions WA to any WA issued or subsequent licence for the proposed landfill.
- 4.185 As per the summary provided in Table 3, the ILEAP notes that the WAA did not offer the proposed liner design as an alternative design measure to satisfy Clause 16(2)(a) of the Landfill WMP. As EPA has considered the design measures proposed in the WAA are embedded with an additional design measure, ILEAP recommended consideration be given to the following additional requirements:
- there is a need to demonstrate that the alternative liner is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point; and
  - there is a need to assess the water retention properties of the GCL to ensure that enough water will be available for the GCL to hydrate to the target water content set by the design.
- 4.186 EPA agrees with the ILEAP recommendations and proposes that, if a WA is issued they are included within a suitably worded condition – see paragraph 5.13 and WA\_W1.

*Additional management measure*

- 4.187 It is considered that, the installation and management of a groundwater collection system (as set out in paragraph 3.24) as an additional management measure is acceptable, and should be in place for the Cells 1 to 7 that are to be located in the South Portion of the proposed landfill site to be considered for the compliance of Clause 16(2)(a) of the Landfill WMP. Groundwater extraction mechanism should be provided in the detail design stage.
- 4.188 As per the summary provided in Table 3, the ILEAP accepted EPA's assessment that the provision of a drainage blanket below the liner would provide for additionality for the compliance with clause 16(2) of the Landfill WMP. Further it proposes that the drainage blanket be placed 2 metres below the lowest leachate level (i.e. top of liner in the sump) rather than as illustrated in the Plate 5 of Appendix 6 of the documents supporting the WAA.

- 4.189 EPA agrees with the ILEAP recommendations and proposes that, if a WA is issued they are included within a suitably worded condition – see paragraph 5.13 and WA\_W1.

*Does the Authority determines that regional circumstances exist that warrant the development of the landfill?*

- 4.190 Given that some cells do not meet the 2 metre separation between waste and the long term undisturbed groundwater level, EPA needs to determine that the regional circumstances exist to warrant the development of the landfill in the area as required by clauses 16(2)(b) of the Landfill WMP.
- 4.191 As discussed in paragraphs 4.130 above, the MWRRG has listed the Cleanaway MRL Ravenhall Landfill in its Landfill Schedule of the MWRRIP. Furthermore, it also identifies that the Ravenhall Landfill (i.e. the existing landfill) having landfill capacity until 2025. It further identifies that additional capacity for over 20 years exists but needs necessary approvals (Works Approval and planning permit etc.). Under such circumstances, the proposed development site is considered to be a site listed in the Landfill Schedule of the MWRRIP 2016.
- 4.192 Under such circumstances, it is considered that the Authority can determine that the regional circumstances exist that warrant the development of the proposed landfill.

### **Geotechnical Stability**

- 4.193 As described in paragraphs 3.26-3.28, the configuration of the cells is such that some of the cells (i.e. Cells 1-3 and 8-16) are not placed adjacent to the quarry walls. Their sidewall is away from the quarry wall and to be constructed on the quarry floor. Cells 4, 5, 6 and 7 are to be constructed adjacent to the quarry walls. To ensure that these cells are designed appropriately and are geotechnically stable, further information was requested through the section 22 Notice process.
- 4.194 The applicant's response provided in two submissions contained some limited information explaining the steps that would be taken and the areas that would be addressed (see paragraph 3.26 for details) but was in preliminary nature. It has stated that adequate geotechnical stability measures would be adopted in the detail design stage as that would require using site soil characteristics and material specifications that will be used in the construction. This is considered acceptable, but should be secured through a suitably worded planning condition.
- 4.195 As per the summary provided in Table 3, the ILEAP agreed that the assessment is incomplete in this regard and that stability assessment should be conducted in the detailed design process.
- 4.196 Accordingly, it is recommended that if a WA is issued a requirement to undertake geotechnical assessment and provide supporting evidence of geotechnical stability in the detailed designs should be included within a suitably worded condition – see paragraph 5.13 and WA\_W1.

### **Buffer Requirements**

- 4.197 The Landfill BPEM required outcome for buffers is *provide buffers in accordance with Table 5.2 and Table 8.2; where these are unavailable, demonstrate that risks are mitigated to the same standard*. Table 5.2 gives a buffer distance of 500m. BPEM

qualifies the required outcome stating “*that appropriate buffer distance must be maintained between the landfill and sensitive receptors (users) to protect those receptors from any potential impacts resulting from a failure of landfill design or management or abnormal weather conditions*”. Landfill BPEM additional notes that “*buffer areas are not an alternative to providing appropriate management practices, but provide for contingencies that may arise with typical management practices*”. The Landfill BPEM provides buffer distances requirements for various receptors, which is reproduced in Table 8 below (along with EPA’s assessment of the WAA against them). Figure 27, reproduced from the WAA show the distances to sensitive receptors from the boundary of the proposed landfill.

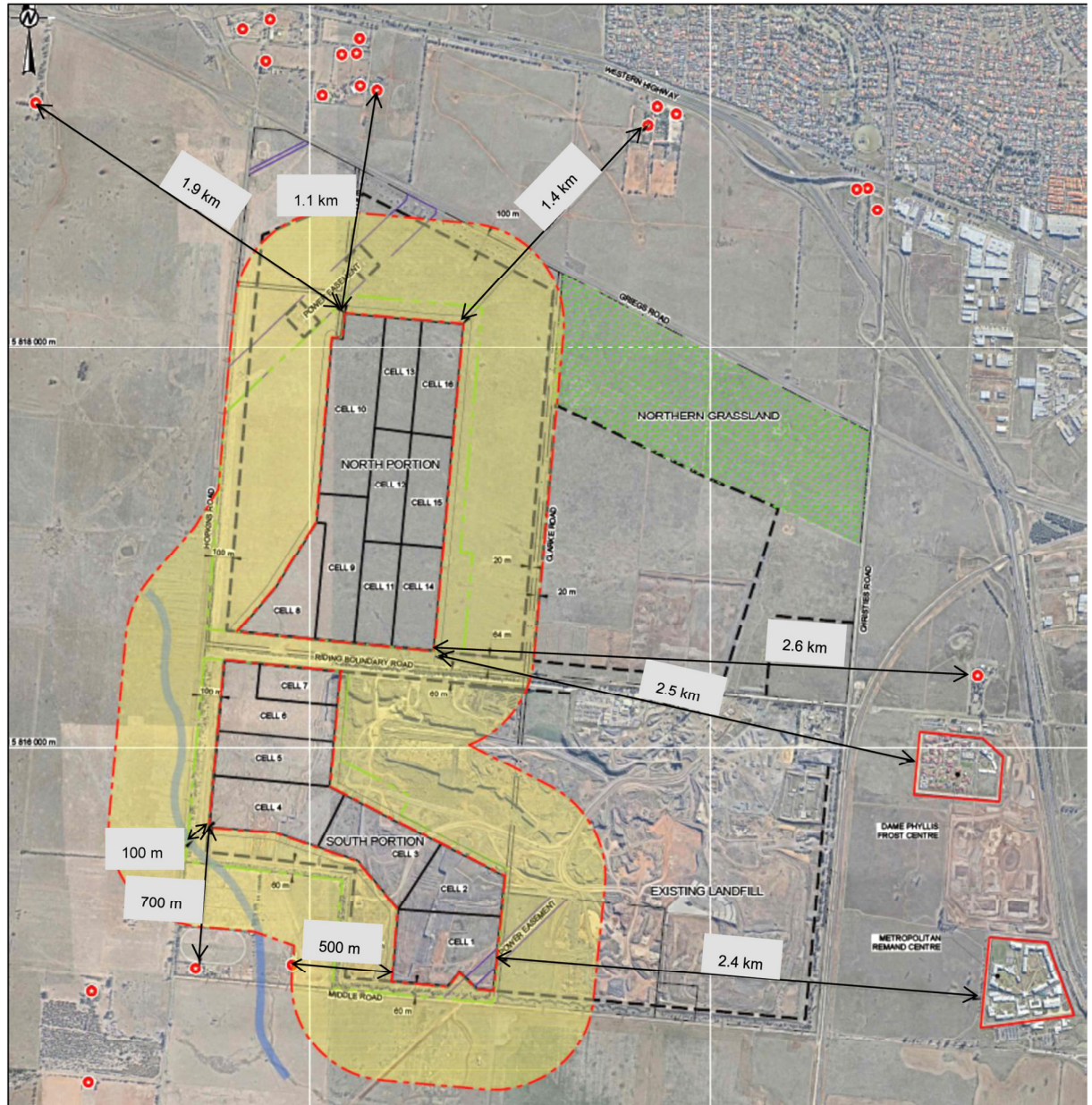
- 4.198 As described in paragraph 4.79 groundwater in the vicinity of the extension is considered Segment C and therefore does not preclude use of the land for landfilling in accordance with requirements of the Landfill WMP. As described in paragraphs 4.162-4.178, groundwater levels at the site show a temporal variability that is impacted by rainfall recharge and also groundwater extraction. Based on the information presented the proposal will be able to comply with the intent of buffer requirements of the Landfill BPEM, however, with additional design and management measures for groundwater protection. The requirements for additional design and management measures must be specified as conditions of the works approval.
- 4.199 As described in paragraph 4.86, the nearest water body to the site is Skeleton Creek which located south-west of the south portion of the extension and is a drainage line which ultimately feeds into Port Phillip Bay. This creek is understood to be ephemeral and the buffer distance to it is considered compliant with Landfill BPEM.
- 4.200 Landfill odour impacts have multiple contributing factors, in particular, the type and quantities of waste accepted, active cell management, filling profile, size of cells, use and proper management of LFG extraction systems, leachate management, site topography, local meteorology, number of truck movements per day. In addition, many of these factors are site-specific, all of which makes the task of setting an appropriate, single separation distance challenging. An appropriate separation or buffer distance should be situated where there would be an observable and significant reduction in the likelihood of detecting an odour.

**Table 8: EPA Assessment of the WAA Compliance with the Landfill BPEM Buffer Siting Distance requirements for LFG migration, safety and amenity (including odour) impacts**

Receptor	Landfill BPEM buffer requirement (m)	Information presented	Compliance accepted (Y/N)
Groundwater	2 (between waste and long-term undisturbed groundwater)	Some cells would not meet the 2m separation	Additional design and management measures required and accepted. Yes
Surface waters	100	The proposed landfill boundary is within 100m from the Skeleton Creek. However, two tributaries of the creek will be removed by the quarry operations under the Works Authority and this is considered under stormwater management. Hence, this is not considered to be an issue.	Yes
Buildings and structures	500	A residence is located ~500m from the site and more residences at 700m to 2.5kms from the site.	Currently in compliance. However further investigations/auditing would be required for future encroachment of buildings
Aerodrome for piston engine propeller-driven aircraft	1500	There is no aerodrome within 1500m from the site	Yes
Aerodrome for jet aircraft	3000	The is no aerodrome within 3kms (the Tullamarine airport is ~ 14kms from the site)	Yes

4.201 As indicated in Table 8 above, BPEM recommends a minimum buffer distance of 500 metres for siting new landfills (Type 2) for buildings and structures. It is highlighted, that the Landfill BPEM is however a general guideline based on landfill classification and not landfill size, with no provisions for determining appropriate buffers for expansions of existing landfills and the scale of the expansion. As noted previously EPA considers that the BPEM buffer distance of 500 metres is based only on LFG sub-surface migration risks and not impacts from LFG odours on amenity.





**Figure 27: Distances to Sensitive Receptors, reproduced from WAA Doc 2**

4.202 Accordingly, EPA has given consideration to what would be the most appropriate buffer distances in order to effectively manage odour impacts from this proposed development. This is based on the targeted EPA odour surveillance analysis of the existing landfill and extensive experience with odour impacts from similar landfills in Victoria, combined with the characteristics of the existing local area, including potential future development. The outcome of this consideration was provided by EPA to the Planning Panel considering the PPA, and is set out below:

- EPA strongly recommends a minimum 1,500 metres odour and amenity buffer between any proposed landfill cell and existing sensitive uses in the main residential areas of Caroline Springs, Deer Park and Derrimut (i.e. to the north and northeast). This should

be applied to ensure that there are no adverse odour and amenity impacts to the existing community in those established areas

- EPA strongly recommends a minimum 1,000 metres odour and amenity buffer between any proposed landfill cell and sensitive uses in the proposed Mt. Atkinson and Tarneit Plains PSP (i.e. to the west). This should be applied to ensure that there are no adverse odour and amenity impacts to the future community in the Mt Atkinson precinct, should Planning Scheme Amendment C162 be approved
  - the existence of isolated buildings should also be noted within 1,500 metres of the proposed landfill cells, which are potentially being used as residences. These buildings are located on land formerly zoned as Green Wedge Zone but now zoned as either Farming Zone or Urban Growth Zone. In assessing the planning application, the responsible authority must consider the odour and amenity impact to these potentially sensitive uses, given their respective zoning contexts.
- 4.203 Varying the default Landfill BPEM buffer is consistent with the EPA approach in advising extended amenity buffers for similar landfill developments and recognises that the 500 metres buffer as stated in BPEM will not be protective of amenity when it is contrasted against EPA odour surveillance and the present and proposed receptor situation.
- 4.204 The landfill setting currently complies with the Landfill BPEM buffer requirements for a Type 2 landfill for groundwater, surface waters, buildings and structures and aerodromes.
- 4.205 As per Table 3, the ILEAP recommended that a 100 metres buffer internal to the MRL site be maintained. The panel report did not state whether the panel considered a 100 metres buffer sufficient alone, or that 100m of an overall larger buffer be internal to the MRL site. EPA sought clarification with the panel (via a telephone conversation between a panel member and EPA's Principal Expert – Landfills) who stated that:
- 100 metres of the buffer should be internal to the MRL site on the basis of the land which appeared to be available to Landfill Operations
  - that the panel was of the opinion that a 100 metres buffer would be sufficient to identify and rectify LFG migration in the sub-surface geology provided that a double layer of perimeter LFG monitoring bores is provided. The IPEAL further stated that there was no scientific basis for the selection of 100 metres.
- 4.206 The buffer recommendations of the ILEAP therefore consider the LFG migration hazard only, not impacts on amenity. EPA undertook an assessment of whether a 100m buffer would be acceptable to mitigate LFG sub-surface migration hazards. This assessment considered four key aspects:
1. that EPA agrees with the ILEAP that the 500 metres buffer is based on LFG migration observed from unlined landfill or landfills lined to less stringent standards. EPA adds to this that the sites studied in deriving the 500 metres buffer were in matrix dominated strata, not fracture flow strata as with MRL
  2. that EPA has used a known occurrence of LFG migration from the current MRL as a proxy for the extension as the extension does not exist so no data can be gathered
  3. that the area where the known LFG migration has occurred is adjacent to landfill cells lined to the same standard as that proposed for the landfill extension and the geology is the same, but is noted to be highly heterogeneous



4. that the LFG perimeter monitoring bore network at the current MRL has spacings considerably in excess of those recommended in BPEM.
- 4.207 The outcome of this assessment was that LFG migration is known to have occurred to a distance of ~110 metres from the edge of the cell liner. That there is potential that the migration may have travelled further than 110 metres as there are no bores beyond the bores situated at 110 metres and LFG may also be moving through the geology between the extended spacings of the bores and thus goes undetected. The reason for the migration is a lack of LFG extraction in shallower waste towards the edge of the cell, which is considered a 'failure of management' with reference to BPEM statements on the need for buffers.
- 4.208 EPA concludes that 100 metres buffer is not acceptable on the basis of its assessment of known migration at the existing MRL exceeding 110m due to a failure to manage LFG properly.
- 4.209 EPA further concludes that there is no data available to ascertain if a buffer less than 500 metres would be appropriate for mitigating LFG migration as a result of LFG management failure.
- 4.210 EPA maintains its support for the default 500 metres buffer. This could be amended for the proposed extension if appropriate data supportive of a buffer <500 metres but >110 metres becomes available from the current MRL. Alternatively should the extension be approved, data could be gathered from perimeter monitoring bores from the first cells and the buffer amended for future cells.
- 4.211 EPA assesses that these buffers are currently met and recommends formalisation of required odour and LFG buffers in the planning scheme.

#### **Compliance with clause 13(2) of the Landfill WMP**

- 4.212 Clause 13(2) of the Landfill WMP requires that landfill sites must not be established or extended into any area listed in Schedule A of the Landfill WMP. Based on the information presented in the WAA the assessment of this requirement is presented in Table 9 below.
- 4.213 In relation to ecological assessments, the WAA Doc 2 stated that "*the site is not located within the Melbourne Strategic Assessment program area and is unaffected by the implications of the Biodiversity Conservation Strategy*". However, the referral agency (DELWP) response (see Appendix C.5) provided a conflicting position, stating that the proposed landfill property is located within the Melbourne Strategic Assessment program area. The Applicant was requested to clarify the above issue. The applicant's response was that: "*it confirms that the statements in the Ecology & Heritage Partners report that the Melbourne Strategic Assessment does not apply to the site were corrected - the Melbourne Strategic Assessment does apply*". The response goes on to state that "*The vast majority of the footprint of the landfill is located within the quarry footprint, within which vegetation removal has already been authorised subject to conditions including the creation of the Northern Grasslands Reserve.*"

**Table 9: EPA Assessment of the WAA Compliance with Clause 13(2) of the Landfill WMP**

Not to be located in the following areas	Compliance
High value wetlands of international significance	No listed wetlands
Areas of significance for spawning, nursery, breeding, roosting etc.	No relevant areas located
Marine and coastal reserves listed in the National Parks Act 1975	No relevant areas located.
Water supply catchment areas	No water supply catchments located
State wildlife reserves listed under the Wildlife Act 1975	No wildlife reserves located in the area
Critical habitat of fauna and flora under the Flora and Fauna Guarantee Act 1988	Not within the proposed site
Water supply protection areas under the Water Act 1989	No water supply protection areas located
Groundwater protection zones	No such zones located
Matters of national significance as per the Environment Protection and Biodiversity Conservation Act 1999 (Cth)	Proposed landfill will not cause vegetation loss (see paragraph 4.213)
Surface waters	No waters

4.214 Based on the information presented and revised, it is considered that the proposal complies with the requirements of Clause 13(2).

#### **Detailed designs for the landfill construction**

4.215 The WAA contains preliminary designs for the landfill which are considered appropriate. If the WA is granted, detailed designs should be provided prior to start construction of the landfill (landfill cells) as per paragraph 5.13 and WA\_W1.

4.216 The preliminary designs show that the landfill will be constructed with the liner configurations set out in paragraphs 3.24-3.25.

#### *Additional design and management measures*

4.217 The liner configuration set out in paragraphs 3.24-3.25 which includes for the additional design measure of a basal liner comprising a GCL layer with a 0.6 metres thick compacted clay liner in place of the 1m thick compacted clay liner should apply to the Cells 1, 2, 3, 4, 5, 6 and 7 in the South portion as a minimum.

4.218 However, as described in paragraph 4.215 above an assessment would be required to demonstrate that the liner configuration meets BPEM requirements and the GCL will achieve appropriate hydration conditions. This should be included in a suitably worded condition of any WA issued – see paragraph 5.13 and WA\_W1.

*Landfill cap:*

- 4.219 The capping profile proposed is in line with Type 2 landfill criteria and is considered appropriate, and should be secured by a suitably worded condition if WA is granted.

*Alternative capping:*

- 4.220 As described in paragraph 3.29 above, the WAA provides a preliminary design for the landfill cap. Further it states that an evapotranspiration cap (ET cap) or the phytocapping will be considered as an alternative capping option for the proposed landfill. This consideration is acceptable in principal at this stage. However, once finalised, detailed designs should be submitted in line with the Landfill BPEM and the Landfill Licensing Guidelines. If an ET cap is proposed, it should also include a testing trial as per the Landfill BPEM.
- 4.221 A pre-settlement contour plan has also been provided.
- 4.222 The proposed liner configurations for the base, side wall and the cap are considered appropriate. However, detailed designs must be provided prior to start construction of landfill cells. Suitably worded conditions should be included in any WA issued to secure this – see paragraph 5.13 and WA\_W1.

**Leachate management**

- 4.223 Leachate is to be collected through the leachate pipe system embedded in the liner system and will be directed to the leachate sumps in each cell for collection and transfer into two storage ponds for treatment. One pond will be located in the South Portion and the second pond will be located in the North Portion. Paragraphs 3.31-33 above describe the proposed leachate management system. This is considered acceptable at the works approval stage. Further storage and treatment details depending on the need should be included in the detail design stage.

**Rehabilitation of the landfill**

- 4.224 As described in paragraph 3.63, the WAA contains both pre-settlement top of waste and top of cap contours for both south and north sections of the landfill site, as shown in Figure 18 of the WAA. These plans are considered acceptable. However, if an alternative capping (i.e. ET) was to be proposed at the detailed design stage, pre-settlement top of cap contour may have to be revised to accommodate that.
- 4.225 The proposed sequential filling followed by placement of intermediate cover prior to capping Cells (1 to 16) is considered appropriate and meets BPEM required outcomes for rehabilitation.
- 4.226 Progressive rehabilitation of the landfill would also be a statutory requirement in any EPA Licence for the site.
- 4.227 As described in paragraph 3.67, a Landfill Aftercare Management Plan and Monitoring Program has been included in the WAA, and are considered consistent with requirements of EPA's Closed Landfill Guidelines however these are working documents and will be required to be revised and updated throughout the operating and post-closure life of the landfill. This will be regulated by EPA through licence compliance activities and Environmental Auditing as well as possible remedial notices.

- 4.228 Landfill Operations propose for the final land use of the site post landfill closure to be open public space noting that much of the land surrounding the proposal has been designated for future development.
- 4.229 EPA does not have any concerns relating to the information presented in the WAA relating to rehabilitation and aftercare.

### **Planning requirements**

- 4.230 It is noted that the proposal requires planning permission, and that PPA2016/5118 is currently before the Minister for Planning following his call-in of the PPA in April 2016. It is highlighted that if a WA is issued its effect can only occur if there is a corresponding planning permission. Accordingly, a suitably worded condition should be included in any WA issued – see paragraph 5.9 WA\_G3.

### **Best-practice Operation**

#### *Leachate management*

- 4.231 The leachate management practices proposed in the WAA (as summarised in paragraphs 3.31-3.33) meets the industry standard. Similar to their existing leachate pond, aerators will be used to reduce odour generation from the leachate ponds also increase the evaporation of leachate from the ponds.
- 4.232 It is recommended that suitably worded conditions are attached to any WA issued (see paragraph 5.18 and WA\_W8) and subsequent licence, such as licence conditions L.4.1 and L4.4 to ensure proper leachate control. L4.1 requires that the maximum depth of leachate in each cell is 300 millimetres, and L4.4 requires a hydrogeological assessment every five years to review leachate management practices on-site compared to the risks/impacts on beneficial uses of groundwater.

#### *Waste acceptance*

- 4.233 The proposed operational measures for waste acceptance summarised in paragraphs 3.39-3.61 meet the required outcomes and suggested measures for waste acceptance in the Landfill BPEM.
- 4.234 It is recommended that suitably worded conditions are attached to any WA issued (see paragraph 5.7 and WA\_G1) and subsequent licence, limiting the types of waste permitted to be disposed of at the facility, and requiring waste recording and inspections.

#### *Cell operation / cell filling*

- 4.235 The WAA states that one active tipping area will be in operation. This is acceptable; however EPA notes it likely that occasional short term operation of two tipping faces will be required. This is allowable under licence conditions and EPA Publication 1323.3 Landfill Licensing for limited operational reasons, which are stated in the publication.

#### *Active tipping area size*

- 4.236 The active tipping area will be kept 'as small as possible' and is proposed to be no larger than 1,800 square metres to minimise amenity impacts such as odour and to better control litter and pests. In the event that WA is issued, EPA will agree with Landfill

Operations on the active tipping area size at the detailed design stage secured through a suitably worded licence condition – (i.e. L8 setting the upper limit size). 1800 square metres was identified as the minimum workable tipping area size based on the site's waste acceptance volumes and associated vehicle movements. The Landfill BPEM recommends a tipping area size of 900 square metres but this is a generalisation for all sites and as such does not account for the specifics of each site. For some sites 900 square metres is too large, for others such as the proposed MRL extension it is too small.

#### *Use of cover*

- 4.237 The proposed daily cover in paragraphs 3.41-3.43 aligns with the existing EPA licence condition L7.
- 4.238 A new EPA licence condition (L6) now requires progressive cover of waste during the days operations such that only the active tip face is uncovered. This condition was not yet in use at the time of application, hence it was not included in the procedures to demonstrate compliance. It is noted that during EPA inspections of the current MRL operations, the active tipping area was operated in a manner which is consistent with L6 and L7 with minimal active tipping area size. The use of L6 and L7 in the licence will ultimately regulate cover use.
- 4.239 Compliance with L6, L7 and L8 represents best practice in reducing waste odours from the active tipping area.

#### *Deep burial*

- 4.240 The deep burial hole(s) are excavations into the existing waste in the active cell used for burial of highly odorous or sensitive/classified materials. The WAA contains a statement requiring the deep burial hole be covered at all times. The WAA and the licence conditions contain appropriate actions to limit waste odour from the active cell in accordance with best practice, however the licence conditions bring the most to bear on this aspect.

#### *Litter control*

- 4.241 Litter control measures summarised in paragraphs 3.55-56 are in accordance with the required outcomes and suggested measures in the Landfill BPEM. Litter control is most effective when operated correctly at the largest source; the active tipping area. Compliance with licence conditions L6, L7 and L8 will be sufficient in controlling litter from the active tipping area. It is anticipated that some loss of litter is inevitable, and if not caught by the proposed 12 metres high fences, Landfill Operations should have teams of litter pickers for retrieval. In the event that WA is issued, it proposed that implementation of litter control is secured by conditions – see paragraph 5.18 WA\_W8 and 5.24 WA\_R4.

#### *Fires*

- 4.242 The fire prevention methods detailed in the WAA are only concerned with surface fires and bush fire risk. Although this meets the Landfill BPEM required outcomes in this regard, further information was requested on landfill hotspots (also known as sub-surface fires in the waste mass). The supplementary technical memorandum by Golder Associates provided in WAA Doc 3 contains information on hotspot prevention, detection and extinguishing which accord with new EPA licence conditions for hotspot prevention, detection and extinguishing and reporting (L15, L16, L17).

### *Disease vector control*

- 4.243 The proposed disease vector controls, as summarised in paragraphs 3.59-60, meet the required outcomes and suggested measures of the Landfill BPEM. It is recommended that disease vector monitoring and managements requirements are included in an Environmental Management Plan or Vermin Management Plan and are subject to WA conditions – see paragraph 5.24 and WA\_R4.

### *Noxious weed control*

- 4.244 The WAA recognises the nearby farmland as a receptor at risk from noxious weeds, and proposes operational controls which meet the required outcomes and suggested measures of the Landfill BPEM.

### **Best-practice Rehabilitation and Aftercare**

- 4.245 Progressive rehabilitation / rehabilitation - the WAA and appendices contain sufficient information to demonstrate that progressive rehabilitation will be undertaken in accordance with the required outcomes for rehabilitation in the Landfill BPEM. The key aspects for odour control and meeting LFG action levels are swift placement of intermediate cover and installation of gas wells in completed cells. Licence condition L23 requires that intermediate cover be applied to the filled cell within 1 month of completion. The cover does not need to completed within one month, but likely will be in order to achieve licence compliance with L5.
- 4.246 WAA Doc 2 Appendix B contained cell phasing plans showing the construction, filling, intermediate cover and final capping sequence, which accords with the required outcomes for rehabilitation in the Landfill BPEM provided that it is implemented. EPA licence conditions do not regulate phasing plans, however the cell approval process is a major driver of phasing as each cell will be allowed a maximum filling time of 2 years after which it will be rehabilitated in accordance with L23 (intermediate cover) and L27 (final capping of each cell by a certain date). During this two year window new cells are built and previous ones capped, thus achieving the phasing plan.

### **Conclusions**

Overall, the conclusions of the assessment are that:

- the proposed MRL site meets the landfilling siting requirements of Landfill WMP and the Landfill BPEM
- WAA complies with the design, management and rehabilitation requirements of the Landfill WMP and Landfill BPEM
- additional design and management measures are required to ensure groundwater protection for Cells 1-7 (South Portion) where there is not a 2m separation between the base of the waste body and the top of the long term undisturbed water table
- if WA is issued, it should be subject to a series of WA conditions
- if a licence is subsequently issued similarly it should be subject to a series of licence conditions.



## CONSIDERATION OF THE PRINCIPLES OF THE EP ACT

### Why is consideration of the Principles of EP Act a key issue?

- 4.247 As per section 1A(3) of the EP Act, EPA must consider the environment protection principles in all of its assessments and decisions. In practice, this means that the applicant must demonstrate to EPA how it has considered the environment protection principles set out in the EP Act, and that the EPA needs to consider them as part of its assessment when making decisions on approval applications.
- 4.248 Section 3.1.1 of the WAA (Doc 2) outlines how the WAA has been developed with consideration for the principles of environment protection (see paragraph 1.61 of this Assessment Report).
- 4.249 In assessing the WAA against the environment protection principles, EPA has considered its Publication 1565 ‘Application of environment protection principles to EPA’s approvals process’ (2014). This publication explains how EPA expects applicants to consider the environment protection principles when developing proposals and preparing applications for an EPA approval. Since the principles provide the basis for developing statutory policy (the SEPPs and Landfill WMP), they are already integrated into many statutory policy requirements.
- 4.250 Publication 1565 discusses the relevance of the principles in and in section 2.1 states:
- *“all of the principles are relevant to some extent to all proposals within the approval process ... the direct relevance of each principle depends on the issues arising in a particular proposal”;*
  - *“different principles (or combinations of principles) of varying significance may apply to different applications. They can moderate or balance each other in the overall assessment. However, none of the principles is treated as absolute or totally dominant in any given situation. The principles are commonly applied in an integrated fashion.*
  - *In applying the principles, EPA focuses on achieving efficient and practicable outcomes that are in proportion to the significance of the environmental problem(s) being addressed.*
  - *Also, the principles are not to be considered in isolation from the other matters (e.g. best practice and other statutory policy requirements) that proponents and EPA need to consider”.*
- 4.251 EPA’s assessment gave particular consideration to the following principles:
- 1B - integration of economic, social and environmental considerations
  - 1C - precautionary principle
  - 1D - intergenerational equity
  - 1F – improved valuation, pricing and incentive mechanism
  - 1I - waste hierarchy
  - 1L accountability.

## Principle 1B - Integration of economic, social and environmental considerations

- 4.252 Principle 1B aims to optimise the outcome of available trade-offs or compromises between competing concerns and values, and assist in reaching a balanced decision, rather than provide the absolute maximum level of protection of the environment. It requires the effective integration of economic, social and environmental considerations in decision making processes with the need to improve community wellbeing and the benefit of future generations
- 4.253 A proposal that may generate significant external economic and social impacts, consideration needs to be given first to whether the proposal is consistent with statutory policy (SEPPs and Landfill WMP), and how likely is it to cause an environmental hazard first before broader economic and social issues are taken into account. The principle does not require EPA to balance the financial viability of a proposal with broader economic, social and environmental concerns. It is the overall impact of a proposal on society and the environment (rather than the applicant) that is of primary interest in applying principle 1B.
- 4.254 As shown in the assessment of key issues in the previous subsections of this WAA Assessment Report, it is considered that the proposal is consistent with the SEPPs and Landfill WMP. As such, that consideration should be given to economic and social issues.
- 4.255 As set out in the WAA Doc 2 Appendix A and paragraphs 3.2-3.4 above, the proposed landfill extension would see the transfer of and disposal of waste from Cleanaway's metropolitan transfer network and the South East Melbourne Transfer Station. This would result in a 12 per cent increase of Greater Melbourne's waste being deposited at MRL from 24 to over 36 per cent by 2020.
- 4.256 As evidenced by the concerns raised by many of the submissions, the proposal may generate significant external economic and social impacts (potential impacts on house prices, amenity and well-being) on local communities with few benefits for local community (long-term open space following rehabilitation and the generation of energy from LFG). There is a wider community benefit through more landfill capacity.
- 4.257 Accordingly it can be considered, as argued by many of the submitters that the local communities near to the MRL site i.e. Caroline Springs, Deer Park, Derrimut and Werribee would be disproportionately affected.
- 4.258 Whilst it is considered above that the proposed landfill extension is consistent with the SEPPS, Landfill WMP and Landfill BPEM, the likely effect on the local community cannot be ignored nor the need for consideration of 'benefits of future generations'. As such, EPA has assessed that Principle 1B is not fully met with the scale of the WAA.

## Principle 1C – Precautionary Principle

- 4.259 Applying Principle 1C requires the consideration of the risk-weighted consequences, rather than a total avoidance of all risks. This requires a reasonable balance between the risks and costs associated with various environment protection measures and the benefits to be derived from them.
- 4.260 In establishing if the precautionary principle is applicable to a WA, it is necessary to determine whether two necessary conditions are satisfied, namely the existence of:

1. the threat of serious or irreversible environmental impacts
  2. scientific uncertainty about those impacts.
- 4.261 In relation to the threat, if it is considered serious, it does not matter whether the threat is irreversible or not. In addition, the expectation of damage should have 'reasonable scientific plausibility', even if it is not fully demonstrable.
- 4.262 The need for precautionary action increases with both the level of possible harm (potential threat) and the degree of uncertainty.
- 4.263 An applicant should also consider any potential cumulative impacts arising from a proposal, which is, whether the proposal's impacts or risks would add significantly to the seriousness of a threat which already exists.
- 4.264 With regards to the consideration of MRL proposal, it is noted that landfilling is a well established waste disposal activity that occurs globally and is one of the most heavily regulated industries. Accordingly, the potential environmental risks and impacts are well known, with evolving improvements in containment, control and monitoring technologies. As discussed previously, the Landfill BPEM which is the key compliance policy document that the proposal will need to meet, gets regularly updated to reflect international best practice.
- 4.265 EPA notes that the updated literature review on Air Emissions from Non-hazardous Waste Landfills, (referred to in paragraph 4.127) concluded that an assessment of all available data and published studies shows that living near a non-hazardous waste landfill is not associated with any adverse health effects.
- 4.266 A common thread in some of the submissions centred around the long-term performance of the proposed liners and leachate collection system. In this regard it is noted that containment technology and the requirements in the Landfill BPEM have evolved and become more stringent and may continue to do so in the future. If a WA is issued, the future landfill cell designs will be assessed against the Landfill BPEM that exists at that time.
- 4.267 Further, it is noted that if a WA is issued, there would be appropriate management and monitoring programs for groundwater, surface water and LFG conditioned as part of any WA and subsequent licence amendments. These would be designed with monitoring boreholes close to the perimeter of the landfill cells to monitor and detect any off-site migration of leachate and LFG. As such, if any off-site migration was detected, appropriate actions, overseen and regulated by EPA, could be taken before the leachate or LFG had travelled beyond the boundary of the premises.
- 4.268 The key aspect that is considered to be inconsistent with the precautionary principle is that approval of the WAA would mean approving beyond the current identified government need for landfilling (i.e. 2046 as per the 2016 MWRRIP). It would be an incorrect decision to approve the WAA when it in the future there may be significant changes in the waste management sector
- 4.269 Accordingly, it is considered Principle 1C would not be fully met.

### **Principle 1 D - Intergenerational Equity**

- 4.270 As described earlier in this Assessment Report, the WAA proposals seek approval for 30 years of landfilling starting in 2025. If the WAA is approved as proposed this would see

- the landfilling activities occurring at the site until 2055 with the potential to create a legacy larger than required by current SWRRIP and MWRRIP.
- 4.271 While the landfill will be designed and operated to best practice standards and regulated by the EPA, there would be landfilling activities (such as final capping and rehabilitation) after landfilling has ceased. These activities would still require containment and management in a way that could potentially affect future generations beyond 2055.
  - 4.272 The WAA includes a LFG collection system that will be connected up to gas-fired engines (not included in the WAA see paragraph 4.113), which will minimise GHG emissions through the conversion of methane (with a higher GHG equivalent) to carbon dioxide.
  - 4.273 Further, it is noted that it typically it takes 2-3 years to obtain the necessary detailed design approvals and construct the first landfill cell. In this regard, it could be argued (as the ILEAP and some of the objectors have noted) that the WAA is being made prematurely. With the Victorian Government’s response to the Ministerial Advisory Committee into the EPA (released on 17 January 2017), the legislative and policy framework that will approve and subsequently regulate the proposed landfill extension can reasonably be expected to change in the next five years. In this context, it is considered prudent for any WA issued now to be subject to some form of reappraisal in the future.
  - 4.274 In the event that a WA is issued, it is recommended that a suitably worded condition be included – see paragraph 5.23 WA\_R1 requiring demonstration of the need for landfilling at the site, as demonstrated by the presence of the landfill in on the landfill schedule in the SWRRIP and MWRRIP two months prior to commencement of any landfilling.
  - 4.275 Given that landfills leave a long legacy for future generations, and the potential for impacts from landfill activities to impact communities to 2055 and beyond, EPA has assessed the WA proposed by Cleanaway as not meeting Principle 1D.

**Principle 1I – Waste Hierarchy**

- 4.276 This principle is based on the concept of a hierarchy of preferred waste management options, with avoidance being the most preferred option and disposal being the least preferred. While landfilling is at the bottom of the hierarchy, Cleanaway uses waste management options that are higher up the hierarchy through their pre-sorting at source and transfer stations to recover any saleable materials.
- 4.277 Furthermore, the WAA includes a LFG collection system to capture LFG produced, which will be connected to gas turbines to produce electricity, and the landfill itself as described above is considered to meet the Landfill BPEM.
- 4.278 The waste management policy and the waste management sector is however, dynamic and evolving. The current SWRRIP covers the period 2015 to 2044 but is reviewed every five years. This means there would be seven reviews of the SWRRIP before 2055. The MWRRIP would also be subject to review, with the next review scheduled for 2019. Not only do these documents identify the need for landfills, they also set out government waste management policy for other elements of waste management that is higher up the waste hierarchy (such as avoidance, re-use, recycling, recovery of energy, treatment and containment).
- 4.279 Accordingly, EPA considers it likely that in such a dynamic environment the need for landfilling, and the waste types and volumes that could be disposed at the proposed MRL could be different from the situation now. In this regard approving a 30-year landfill

beyond the current government identified need of 2046, can be considered premature and contrary to Principle 1I (waste hierarchy).

### Principle 1F – Improved valuation, pricing and incentive mechanism

- 4.280 This principle requires environmental costs to be integrated into economic activities with:
- prices of goods and services incorporating their full life cycle costs
  - the polluter pays
  - consumers paying the true costs of the goods and services they buy
  - the environment not being seen as a free commodity.
- 4.281 In assessing against principle 1F, two issues need careful consideration:
- a) Polluter-pays - as Mt Atkinson Holdings, the VPA and MCC argued in their submissions, the South Portion of the WAA has been designed in such a way that the default 500 metre buffer encroaches onto land outside of Landfill Operations control. Further due to potential off-site LFG migration, that land's availability for future development could be restricted and sterilised until a suitable LFG risk assessment is completed as part of a future section 53V audit, or if a WA is issued without the landfill's cells being moved to internalise the buffer (as described in paragraphs 4211. above)
- b) Full-life cycle costs and costs to the consumer - as argued by many submitters, issuing a WA for a 30-year landfill at MRL could influence the costs of landfilling to the waste producers and transporters, which could hinder the development of other waste management options higher up the waste hierarchy. This would undermine the state waste policy's objectives of encouraging greater recycling and resource recovery by disincentivising those alternatives.
- 4.282 With regard to the (a) EPA notes that following the C126 Panel Hearing into the Mt Atkinson and Tarneit Plains PSP, EPA expects that further discussions will occur between the respective landowners, VPA and EPA on how to agree development approvals within the buffer and any future landfill cell approvals may occur. EPA considers it reasonable to expect that the discussions and any agreed outcome will also capture and resolve issues regarding the commissioning of any future risk assessments and subsequent actions.
- 4.283 However, in terms of (b), EPA notes that at the Joint Panel Hearing and section 20B Conference, both SV and MWRRG indicated that they have a series of initiatives to assist in the promotion of recycling and resource recovery. As such, they believe the proposal would not hinder the alternative waste management options. SV did, however, state that too much excess landfill capacity could affect the objectives of those initiatives.
- 4.284 Accordingly it is assessed that Principle 1F is met.

### Principle 1L - Accountability

- 4.285 This basis for this principle is that the "*aspirations of the people of Victoria for environmental quality should drive environmental improvement*" and that "*members of the public should therefore be given access to reliable and relevant information in appropriate forms to facilitate a good understanding of environmental issues and opportunities to participate in policy and program development*". On the latter, EPA notes that this does not just relate to policy and program development but also includes the opportunity for the

- general public (and other third parties) to comment on an application when it is advertised, and to request VCAT to review EPA's decision on the application.
- 4.286 It is acknowledged that with regards to this WAA, Landfill Operations had undertaken pre-application consultation (as described in Section 5 of WAA Doc 2), and facilitated the formation of the Melbourne Regional Landfill Community Consultation Group (MRLCCG) which provides a forum for engagement between Landfill Operations and stakeholders (including the members of the local community, as well as MCC, BCC and EPA). EPA notes that during the WAA assessment process, the MRLCCG was disbanded but has recently in early 2017, has been reformed as the Melbourne Regional Landfill Community Reference Group (MRLCRG).
- 4.287 It is further noted that as a licence holder, Landfill Operations currently - and would in the future if a WA and subsequent licence is issued - report annually on compliance with their EPA licence conditions. This is reported via Annual Performance Statements which are made available on EPA's website. s53V Environmental Audits undertaken by independent Environmental Auditors are also made available on EPA's website.
- 4.288 Additionally, EPA acknowledges that through the WAA assessment, opportunities have been provided for the general public and other third parties to comment on the WAA (see section 2), through two extended consultation processes, as well as attendance at the Information Sessions and Joint Panel Hearing and section 20B Conference.
- 4.289 Accordingly it can be considered that principle has been met and will continue to be met in the future.
- 4.290 It is evident however through the disbanding of the MRLCCG and submissions made, that there are issues with the effectiveness or perceived effectiveness of the ongoing engagement between the Landfill Operations and stakeholders. In this regard, the ILEAP were asked to consider how the community should be involved in the WA and licensing of the MRL extension ILEAP response recommended the resourcing and convening of an 'independent stakeholder liaison body'. This would allow all major stakeholders to be informed on project progress; complaints and subsequent investigations; compliance with Licence conditions; and auditor's reports. EPA considers that the existing MRLCRG meets this recommendation.
- 4.291 ILEAP also recommended that the independent stakeholder liaison body be a stakeholder for the purposes of scoping any Section 53V operational environmental audits and that the independent stakeholder liaison body have appropriate technical resources to assist them in interpreting and commenting on the scopes for the operational environmental audits. EPA considers that this recommendation is not presently within the Terms of Reference for the MRLCRG. EPA agrees with the recommendation and justification provided by ILEAP but notes that it does not have the power to request Landfill Operations to adopt the recommendation.
- 4.292 For all interactions (current and future) with MRL, EPA:
- endeavours to make its resources available to help MRLCRG interpret audits and technical matters and assist in the group's input to audit scopes; and
  - endeavours to ensure that Environmental Auditors consider MRLCRG (or any version of a stakeholder liaison group) as a stakeholder and develop the future audit scopes taking into account views of this stakeholder.
- 4.293 Nonetheless, in the event EPA issues a WA it:



- encourages Landfill Operations to adopt the ILEAP's recommendations and notes that it will recommend that the Minister for Planning carefully consider the ILEAP's recommendation in its planning referral response to the Minister.

4.294 Overall on balance it is considered that the WAA accords with Principle 1L.

### **Conclusions**

Overall, the conclusions of the review of the WAA against the environment protection principles of the Act relevant to the WAA are:

- Principle 1B – Integration of economic, social and environmental considerations is not fully met with the scale of the WAA proposed;
- Principle 1C – Precautionary principle is not fully met;
- Principle 1D – Intergenerational Equity is not fully met with the temporal scale of the WAA proposed;
- Principle 1F - Improved valuation, pricing and incentive mechanism is met; and
- Principle 1I – Waste Hierarchy is met.

## 5 ASSESSMENT RECOMMENDATIONS AND PROPOSED WORKS APPROVAL CONDITIONS

- 5.1 In consideration of the assessment of key issues in Section 4 above EPA recommends that a WA be issued, however not to the extent proposed by the Landfill Operations.
- 5.2 The WAA proposes that landfill construction and operations commences in 2025 and continues until 2055. However, current government waste management policy (the 2015 SWRRIP and October 2016 MWRRIP) only identifies a need for landfilling for the periods of 2015-2044 and 2016-2046 respectively. Accordingly, and given the complete assessment of the key issues, EPA considers it appropriate to limit the extent of the WA and place strict conditions on it. By limiting the extent of the WA, the relevant environment protection principles (see paragraphs 4.258, 4.69, 4.275 and 4.279) would be fully met. The limits and the proposed conditions are described below.
- 5.3 In addition, the limiting of the WA issued considers the design and site layout within the WAA and the proposed sequencing of cell construction and progressive rehabilitation. In this regard, EPA notes that the South and North Portions can each operate independently of each other due to their designs which includes structures for leachate management, stormwater and LFG systems and that the sequencing follows the quarrying. There are no alternative proposals before the EPA for the designs of the North Portion, which seek landfilling up to 2046. In such circumstances, granting a WA up to a certain date does not have the automatic effect of ensuring the associated leachate, stormwater and LFG collection systems and final capped and rehabilitated landform with meet policy requirements. An extensive redesign of the North Portion would need to be undertaken, and then re-assessed by EPA for compliance. In view of the likely redesign and subsequent reassessment, EPA does not consider that this could not be done under a conditional approval.
- 5.4 Accordingly, it is recommended that WA be issued subject to a series of conditions, but to the extent that the approval is for the South Portion only, (Cells 1-7) as illustrated in Figures 28-30.

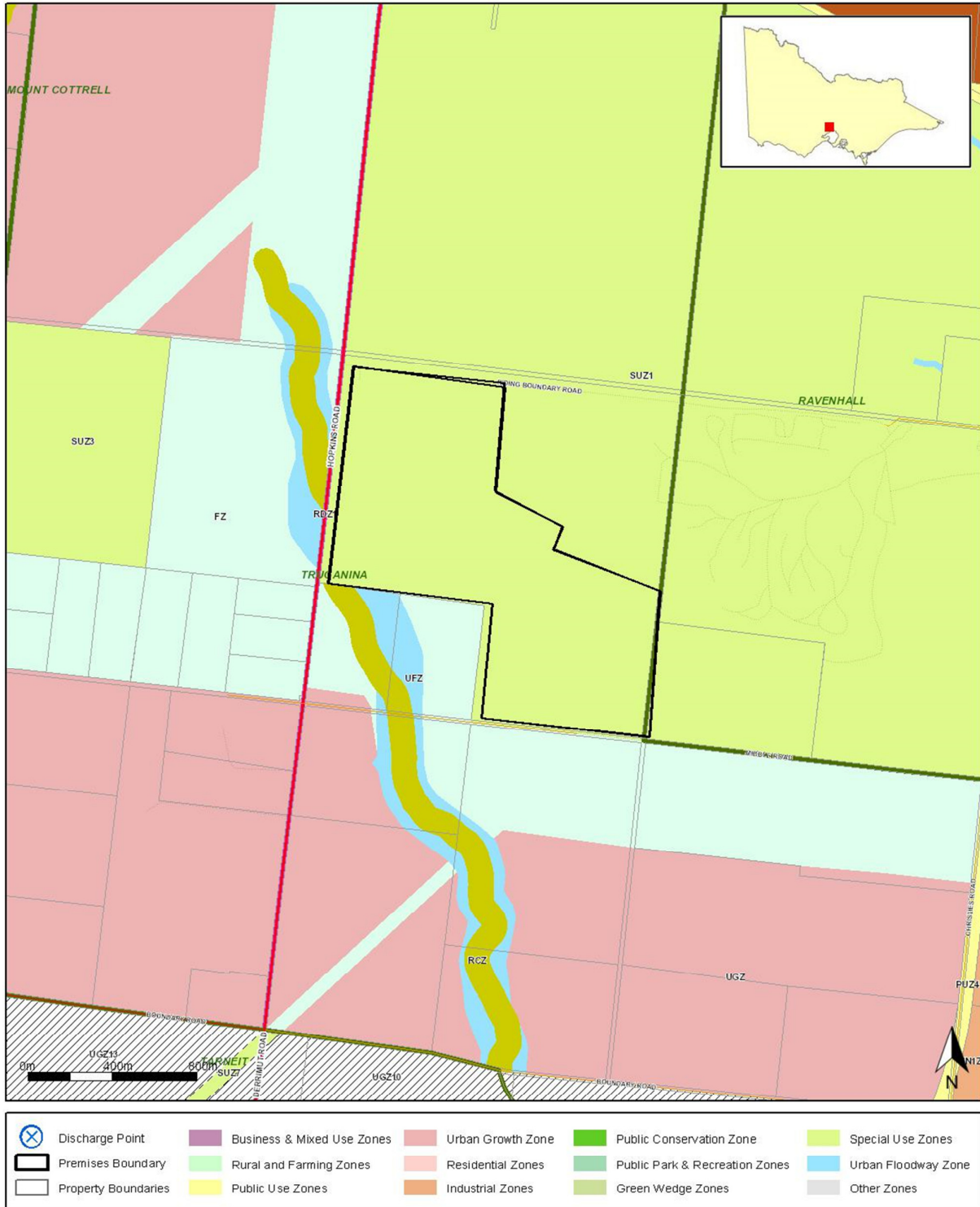


Figure 28: Location Plan showing the WA boundary

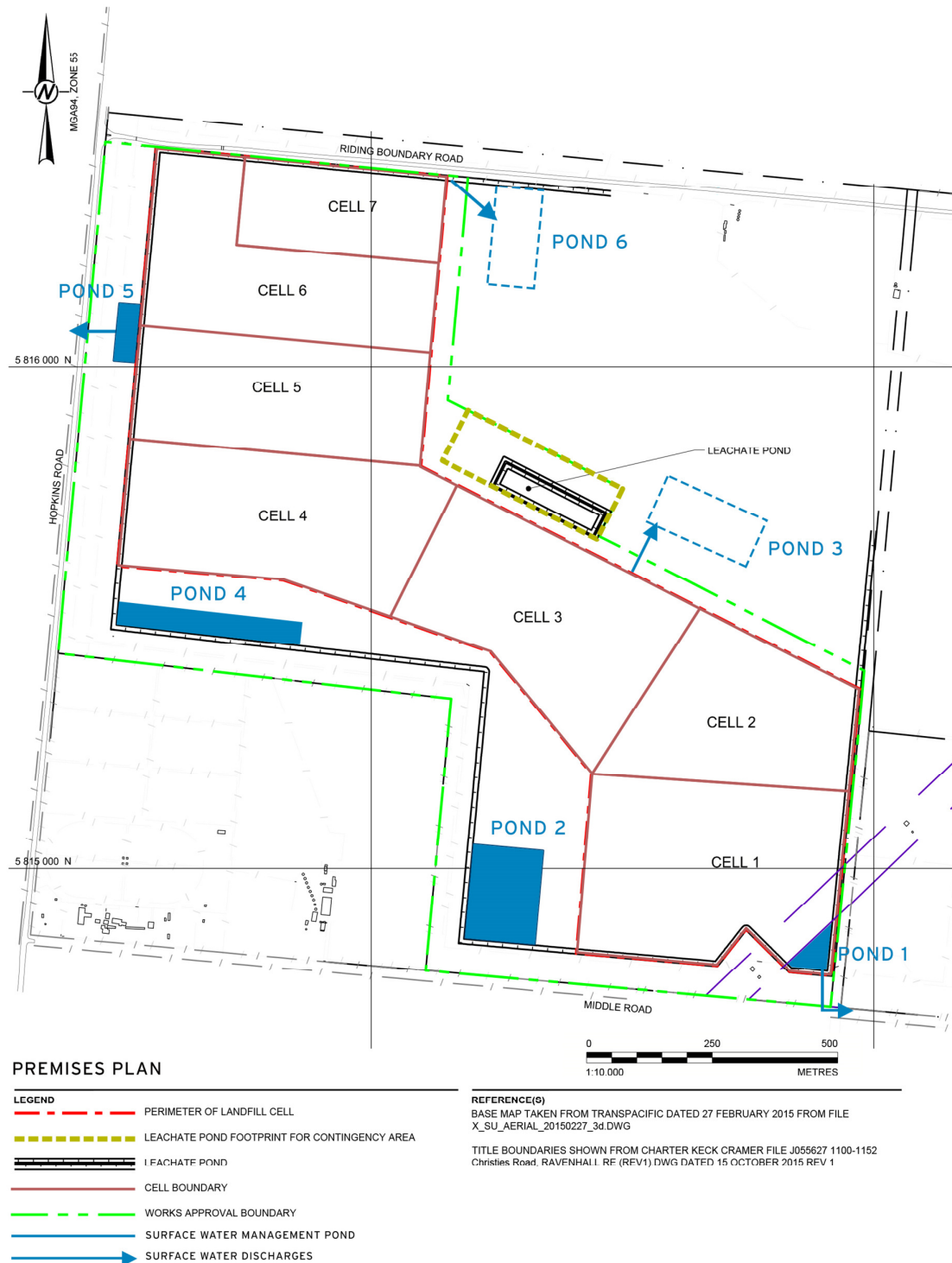


Figure 29: Premise Plan showing the boundary of the individual landfill cells

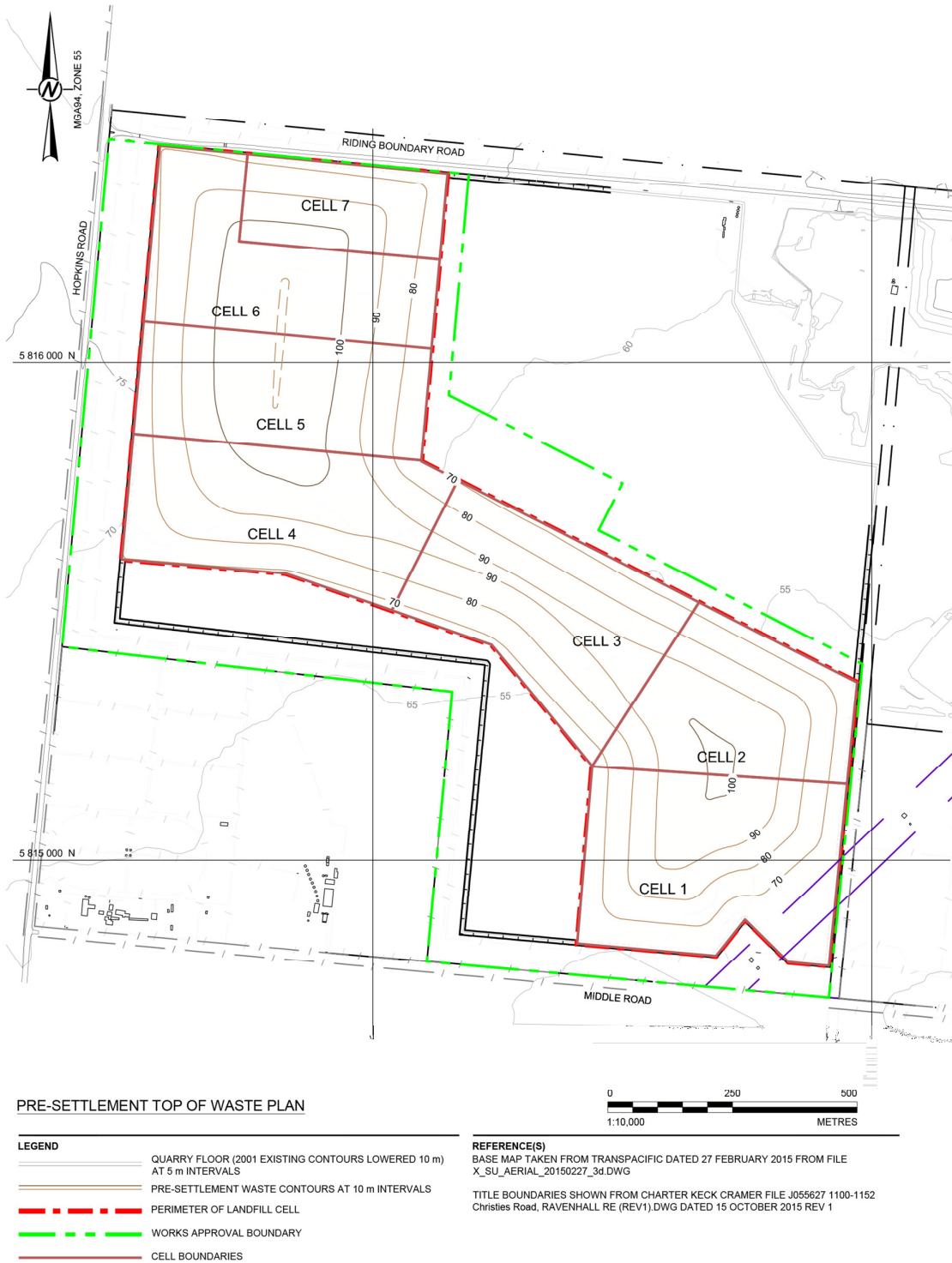


Figure 30: Pre-settlement Contour Map for the top of waste

- 5.6 The following WA conditions are proposed.

## **GENERAL WA CONDITIONS**

### **WA\_G1**

- 5.7 Subject to the following conditions, this approval allows the construction of the following works and associated equipment - a landfill for the deposit of solid inert waste, putrescible waste, pneumatic tyres shredded into pieces <250 mm, and contaminated soil (N121 Cat C) as defined in EPA Publication 631, Industrial Waste Resource Guidelines, Solid Industrial Waste Hazard Categorisation and Management, dated July 2009.

### **WA\_G2**

- 5.8 The works must be constructed in accordance with the application accepted on 13 May 2016 comprising the application received on 29 February 2016 as augmented by additional information received on 13 May 2016, 23 September 2016, 30 November 2016 and 9 December 2016 as identified in the documents listed in Appendix A of this Works Approval restricted to the South Portion as shown on Schedules 1A, 1B and 1C ("the application") except that, in the event of any inconsistency arising between the application and the conditions of this approval, the conditions of this approval shall apply.

### **WA\_G3**

- 5.9 This approval will not take effect until any permit which is required under the Planning and Environment Act 1987 has been issued by the Responsible Planning Authority.

### **WA\_G4.1**

- 5.10 This works approval will expire:
- (a) on the issue or amendment of a licence relating to all works covered by the works approval; or
  - (b) on the issue of written notification from EPA confirming that all works covered by the works approval are complete and that no licence or licence amendment is required to operate the works; or
  - (c) eight years from the date of issue unless the works have been commenced by that date to the satisfaction of EPA.

### **WA\_G6**

- 5.11 You must maintain a financial assurance calculated in accordance with the EPA method.

### **WA\_G6.3**

- 5.12 You must submit the financial assurance instalment determined by the EPA for each landfill cell prior to the addition of the cell to the licence.

## **WORKS CONDITIONS**

### **WA\_W1**

- 5.13 Before commencing construction of the following components of the works, you must provide to EPA a report or reports with the plans and specifications of those components, including details of:



- (a) the geotechnical stability assessment including material characteristics and specifications, with supporting evidence, demonstrating total geotechnical stability for each landfill cell or leachate pond;
  - (b) the drainage layer for groundwater collection for each cell or leachate pond which shall be placed with minimum 2m separation from the top of the liner of the leachate sump of the cell or the top of the liner of the leachate pond;
  - (c) the plans, the technical specifications and a construction quality assurance plan (CQA plan) (“design documents”), assessed by an EPA-appointed auditor, in accordance with the procedures outlined in EPA Publication 1323.3 (Landfill Licensing Guidelines) (as amended from time to time), for the design and construction of each landfill cell and leachate pond prior to submission for EPA approval. The plans, technical specifications and CQA plan must comply with the Works Approval Application, the liner configuration given in Figure 27 (No 1528407) of Appendix B included in Doc 2, drainage layer referred to in condition WA\_W1 (b) and EPA Publication 788.3 Best Practice Environmental Management (Siting, Design and Management of Landfills) (as amended from time to time);
  - (d) for each cell or leachate pond the name of the environmental auditor, appointed under the Environment Protection Act 1970, engaged by you to conduct the audit required under WA\_R1; and
  - (e) designs of the environmental monitoring network infrastructure to include landfill gas, odour, dust, groundwater and surface water monitoring for the premises.
- WA\_W2
- 5.14 You must not commence construction of those parts of the works for which reports are required by condition WA\_W1 until written EPA approval of those reports has been received.
- WA\_W3
- 5.15 Where any reports specified in condition WA\_W1 and approved by EPA differ from the application, the works must be constructed in accordance with those approved reports.
- WA\_W4
- 5.16 You must notify EPA when the construction of the works covered by this approval has been commenced.
- WA\_W5
- 5.17 You must notify EPA when the construction of the works covered by this approval has been completed.
- WA\_W8
- 5.18 You must install:
- (a) additional groundwater monitoring bores in both the Upper Newer and Lower New Volcanic aquifers;
  - (b) noise abatement and barriers as identified as being required to protect nearby receptors such as on Middle Road and as identified by the noise report required in condition WA\_R4 below;

- (c) fencing around the perimeter of the premise including 12m high litter fencing in key areas to prevent litter escaping the premise;
- (d) litter traps on stormwater drains;
- (e) mobile nets near the tip face;
- (f) a wheel wash on the egress road;
- (g) a leachate collection system and a leachate pond with a capacity sufficient to maintain leachate levels such that the depth of leachate above the lowest point of the drainage layer does not exceed 300 millimetres.;
- (h) a landfill gas collection system to a design approved by the EPA;
- (i) a landfill gas detection bore network around the perimeter of the landfill cells and at the premise boundary to a minimum frequency that meets Table B2 of EPA Publication 788.3 Best Practice Environmental Management (Siting, Design and Management of Landfills) (as amended from time to time) and identified in the approved Landfill Gas Management and Monitoring Plan;
- (j) fire fighting equipment including on-site water trucks that must be available on-site at all times; and
- (k) dust monitors detailed in condition WA\_W1(e) and approved by WA\_W2.

WA\_W15

- 5.19 During construction, unacceptable noise (including vibration) must not be emitted beyond the boundaries of the premises.

WA\_W16

- 5.20 During construction, stormwater discharged from the premises must not be contaminated with waste.

WA\_W17

- 5.21 All construction activities must be undertaken in accordance with EPA Publication 480 "Environmental Guidelines for Major Construction Sites" (1996).

WA\_W18

- 5.22 During construction, you must undertake an environmental monitoring program that enables you and EPA to determine compliance with condition(s) WA\_W15 and WA\_W16.

## **REPORTING CONDITIONS**

WA\_R1

- 5.23 At least 2 months before the commencement of any commissioning, you must provide to EPA a report that include(s):
- (a) the need for landfilling at the site, as demonstrated by the presence of the site on the landfill schedule in the Statewide Waste and Resource Recovery Infrastructure Plan and the Metropolitan Waste and Resource Recovery Implementation Plan (and any future successor or replacement policy documents);

(b) an environmental audit report, under S53V of the EP Act on the risk of harm and confirming construction compliance in accordance with EPA approved reports as set out in condition WA\_W2 above;

(c) a report which details liner leak detection test results for each cell liner and the person who conducts and reports the liner leak detection survey should be independent to the contractor who constructs the landfill cell or leachate pond;

(d) details of how you have informed the community through the Melbourne Regional Landfill Community Reference Group (MRLCRG) or alternative engagement activities of the progress regarding the construction of cells and leachate pond and the progressive rehabilitation of the landfill. This must include explanations about how any issues or concerns raised have been considered; and

(e) the environmental performance of the preceding cells as determined by the monitoring required in the monitoring and management plans identified in WA\_R4.

#### WA\_R4

5.24 Before the commencement of any commissioning, you must provide, to the satisfaction of EPA, a report that includes:

(a) a Dust Management Plan incorporating Air Monitoring Program & Dust Deposition including but not limited to;

(i) Implementation of best practice airborne particulate and dust control measures that also includes adaptive operational practices to respond and control dust events on site;

(ii) real time PM10 air monitoring that enables an assessment of air quality impacts and triggers reactive management practices to be implemented during dust events on site;

(iii) dust deposition monitoring that enables an assessment of nuisance dust impacts;

(iv) a review of the effectiveness of the particulate and dust control measures in light of the monitoring data produced from (ii) and (iii) above and the relevant standards for the control of airborne particulate and dust;

(v) provision of surveillance or monitoring records to the MRLCRG, the Responsible Authority and the Authority; and

(vi) the approved Dust Management and Monitoring Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.

(b) an Odour Monitoring and Management Plan which should detail the odour management controls and monitoring regime to be undertaken during the life of the landfill including but not limited to:

(i) identification of potential odour sources and receptors;

(ii) specifying the odour mitigation measures and procedures to manage the odour impact off-site of the various potential odour sources and to mitigate the off-site odour impacts;

- (iii) comprehensive monitoring practices, including surveillance by independent and appropriately trained personnel;
  - (iv) procedures for addressing the odour source if a complaint is verified, including consideration of any mitigation measures or operational changes that might be required;
  - (v) provision of surveillance or monitoring records to the MRLCRG, the Responsible Authority and the Authority;
  - (vi) incorporation of a requirement to assess new odour management technologies or tools on a regular basis; and
  - (vi) the approved Odour Monitoring and Management Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.
- (c) a Landfill Gas Monitoring & Management Plan including but not limited to:
- (i) details (numbers and locations) of landfill gas perimeter monitoring bores consisting of an inner and outer network located within the premises between the landfill cells and premises boundary to be monitored monthly. The inner network should be at least 20m distant from the edge of the waste and the outer layer should be at the premises boundary. The landfill gas perimeter monitoring bore spacings must meet the recommended spacings in Table B.2 of EPA Publication 788.3 Best Practice Environmental Management (Siting, Design and Management of Landfills) (as amended from time to time);
  - (ii) the sequencing for the design and installation of the landfill gas extraction system in each cell;
  - (iii) the sequencing for the design and installation of the horizontal gas wells in each active cell;
  - (iv) the sequencing for the approval and installation of gas engines, gas flares and ancillary equipment including increases in the electrical interconnection for the gas engines;
  - (v) a program of inspection and maintenance of landfill gas extraction and monitoring infrastructure including provision of standby equipment; and
  - (vi) a schedule of landfill gas well balancing frequency and condensate management.
- (d) a Groundwater Monitoring and Management Plan including but not limited to:
- (i) updating the Conceptual Site Model to illustrate the hydrogeology, surrounding land uses and receptors more comprehensively;
  - (ii) completion of a groundwater bore network performance audit and undertaking of any remedial repairs, if required;
  - (iii) installation of additional groundwater monitoring bores in both the Upper Newer and Lower Newer Volcanic Aquifers;
  - (iv) preparation of and maintenance of a groundwater bore network register where a summary tabulation of groundwater bore construction, describing the condition of

each bore, the aquifer monitored, and the registered bore ID that is recorded in the State Water Management Information System are kept;

(v) improved groundwater quality sampling, testing and monitoring to additionally include groundwater depth; and

(vi) setting of appropriate trigger points and actions, should exceedances occur.

(e) a Surface Water Monitoring and Management Plan including but not limited to;

(i) sampling of water at retention points prior to discharge to the environment and downstream of the site in Skeleton Creek;

(ii) visual inspection of sediment and erosion control facilities and other potential sources of contamination;

(iii) a sampling plan and methods consistent with those in EPA publication IWRG701; and

(iv) routine testing of stormwater for, but not limited to, the following physio-chemical parameters: total phosphorus and nitrogen, turbidity, electrical conductivity, pH, and dissolved oxygen with occasional testing for heavy metals and indicators of leachate. The sampling frequency and reporting is to be agreed with EPA as are the action levels for each parameter.

(f) a Noise Management and Monitoring Plan including but not limited to:

(i) an assessment of the current background noise levels;

(ii) a calculation of the permissible noise levels for operation and construction undertaken in accordance the techniques in State environment protection policy (Control of Noise from Commerce, Trade and Industry) No N-1 ("SEPP N1");

(iii) modelling showing noise from the landfill meets the permissible noise levels of SEPP N1;

(iv) an assessment showing that the equipment being used minimises the noise emitted as far as practicable;

(v) a monitoring program for assessment of the noise from construction and operation of the landfill, and effectiveness of the noise abatement (including barriers) being applied. This may include the definition of derived point(s) located in accordance with SEPP N1;

(vi) identifying and detailing the noise abatement measures proposed which are being relied upon to meet the permissible noise levels of SEPP N1; and

(vii) milestones to be used for updating and submitting any amendments to the monitoring, assessments and noise abatement required by the noise management plan. The noise monitoring data from each cell construction and operation to be used to confirm the assumptions in modelling and identification of any amendments to the plan and required noise abatement for subsequent cells.

(g) Fuel Use Minimisation Plan to seek more efficient use of energy during construction and operation of the landfill including but not limited to consideration of alternatives such as:

(i) vehicle and equipment use;

(ii) LFG collection and treatment;

promotion of waste minimisation programs;

(iii) use of alternative fuels and engines; and

(iv) improved driver training and fleet maintenance.

(h) an Environmental Management Plan detailing measures to manage potential environmental impacts. The approved Environmental Management Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.

(i) a Vermin Management Plan detailing measures to reduce disease vectors at the landfill and the spread of vermin from the landfill to the surrounding area. The approved Vermin Management Plan must be implemented to the satisfaction of the Authority and must be reviewed, and if necessary, updated every 5 years to the satisfaction of the Authority.



## 6 CONCLUSIONS

- 6.1 Landfill Operation's WAA was assessed for the construction of 16 new landfill cells in to two portions (North and South) to create a total additional landfill airspace volume of 53 million cubic metres. Landfilling is proposed to commence in 2025 and continue for 30 years, operating 24 hours a day, seven days a week. The proposals for the Type 2 Landfill have been designed to meet the Landfill BPEM. Following the disposal phase, the landfill would be progressively rehabilitated in accordance with a Rehabilitation Plan to form a safe and stable landform. The proposed end use is open space.
- 6.2 EPA technically assessed Landfill Operation's WAA (as described in Section 2), taking into account the local community's views, in addition to the recommendations made by the Chairman of the Planning Panel Hearing and section 20B Conference), referral agencies and ILEAP. Peer reviews of the odour modelling and stormwater management plan commissioned by the EPA were also considered in the assessment. As part of the assessment process, EPA identified and considered the following key issues:
- Landfill Operation's and Cleanaway's track record
  - air
  - odour;
  - landfill gas
  - groundwater
  - surface water
  - noise
  - greenhouse gas emissions
  - water use
  - climate change
  - soil resources and land
  - human health
  - compliance with section 50C of the EP Act
  - compliance with the Landfill WMP and Landfill BPEM
  - compliance with the environmental protection principles of the EP Act.
- 6.3 The assessments concluded that the WAA is:
- consistent with SWRRIP, with the exception of the proposed timeframe of the landfill, which at 30 years, exceeds the identified need stated in the SWRRIP
  - identified in the 2016 MWRRIP landfill schedule but EPA notes that the proposed landfill's timeframe exceeds the identified need for landfilling stated in the MWRRIP
  - compliant with the relevant SEPPs
  - compliant with Landfill WMP requirements – in particular landfill siting requirements

- compliant with the Landfill BPEM, on the condition that further detailed design information be provided prior to the start of landfill construction
  - not expected to adversely affect the interests of any person other than the applicant
  - not expected to adversely affect the quality of any segment of the environment nor cause pollution or environmental hazard
  - partially consistent with the Environment Protection Principles of the EP Act
  - made by a fit and proper person/corporation
  - have not been objected to by DHHS.
- 6.4 In its assessment of the WAA against the Environment Protection Principles, EPA considered that several principles were only partially met. However, EPA identified that these principles could be met if the proposal in the WAA was reduced. The principles not met by the original proposal were:
- Principle 1B - Integration of economic, social and environmental considerations, the issue being the scale of the proposals in the WAA, and the disproportionate effects likely to be experienced by the local community, even with a landfill with compliant
  - Principle 1D - Intergenerational equity the issues being the duration of the landfilling proposed and the locking in of landfilling at the site in the ever changing waste management arena
  - Principle 1I - Waste Hierarchy: the issue being that although the WAA is for a BPEM compliant scheme, landfilling is at the bottom of the waste hierarchy and that the WAA would lock in landfilling at the site when the need for landfilling may change during the lifetime of the proposed landfill.
- 6.5 Taking all the conclusions into consideration, EPA has issued a WA that is not to the full extent of the landfill applied for by Landfill Operations, and that the WA will be subject to strict conditions. The extent of the WA issued is limited to the seven cells in the South Portion - an area of 96 hectares, providing 23.3 million cubic metres of airspace, and 13 years of landfilling (2025 to 2038).
- 6.6 In coming to this recommendation, EPA is consistent with government waste management policy (the SWRRIP and MWRRIP) that set out the need for the proposed landfill, but only until the years 2044 and 2046 respectively. As such, the WAA as proposed by Landfill Operations would have extended 9 years past the identified need and EPA is not prepared to approve a duration longer than the published plans. Additionally, EPA recognised that the South Portion of the proposed landfill can operate independently having its own leachate, stormwater and LFG systems.
- 6.7 The WA issued will be subject to a series of conditions, which help define that the extent of the approval is for the South Portion only. The conditions also require specific activities to be undertaken - some prior to the commencement of construction and others that will extend throughout the lifetime of the landfill's operation. They include:
- reporting requirements
  - a requirement for the provision of a Financial Assurance to an amount agreed with the EPA

- a requirement for the provision of detailed design documents for written approval prior to commencement of any construction
  - requirements for the inclusion of the additional design and management measures identified by EPA within the final designs
  - requirements for the development and implementation of odour, groundwater, surface water and LFG monitoring and management plans
  - engagement of an environmental auditor (appointed under the EP Act) to prepare an environmental audit report (in accordance with s.53V of the Act) in relation to the construction of a new landfill cell or the leachate collection pond.
- 6.8 It is highlighted that the WA is dependent on Landfill Operations obtaining a valid planning permit, and that Landfill Operations will still need to obtain an EPA Licence to commence disposing of waste in the proposed cells.

## 7 REPORT DATE

**Date:** 25 March 2017

## APPENDIX A LIST OF APPLICATION DOCUMENTS

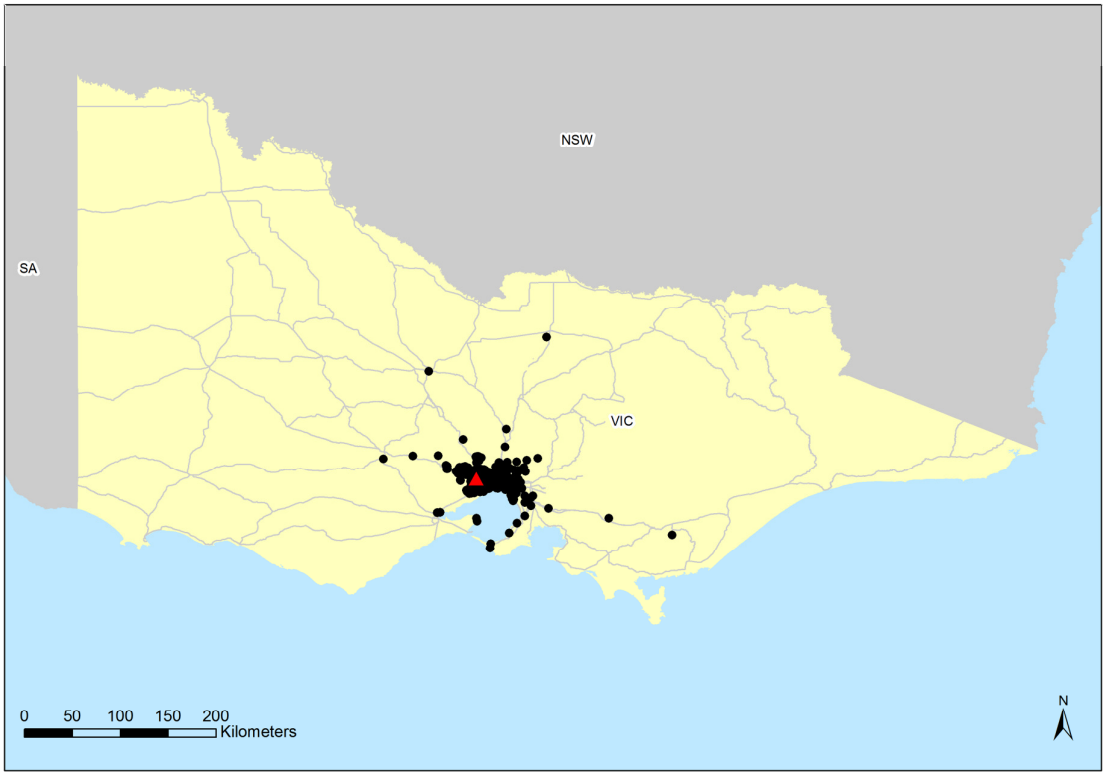
1. Works Approval Application, Proposed Melbourne Regional Landfill (MRL) Extension, Ravenhall, February 2016
2. Information to Support Works Approval, Proposed Melbourne Regional Landfill (MRL) Extension, Ravenhall, Golder Associates, February 2016 including:
  - Appendix A: Needs Assessment
  - Appendix B - Figures
  - Appendix C - Financial assurance - 'commercial-in-confidence' not provided
  - Appendix D - Hydrogeological assessment
  - Appendix E - Ecological assessment
  - Appendix F - Greenhouse gas estimate
  - Appendix G - Leachate management plan
  - Appendix H - Landfill gas management plan
  - Appendix I - Traffic impact assessment
  - Appendix J - Air quality assessment
  - Appendix K - Noise assessment
  - Appendix L - Stormwater management plan
  - Appendix M - Landscape and visual impact assessment, including Annex A: Parameters of human vision and Annex B: Photomontage VP01, VP02, VP05, VP07, VP10, VP13, VP16
  - Appendix M - Landscape and visual impact assessment Annex C: Rehabilitation Plan
  - Appendix N - Monitoring program
  - Appendix O - Aftercare management plan
3. Supplementary Information to Works Approval Proposed Melbourne Regional Landfill (MRL) Extension, Ravenhall, Golder Associates, May 2016 including an updated Appendix J Air Quality Assessment which replaces that provided in February 2016
4. Further information provided by Landfill Operations, 23 September 2016 in response to section 22 Notice of 7 September 2016, comprising:
  - Cover letter;
  - Tabulated response; and
  - Extracts from Cleanaway's Landfill standards operations manual on vermin and bird control.
5. Landfill Operations response to the written submissions, presented to the MRL Planning Panel comprising:

- Landfill Operations response to submissions
  - Table of Landfill Operations response to submissions
  - Expert witness statement of Andrew Green (landfill)
  - Expert witness statement of Tony Kortegast (needs assessment)
  - Expert witness statement of Tony Kortegast (buffers and landfill gas)
  - Expert witness statement of Alex Todoroski (odour)
  - Expert witness statement of David Ife (hydrogeological assessment)
  - Expert witness statement of Christopher Delaire (acoustics)
  - Expert witness statement of Michael Barlow (planning)
  - Expert witness statement of Stephen Hunt (traffic and transport assessment)
  - Expert witness statement of Allan Wyatt (landscape and visual assessment)
6. Further information provided by Landfill Operations, provided on 9 December 2016 in response to section 22 Notice of 7 September 2016, comprising:
- a cover letter
  - Appendix 1: 'Response to hydrogeological Issues Raised by EPA Section 22 Notice of 21st October 2016 in relation to Melbourne Regional Landfill'
  - Appendix 2: 'Letter to EPA - Section 22 Notice Additional Information -Groundwater Levels'
  - Appendix 3: 'Section 7 only of the DRAFT Environmental Audit of Landfill Operations (s. 53V) ('
  - Appendix 4: 'Email to Cardno - Draft Audit Report - Melbourne Regional Landfill''
  - Appendix 5: 'MRL S22 Response letter - Geotechnical Stability of Sidewall batter and liner system'
  - Appendix 6: 'Memorandum - Further information re Section 22 Notice Additional Information, 1528407-057-M-Rev0'

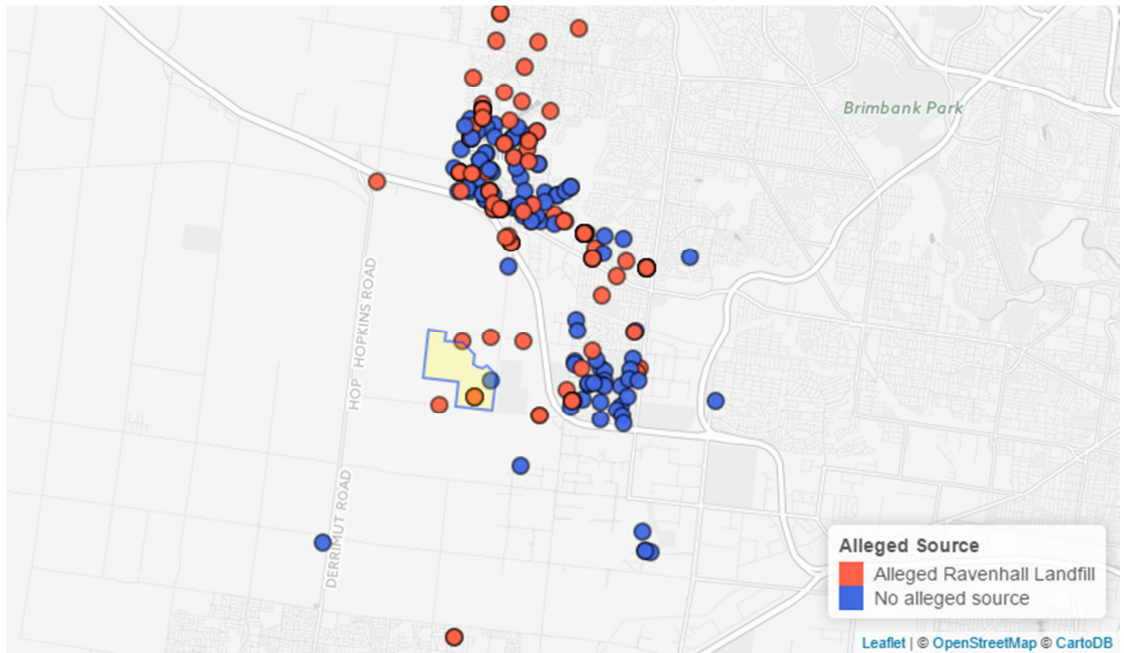




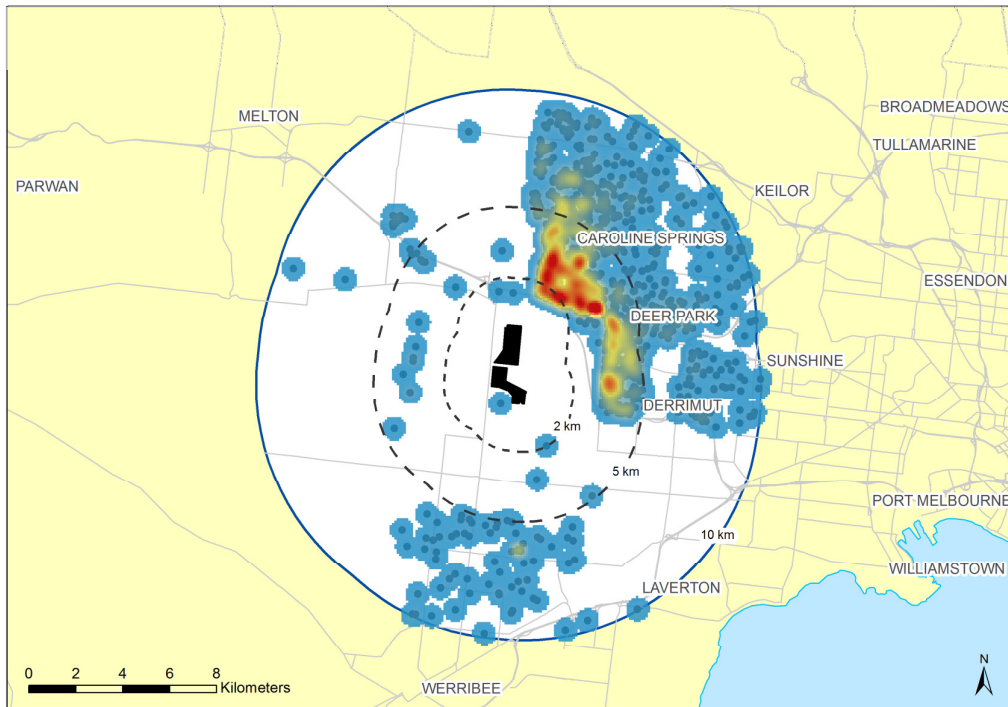
# **APPENDIX B      SPATIAL REPRESENTATION OF ISSUES RAISED IN SUBMISSIONS**



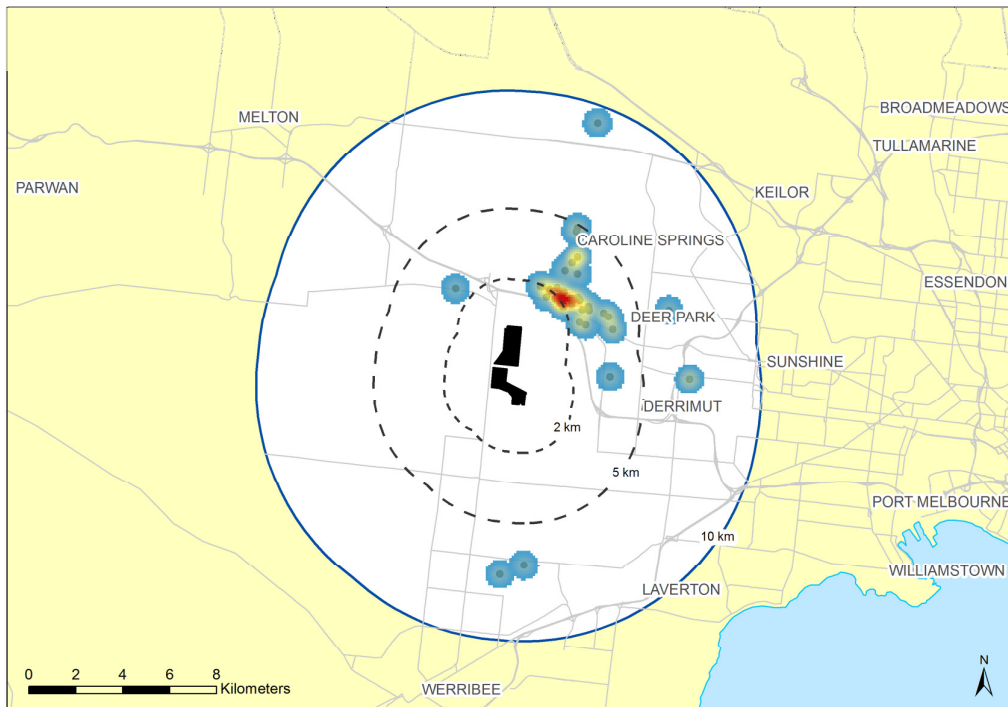
**Figure B.1: Map showing the locations of all submitters (including proforma submissions)**



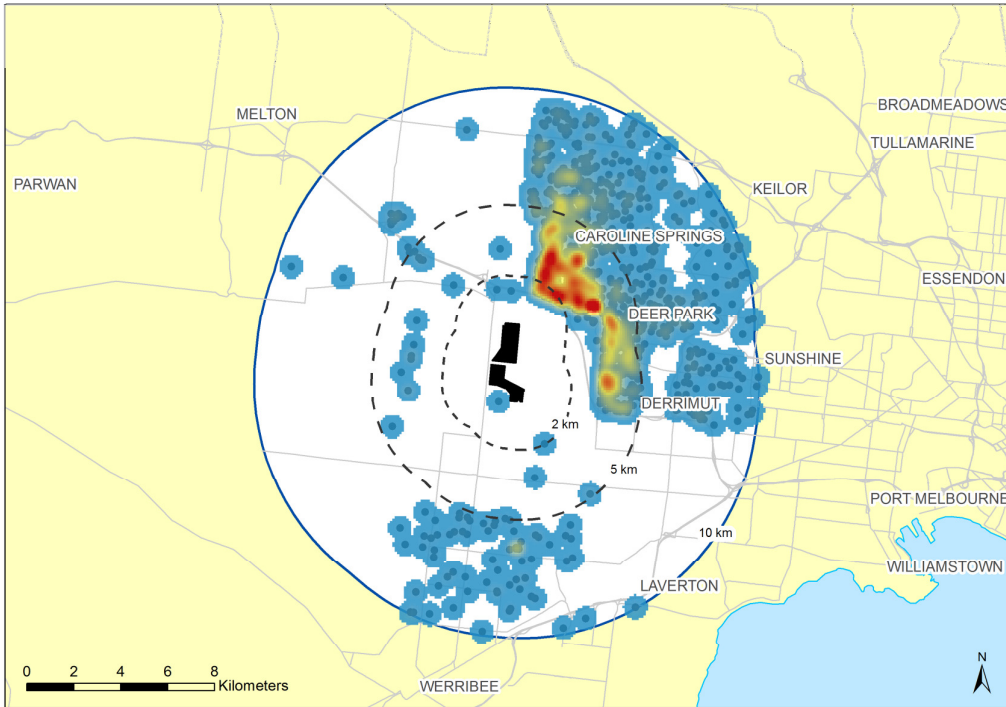
**Figure B.2: Map of pollution reports in the last year (08 Aug 2015 - 07 Aug 2016)**



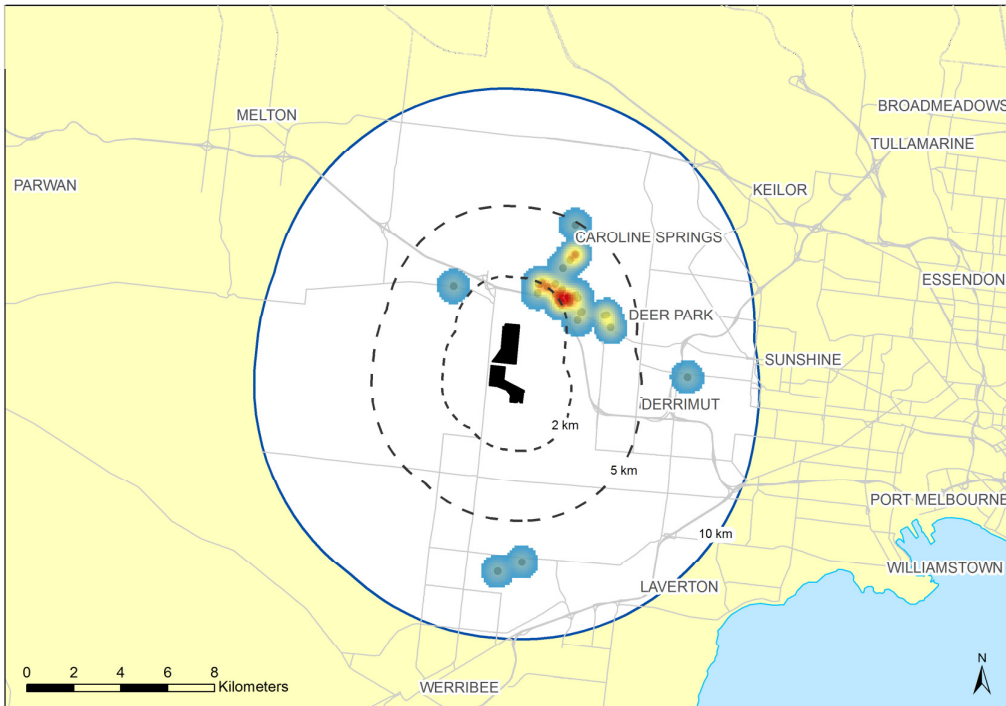
**Figure B.3: Showing the location of all submissions (including proformas) commenting on concerns on potential odour effects within 2, 5 and 10km of the Site**



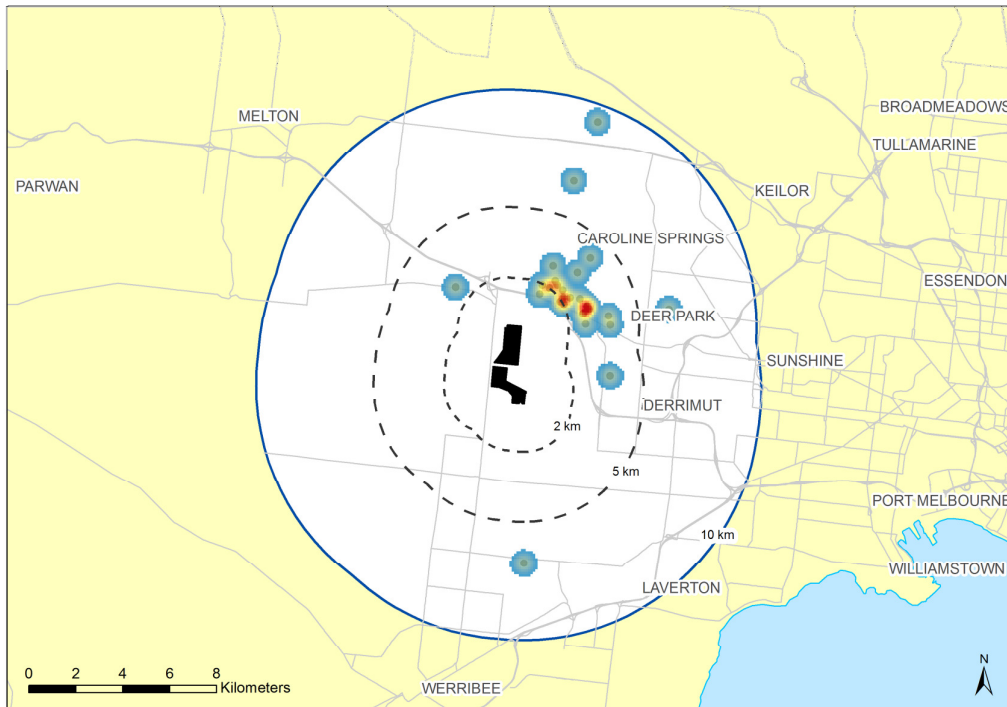
**Figure B.4: Showing the location of individual non-proforma submissions commenting on concerns on potential odour effects within 2, 5 and 10km of the Site**



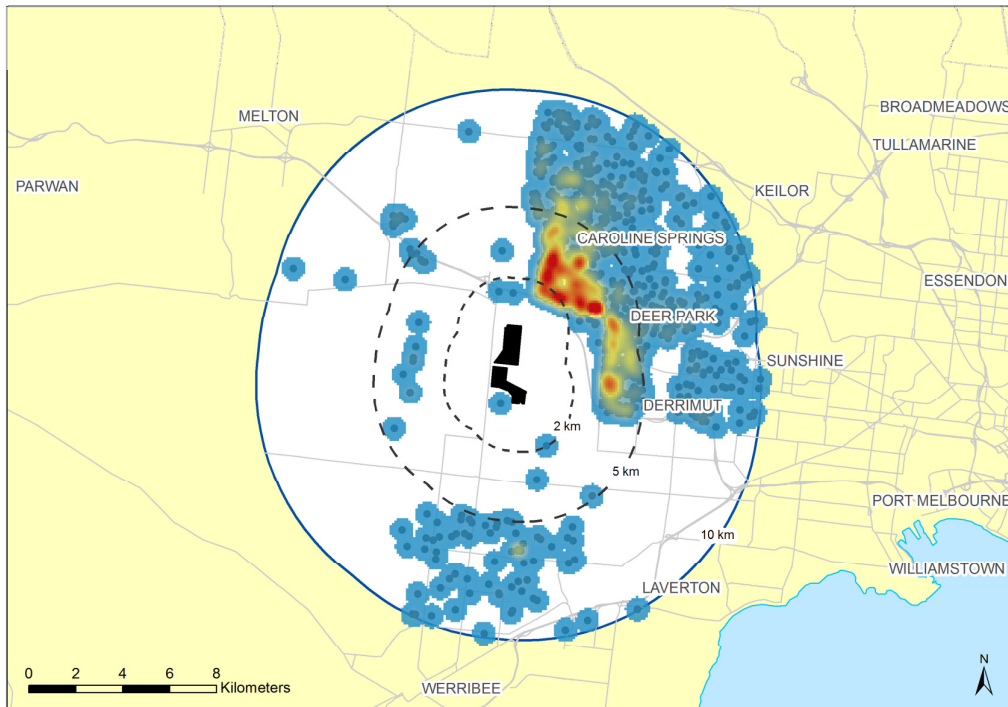
**Figure B.5: Showing the location of all submissions (including proformas) commenting on concerns on potential effects from traffic & truck movements within 2, 5 and 10km of the Site**



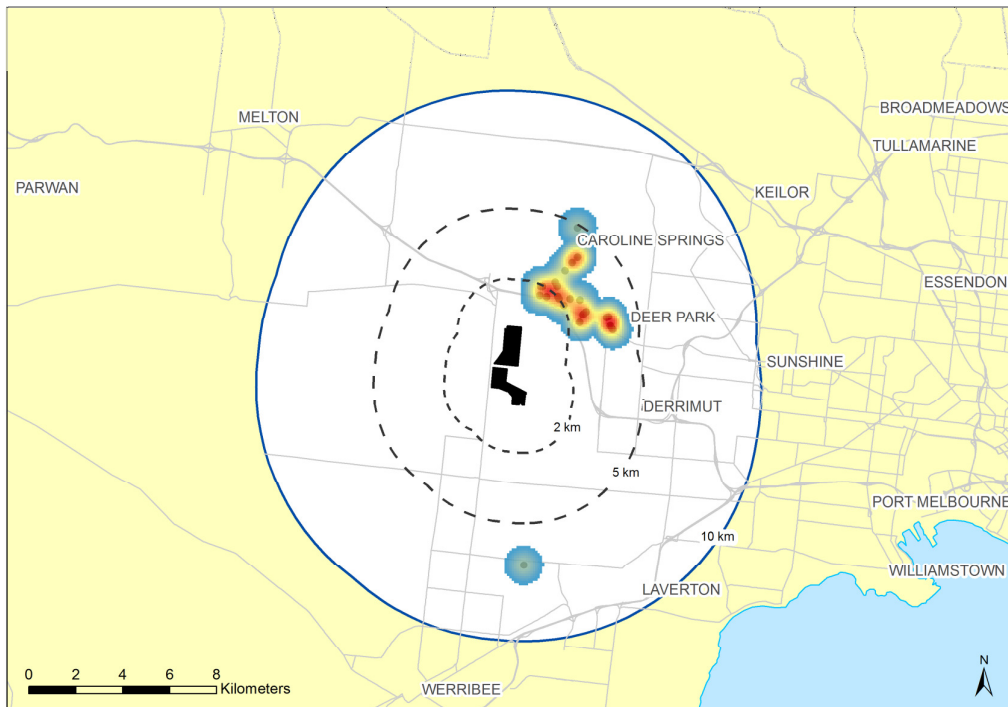
**Figure B.6: Showing the location of individual non-proforma submissions commenting on concerns on potential effects from traffic & truck movements within 2, 5 and 10km of the Site**



**Figure B.7: Showing the location of all submissions (including proformas) commenting on concerns on potential effects on health within 2, 5 and 10km of the Site. It is noted that health concerns were not an item included in the proforma submission.**

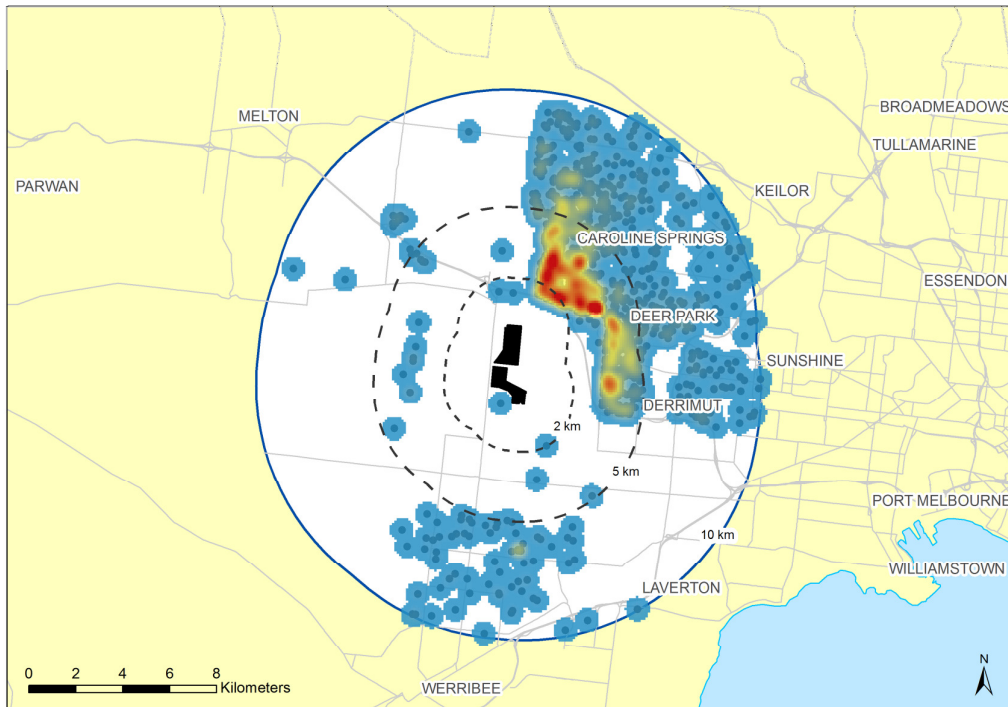


**Figure B.8: Showing the location of all submissions (including proformas) commenting on concerns on potential off-site amenities within 2, 5 and 10km of the Site**

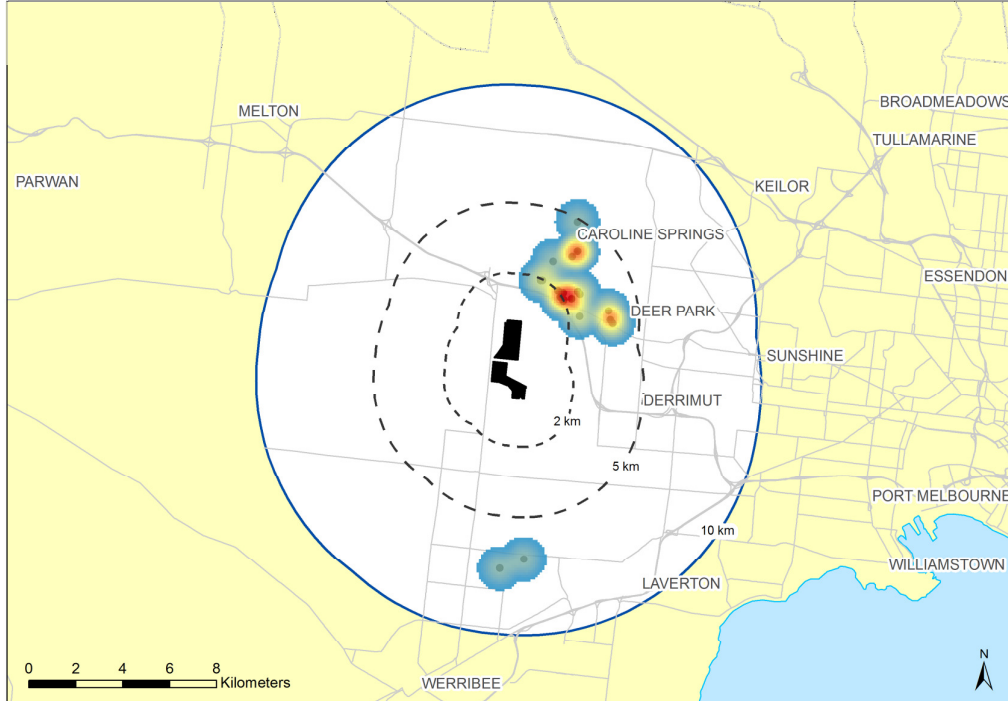


**Figure B.9 Showing the location of individual non-proforma submissions commenting on concerns on potential off-site amenities within 2, 5 and 10km of the Site**

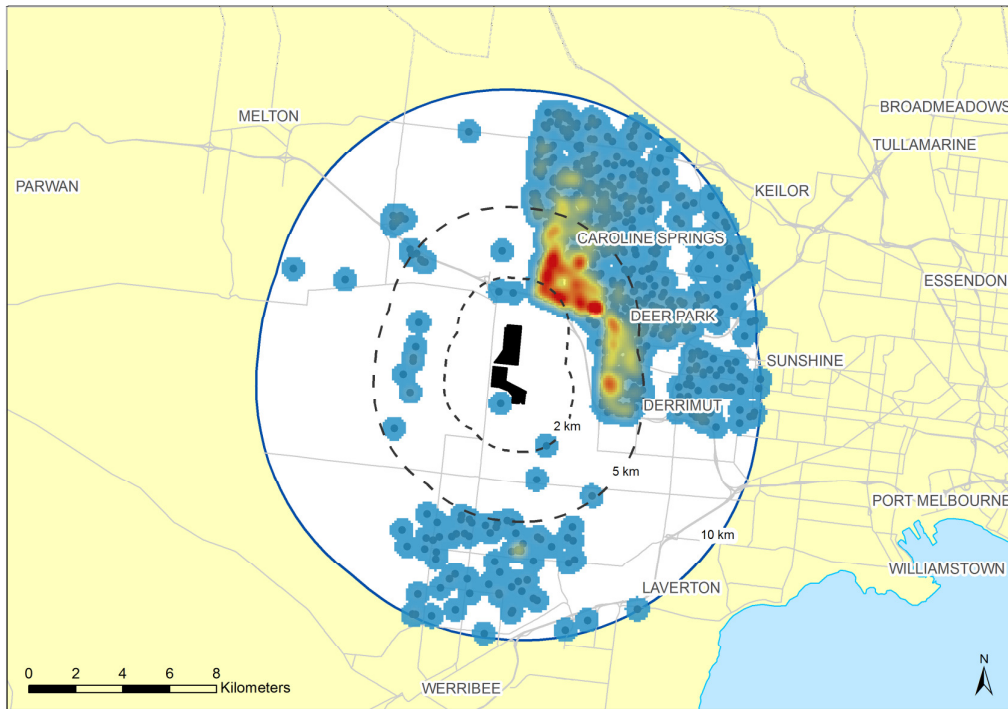




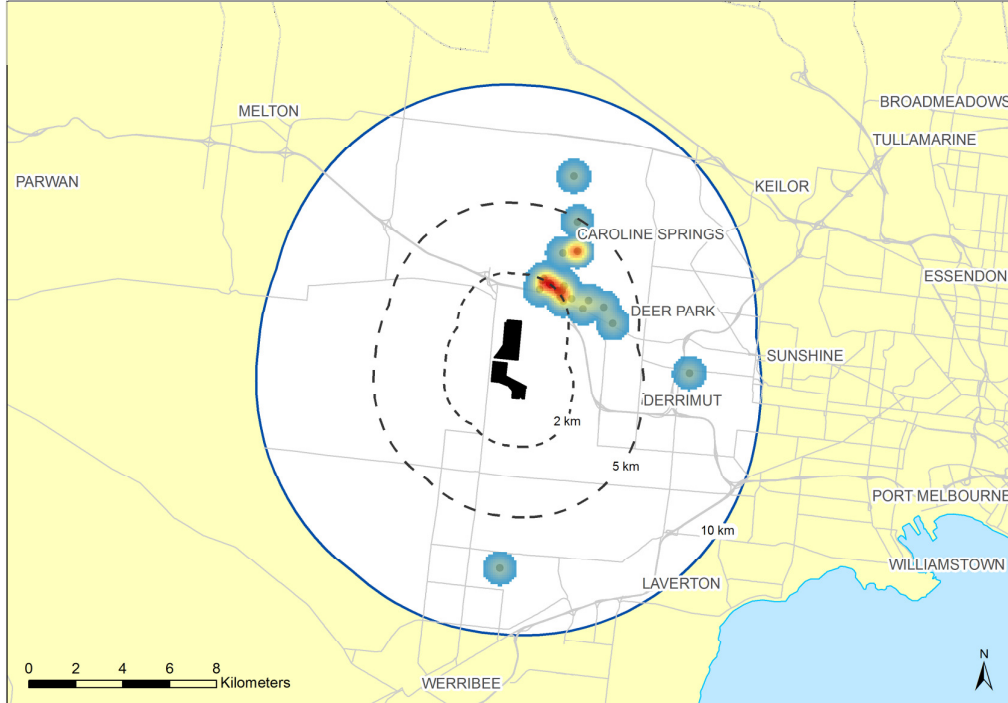
**Figure B.10: Showing the location of all submissions (including proformas) commenting on compliance history and track record within 2, 5 and 10km of the Site**



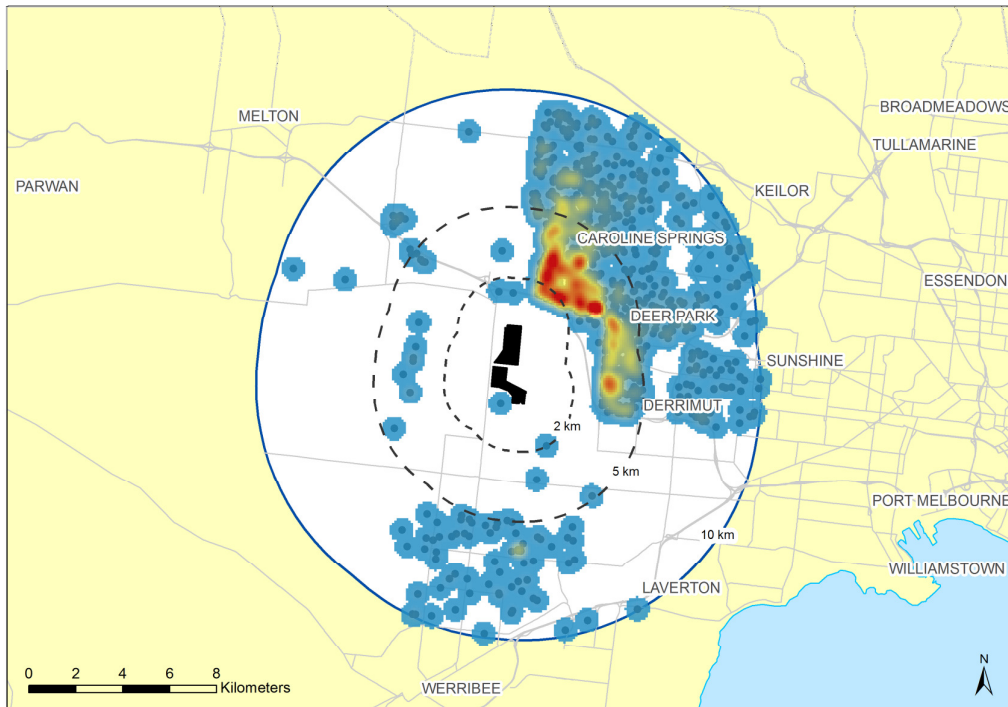
**Figure B.11: Showing the location of individual non-proforma submissions commenting on compliance history and track record within 2, 5 and 10km of the Site**



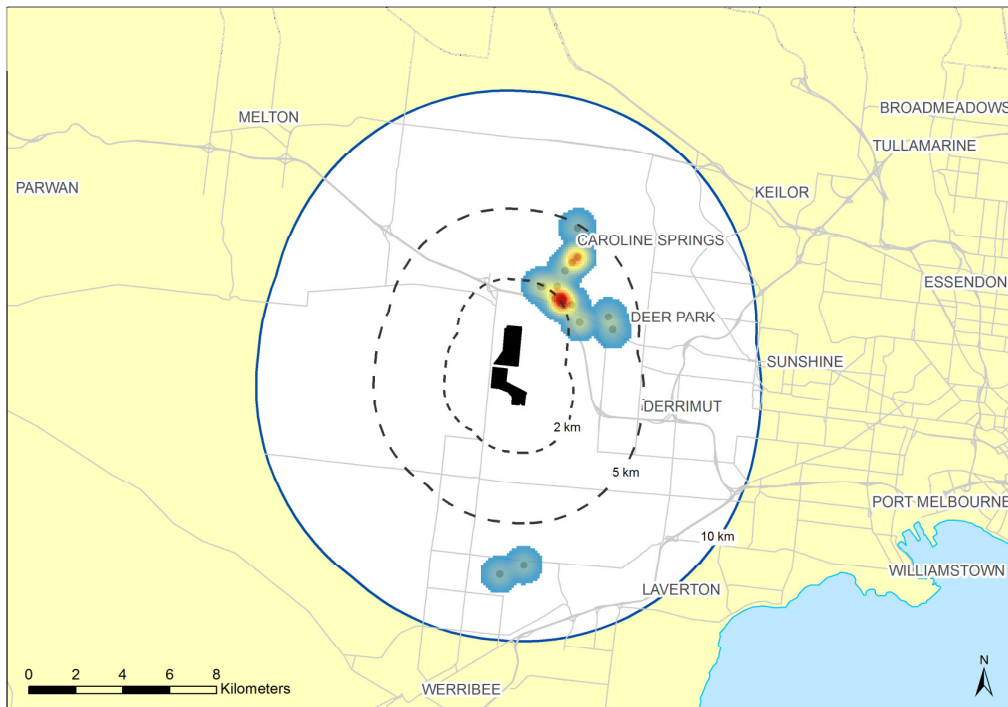
**Figure B.12: Showing the location of all submissions (including proformas) commenting on concerns on buffer within 2, 5 and 10km of the Site**



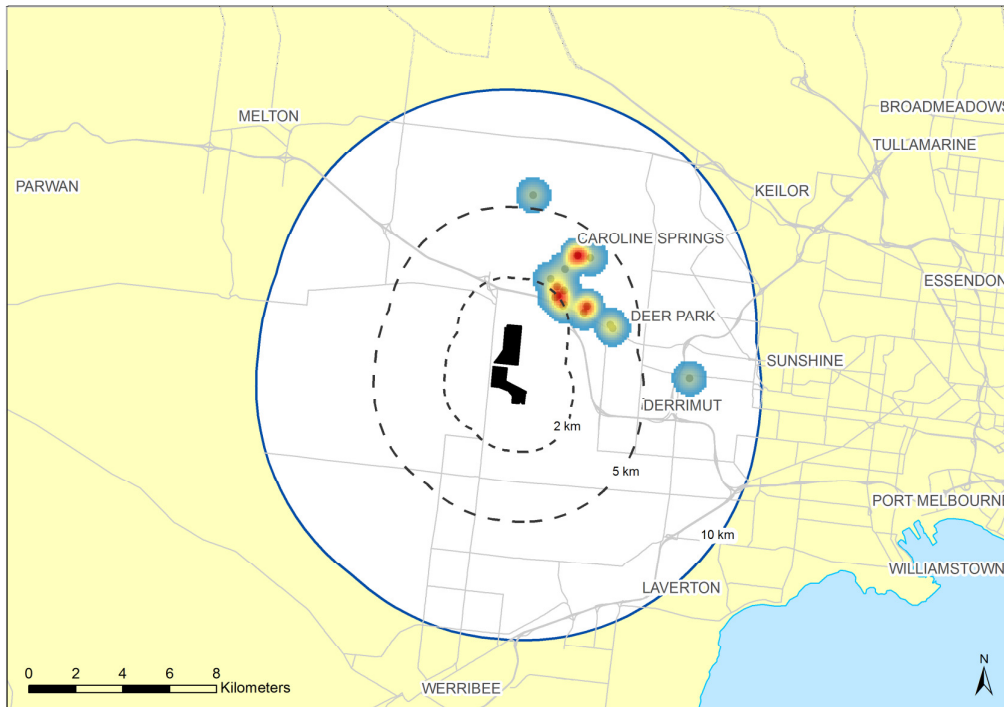
**Figure B.13: Showing the location of individual non-proforma submissions commenting on concerns on buffers within 2, 5 and 10km of the Site**



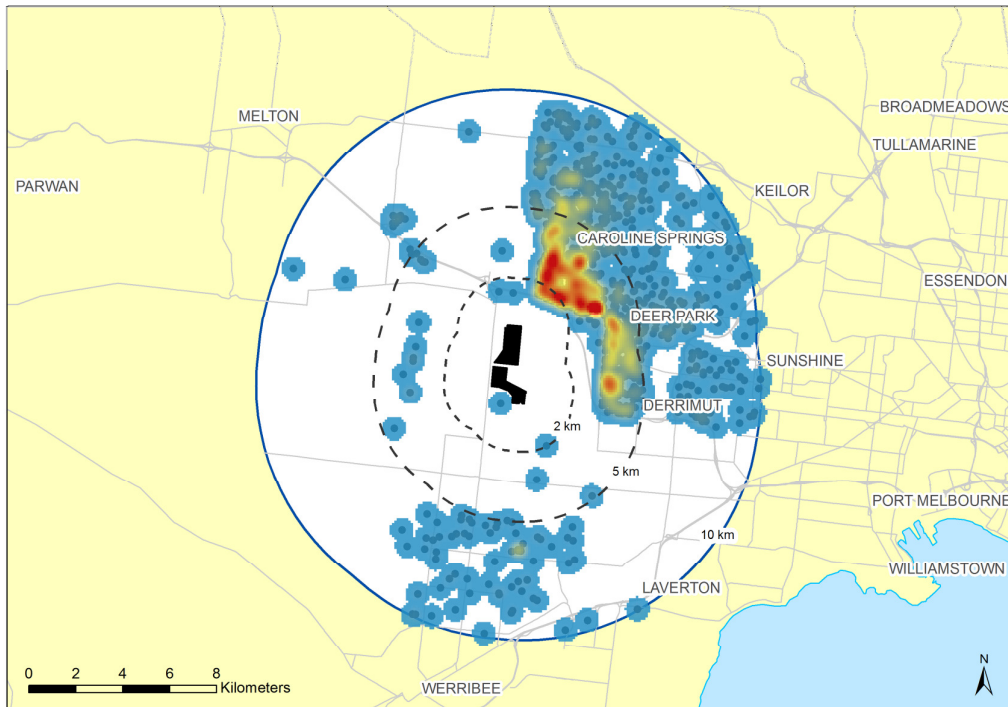
**Figure B.14: Showing the location of all submissions (including proformas) commenting on concerns on potential mud and litter impacts within 2, 5 and 10km of the Site**



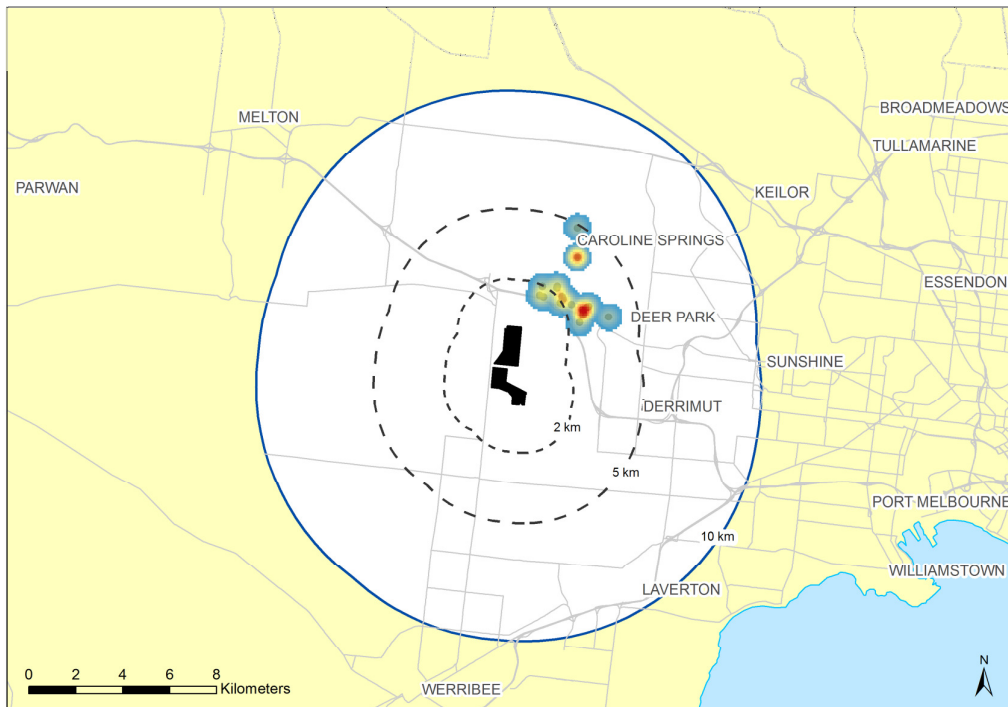
**Figure B.15: Showing the location of individual non-proforma submissions commenting on concerns on potential mud and litter impacts within 2, 5 and 10km of the Site**



**Figure B.16: Showing the location of individual non-proforma submissions commenting on concerns on siting within 2, 5 and 10km of the Site**



**Figure B.17: Showing the location of all submissions (including proformas) commenting on concerns on the scale of the expansion within 2, 5 and 10km of the Site**



**Figure B.18: Showing the location of individual non-proforma submissions commenting on concerns on the scale of the expansion within 2, 5 and 10km of the Site**



B.1 Other issues raised in the individual submissions (all raised by fewer than 18 per cent of respondents) included (in order of frequency raised):

- Impact on house values;
- Alternative waste disposal technologies;
- Policy compliance;
- Noise;
- Dust;
- Extent of the timing and lifespan of permission sought;
- LFG (generation, migration and management);
- Leachate and Groundwater;
- Land values and viability;
- Concerns over community consultation;
- Relationship with the Boral quarry;
- Landscape & Visual;
- Aftercare and Rehabilitation;
- Greenhouse Gas (generation);
- Access;
- Proposed Waste to be disposed of within the landfill and controls on incoming waste;
- Alternative waste landfill sites;
- State-wide Resource Recovery Implementation Plan issues;
- Road safety;
- Financial assurance provisions;
- Stormwater and surface water;
- Monitoring; and
- Need for an EES or 'Independent study';



## **APPENDIX C      REFERRAL RESPONSES RECEIVED IN RESPONSE TO CONSULTATION**

- C.1 – SV
- C.2 – DHHS
- C.3 – MCC
- C.4 – MWRRG
- C.5 – ERR (DEDJTR)
- C.6 – MW
- C.7 - DELWP



29 July 2016

Department of Environment, Land, Water and Planning  
and  
Environment Protection Authority

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SENT BY EMAIL

Dear Sir/Madam,

**Re: Melbourne Regional Landfill Extension (Works Approval Application 1002191, Planning Permit Application PA2016/5118)**

Sustainability Victoria (SV) is Victorian Government's lead agency delivering waste management and resource efficiency programs, with a key role in long-term statewide planning for waste and resource recovery infrastructure. The organisation is dedicated to enhancing Victoria's thriving and sustainable future by improving the way Victoria manages its resources, and supporting communities to respond to climate change.

SV works in partnership with the seven regional waste and resource recovery groups, and of particular relevance to the proposed Melbourne Regional Landfill (MRL) extension, the Metropolitan Waste and Resource Recovery Group (MWRRG).

SV has outlined a number of strategic plans and strategies in this submission for consideration by the Panel. We understand the Panel will report to the Environment Protection Authority (EPA) and the Minister for Planning, who will decide on the Works Approval and Planning Permit applications, respectively. We bring these matters to your attention so that they may receive appropriate consideration, and we offer any further assistance or advice that may be required.

Underpinning this submission is an expectation that waste and resource recovery infrastructure established in response to SV's activities meets the highest standards. In doing so, Victoria is provided with the essential infrastructure it needs whilst protecting the community, amenity, public health and the environment.

**Context**

The *Environment Protection Act 1970* (the EP Act) establishes the Victorian Waste and Resource Recovery Infrastructure Planning Framework (the Framework). The Act includes a number of objectives for the Framework, but of particular importance to these applications is the following objective:

### **50A Objectives of the Victorian Waste and Resource Recovery Infrastructure Planning Framework**

*The objectives of the Victorian Waste and Resource Recovery Infrastructure Planning Framework are—*

...

- (c) *to enable waste and resource recovery infrastructure planning to be—*
- (i) *effectively integrated with land use and development planning and policy; and*

...

[*Environment Protection Act 1970*]

This objective underpins our submission, and highlights the importance of the proper recognition of the Framework in planning decisions to ensure there is adequate infrastructure for resource recovery and landfilling at a state wide level.

The Framework comprises the *Statewide Waste and Resource Recovery Infrastructure Plan* (Statewide Plan), and seven Regional Waste and Resource Recovery Implementation Plans. The Statewide Plan was prepared by SV and approved by the Minister for Environment, Climate Change and Water in June 2015. The *Draft Metropolitan Waste and Resource Recovery Implementation Plan* (Metropolitan Implementation Plan) has been prepared by the MWRRG.

The purpose of the Statewide Plan is:

*To provide strategic direction for the management of waste and resource recovery infrastructure to achieve an integrated system that effectively manages the expected mix and volumes of waste, reflects the principles of environmental justice to ensure that impacts on the community, environment and public health are not disproportionately felt, supports a viable resource recovery industry and reduces the amount of valuable materials going to landfill. [p17]*

This purpose translates into the 30 year goals of the Statewide Plan, including:

- 1. Landfills will only be for receiving and treating waste streams from which all materials that can be viably recovered have been extracted.*
- 2. Materials are made available to the resource recovery market through aggregation and consolidation of volumes to create viability in recovering valuable resources from waste.*
- 3. Waste and resource recovery facilities including landfills are established and managed over their lifetime to provide best economic, community, environment and public health outcomes for local communities and the state and ensure their impacts are not disproportionately felt across communities. [p17]*

An integral part of achieving a cohesive and integrated waste and resource recovery system outlined in the Statewide Plan is the concept of non-exclusive waste and resource recovery hubs (hubs) and spokes. A hub is a facility, or group of facilities, that manage or recovery waste or material streams. Hubs are described across three levels, state, regional and local. A hub of state significance includes infrastructure that manages a state need or range and/or volume of materials significant at the state level. Spokes are the sequence of activities that move materials from waste or material generators to hubs. The length of the spoke network is a critical influence on the

eventual cost of managing materials in the waste and resource recovery system.

### **Waste and Resource Recovery Hub**

The Statewide Plan identifies 23 hubs around Victoria that are of State significance, 14 within the Metropolitan region. Describing these hubs underpins the essential role played by this infrastructure, recognising that any impact on their functionality would make it difficult to manage the State's waste and resource recovery system. The 'Deer Park Precinct, TPI Landfill and Boral Quarry' hub is located on the eastern side of Hopkins Road, adjacent the Precinct Structure Plan (PSP) areas for Mt Atkinson and Tarneit Plains. The existing Melbourne Regional Landfill (MRL) is a facility within the hub. The Statewide Plan has the following observations about the hub:

- *This site is the largest MSW landfill in the state and reprocesses significant tonnes of C&D materials and organics.*
- *It is well located close to the metropolitan Melbourne area and major transport routes.*
- *There is potential to expand all activities onsite, including organics reprocessing, using existing buffers subject to meeting planning requirements and EPA approval.*
- *Urban encroachment and balancing community expectations in relation to the operation of the site is a future risk to the functionality of the site. If the site is to be maintained in the long term as a hub then planning needs to ensure the preservation of adequate buffer distances and that incompatible land uses are not established in proximity to the hub and activities on the site are conducted in a manner that does not impact on the community, environment and public health of surrounding land users.*
- *Community engagement is needed to determine the outcomes for this hub including potential benefits to the community of this site remaining available for resource recovery activities, and to reassure the community that activities will have minimal impact on local amenity.*

MRL currently has planning permit and works approvals to receive waste for approximately another 10 years at current operating levels and is approved to operate 24 hours a day, seven days a week.

### **Mt Atkinson and Tarneit Plains Precinct Structure Plan (PSP)**

SV notes that the Metropolitan Planning Authority is currently pursuing Melton Planning Scheme Amendment C162: Mt Atkinson and Tarneit Plains PSP. SV made a submission in response to consultation of the planning scheme amendment on 1 June 2016. A copy of the submission is attached for information.

SV is of the view that strategic issues outlined in its planning scheme amendment submission are of relevance to the Works Approval (WA) and Planning Permit Applications (PPA), and should be read in conjunction with this submission.

### **Matters relevant to determination of the Works Approval and Planning Permit Applications**

SV's comments are of a strategic nature and set out in the following sections:

1. The role of the Framework and Statewide Plan in Works Approval and Planning Permit decision making
2. The appropriateness of an application for additional landfill airspace
3. The strategic significance of the MRL site as a State hub in the Statewide Plan
4. Defining, protecting and maintaining buffers around MRL

5. Requiring best practice.

## 1. Role of the Framework and Statewide Plan in Works Approval and Planning Permit decision making

In relation to the Works Approval application, Section 50C of the Act permits the EPA to refuse to consider an application if the operations of the facility could be inconsistent with the Statewide Plan or relevant regional implementation plan. SV has previously provided advice to the EPA in relation to Section 50C of the EP Act, indicating that SV does not consider the operation of the facility would be inconsistent with the Statewide Plan. However, this advice does not infer that the application should be approved.

A similar requirement exists under the *Planning and Environment Act 1987* (the Planning Act), at Section 4 Objectives:

- (1) *The objectives of planning in Victoria are—*
  - (a) *to provide for the fair, orderly, economic and sustainable use, and development of land;*  
....
  - (e) *to protect public utilities and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community;*  
....
  - (g) *to balance the present and future interests of all Victorians.*

The Statewide Plan considers waste and resource recovery infrastructure as essential infrastructure, and ‘other assets’ as referred to in Section 4(1)(e) of the Planning Act. SV and the Regional Waste and Resource Recovery Groups (including MWRRG) are the State Government agencies responsible for waste planning. The Statewide Plan and Metropolitan Implementation Plan (as part of the Framework) provide for fair, orderly, economic and sustainable development of waste infrastructure in the best interests of all Victorians. In light of the requirement of Section 4 of the Planning Act quoted above, the Responsible Authority must give due consideration of these documents in its decision making.

## 2. Appropriateness of an application for additional landfill airspace

Goal 1 of the Statewide Plan is that landfills only receive waste streams from which all materials have been viably recovered. This goal translates into a number of strategic directions, including the prioritisation of resource recovery and requiring planning for new landfill airspace to be controlled and based on demonstrated need.

The Statewide Plan’s goals and strategic directions are consistent with Clause 19.03-5 of the Melton Planning Scheme. Clause 19.03-5 does not discuss demand for airspace. However, strategies within the clause seek the establishment of facilities to “sustainably manage all waste” (our emphasis), whilst also maximising resource recovery.

Currently, Victoria recovers approximately 70% of all materials generated by the waste system through reuse and recycling, with the remaining 30% going to landfill - over four million tonnes in 2011-12. Victoria’s population is growing, particularly Melbourne’s. Notwithstanding a projected

increase in resource recovery activity, it is expected there will remain a significant and growing residual waste stream for landfilling over the 30 year life of the Statewide Plan, which it is not economically viable to recover without increasing risks to the environment, due to the costs and available technologies required for alternative treatments. In other words, whilst we seek to minimise Victoria's reliance on landfills, they will remain an essential part of the waste system for the foreseeable future.

As noted above, the Framework provides for the co-ordinated provision of waste infrastructure in the State. In relation to landfill airspace, the EP Act requires that any new or existing landfill be included in the schedule to a Regional Waste and Resource Recovery Implementation Plan. Scheduling is the responsibility of MWRRG and will be published in the Metropolitan Implementation Plan. The scheduling of landfills is based on need. In the absence of an approved Metropolitan Implementation Plan, Section 74 of the Act provides for the continuation of the *Metropolitan Waste and Resource Recovery Strategic Plan 2009* (Strategic Plan) until it is replaced.

SV understands that MWRRG will be providing a submission that includes details of the scheduling process. In light of this scheduling process, SV considers that the proposal meets a demonstrable need for landfill airspace, for which there is a medium term requirement in Melbourne.

SV is aware that there have been suggestions energy from waste should be provided as an alternative to additional landfill space. SV is supportive of the development of energy from waste, but consider that there are currently a number of barriers and lead times for its large scale delivery in Victoria in the medium term. Government is investing in waste avoidance, recycling and energy from waste in order to overcome these barriers and encourage alternatives to landfills across Victoria. However, deployment of this technology in the short to medium term is unlikely to significantly reduce current landfill needs proposed to be met by MRL in these applications. Furthermore, some residual material is generated from energy from waste infrastructure and requires management.

Nevertheless, SV is focused on working towards a waste and resource recovery system that improves recovery rates, above the current rate of 70%. Accordingly, SV would welcome appropriate Works Approval or Planning Permit conditions that ensure resource recovery is maximised at MRL. Such conditions would be consistent with the strategies of Clause 19.03-5 of the Melton Planning Scheme that seek increased resource recovery. SV would welcome input to drafting, or testing of proposed conditions.

### **3. Strategic significance of the MRL site as a State hub in the Statewide Plan**

The site of MRL is listed as a waste and resource recovery hub of State importance in the Statewide Plan. Hubs, as described in the Statewide Plan, are statements of the existing activities that occur there, noting that future use and development must be subject to due process, including consideration in the relevant regional implementation plan. However, the Statewide Plan further notes that impacts on the functionality of these sites would make it more difficult to manage the State's waste and resource recovery system.



Whilst the extension to MRL (the subject of these applications) is not currently approved, the function and role MRL plays is an existing one. A refusal of these applications would have the effect of reducing the viability and capacity of State significant essential infrastructure from the waste system, for the longer term, at the end of its current permit. This would necessitate finding the same volume of landfill airspace at an alternative location/s. These considerations must be material to a determination of the Planning Permit Application in accordance with Section 4(1)(a), (e) and (g) of the Planning Act.

In the context of the objectives of the Planning Act, provision of a cost effective waste system for all Victorians can be achieved by utilising existing infrastructure. This is consistent with the *Waste Management Policy (siting, design and management of landfills)* established under the EP Act and which seeks to minimise the establishment of new landfills. An extension to MRL would be consistent with this principle. The existing MRL site has significant locational advantages, not least access to a comprehensive transport network, and relative proximity to the areas it services. These are critical issues for the delivery of cost effective waste and resource recovery services, where transport costs are significant in overall costs. Transport costs are fundamentally a function of distance.

Indeed this is recognised by Clause 19.03-5 which includes amongst the strategies:

*Encourage waste generators and resource generators and resource recovery businesses to locate in close proximity to enhance sustainability and economies of scale.*

You will note in SV's submission to Melton Planning Scheme Amendment C162, we consider there are opportunities to improve resource recovery by strengthening the role of this hub. Maintaining landfilling operations in this location for the medium term, will help make available the volume of materials required to underpin viable recovery.

#### **4. Defining, protecting and maintaining buffers around MRL**

We note that application of appropriate buffers to existing sensitive uses will be a material consideration in determining these applications. We also note that measures to protect and maintain these separation distances in the long term are not something that will be delivered by your decisions. Nevertheless, we draw your attention to our submission to Melton Planning Scheme Amendment C162, in particular regarding landfill gas migration buffers.

In summary, community and amenity values can be protected whilst approving the proposed landfill extension, through appropriate application of separation distances from the landfill to sensitive uses. The proposed 1,000 metre amenity buffer, and 500 metre landfill gas migration buffer are consistent with existing published EPA guidance. Specifically *Best practice environmental management for Siting, design, operation and rehabilitation of landfills* (the BPEM) (publication 788.3, August 2015).

Regarding the landfill gas migration buffer specifically, the position of SV, per our submission to Melton Planning Scheme Amendment C162, is that there is currently no requirement for such buffers to be internalised. Application of an external landfill gas migration buffer does not represent a sterilisation of that land for future development. It simply imposes an obligation to properly

assess landfill gas risk, and apply mitigation where appropriate. A fact envisaged by the *Growth Corridor Plan: Melbourne West*, at page 55 where it states:

*Any development within 500m of the putrescible landfill sites at Werribee and Deer Park [the MRL site] will be subject to an environmental audit to ensure that any potential landfill gas migration is mitigated.*

SV considers a requirement to internalise buffers at this location is contrary to standard planning practice and may set a precedent for any land use proposal that requires a buffer, including much industrial development, resource recovery and extractive industry. A precedent requirement to internalise buffers would render a wide range of employment generating development unviable.

#### **5. Requiring best practice**

Key pillars of the Statewide Plan Vision and Purpose are the protection of community, environment and public health. SV has an expectation that all waste and resource recovery infrastructure in Victoria, in accordance with the Framework, will plan for and employ best practice management and operations. Robust application of conditions to ensure best practice at MRL would deliver greater strategic waste system benefits, including minimising long term costs to the community, than finding alternative landfill airspace.

As noted above, SV would welcome input on appropriate conditions to ensure best practice applied at MRL. Thereby ensure protection of community, environment and public health.

Should you wish to discuss this submission further, please do not hesitate to contact Alastair Smith of my office. He can be reached at [alastair.smith@sustainability.vic.gov.au](mailto:alastair.smith@sustainability.vic.gov.au) or 03 8626 8821.

Yours sincerely

**Jonathan Leake**  
Director, Waste and Resource Recovery Planning



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Mr Quentin Cooke  
Development Assessments Unit  
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GPO Box 4395  
MELBOURNE VIC 3001

**Works Approval application WA1002091: Landfill Operations Pty Ltd – Proposed Melbourne Regional Landfill extension at 408-546 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall**

Dear Mr Cooke

Thank you for referring this application to the department for review and comments under Section 19B of the *Environment Protection Act 1970*.

This application involves a proposal to extend the existing Melbourne Regional Landfill (MRL) for ongoing disposal of municipal solid waste, Category C contaminated soil and solid/inert waste within the quarry void associated with Boral's quarrying operations. The proposed extension to the MRL is to the east of Hopkins Road.

The statutory timeframe for provision of written comments, recommendations or objections from this department is 21 days under *s19B (4)* of the *Environment Protection Act 1970*. This application was received by the department on 22 June 2016 which means 21 days is to the 13 July 2016. In relation to this application, EPA granted a written extension for this response until 15 July 2016.

In assessing the content of this application, the department notes the following:

**Buffer distance:**

- The required buffer distance for landfill gas migration, according to Table 5.2 (Section 5.1.5) of EPA Publication 788.3 (2015), titled *Best Practice Environment Management's Siting, Design, Operation and Rehabilitation of Landfills Guideline*, for this landfill (Type 2) is 500 metres from sensitive uses (receptors), measured from the receptor to the edge of the closest landfill cell. This application relates to two landfill sections proposed east of Hopkins Road; one section is north and the other is south of Riding Boundary Road.
- Part of the 500m buffer encroaches on the adjacent site west of Hopkins Rd, which is designated for industrial use, and may contain buildings and structures in future.
- When assessing this application, the wellbeing of people working or visiting any future buildings or structures (if built within this buffer distance) should be considered in relation to the

management of potential nuisance dust or odour that may arise from the proposed MRL extension.

- In this regard, EPA Publication 788.3 (2015), titled *Best Practice Environment Management's Siting, Design, Operation and Rehabilitation of Landfills Guideline* recommends that an environmental audit be carried out where buildings or structures with enclosed spaces that people will enter are proposed to be constructed within this buffer.
- There is a high level of community concern about amenity issues relating to dust and odour emissions from the MRL site, including this extension.

The department recommends that EPA ensures that in relation to buffer distances:

- All required buffer distances of the proposed MRL extension are met.
- The planning panel addresses requirements of required environmental audits to be carried out for any buildings and structures with enclosed spaces that people will enter that may be affected by the extension of the MRL.
- The proponent has measures in place that ensure that no unacceptable offsite dust and odour emissions occur.

The department recommends that EPA consider the following in its overall assessment of this application in relation to management of onsite leachate and stormwater:

- A contingency plan in the event that leachate collection rates exceed evaporation rates.
- Periodically monitoring any offsite discharge of water to either land or a waterway to prevent potential offsite release and possible public exposures.
- To monitor the same set of parameters for leachate and groundwater to determine the relationship (i.e. potential impact) of the leachate on the groundwater.
- Seek rationale from the proponent for heavy metal monitoring in leachate

EPA must be satisfied that the proposed development complies with the relevant State Environment Protection Policies and environmental guidelines, especially with respect to odour, gas and dust emissions.

Please advise the department if further information is provided, or changes are made to the application. If you have any queries regarding this matter, please contact Bradley Peel or Jason Issa from Environmental Public Health on 9096 0456 or 9096 5619 respectively.

Yours sincerely

Sandra Falconer  
Manager Environmental Public Health  
15/ 7 /2016

# Submission Cover Sheet

# MRL00086

Do you wish to be heard? **Yes**

Full name

**Sian Smith**

Name of organisation:

Melton City Council

Address:

232 High Street  
Melton

Address Affected

Comments

Attachment Name

Final-Submission-and-Cover-Letter.pdf, type application/pdf, 2.4 MB



S. Smith

14 July 2016

Minister for Planning  
Via: Online submission portal

Dear Sir;

**Submission to Planning Permit application PA2016/5118 and Works Approval application 1002191 - Extension to the landfill at 408 - 546 Hopkins Road, Truganina and 1154 - 1198 Christies Road, Ravenhall.**

The City of Melton (Council) welcomes the opportunity to comment on planning permit application no. PA2016/5118 and EPA works approval application no. 1002191 (Works Approval Application).

At a Special Meeting of Council on 11 July 2016 Council resolved to:

1. Endorse the attached submission with the amendment that the conclusion on page 27 of the submission read:  
"In conclusion, Council opposes the planning application for the extension of the Melbourne Regional Landfill at 408-546 Hopkins Rd Truganina and 1154-1198 Christies Rd, Ravenhall".

Object to the planning application due to the absence of information regarding:

- a. Identification, auditing and management of potential landfill gas migration
  - b. Traffic modelling that demonstrates the proposed transport network will be able to accommodate the proposed increase in activity
  - c. Mitigation and management of any offsite amenity impacts
  - d. Scale of the proposed expansion
  - e. Addressing of visual impacts
  - f. Provision of appropriate buffers to adjoining land; and
  - g. Native flora and fauna.
2. Direct that the tabled document (Appendix 2) to be used by officers as a reference document to amend the draft submission presented.



3. Submits its objection and amended submission to Planning Panels Victoria for consideration

A copy of the Submission, revised in accordance with Council's resolution, is attached.

Council would welcome the opportunity to discuss this submission in greater detail at the Panel Hearing.

Should you wish to discuss this submission please contact Sian Smith, Coordinator Major Developments on 9747-7393.

Yours Sincerely,

Luke Shannon  
General Manager Planning & Development

**A Proud Community  
Growing Together**



**PLANNING PERMIT APPLICATION PA2016/5118 AND  
WORKS APPROVAL APPLICATION 1002191 –  
EXTENSION TO THE LANDFILL AT 408-546 HOPKINS ROAD,  
TRUGANINA AND 1154-1198 CHRISTIES ROAD, RAVENHALL  
Submission by Melton City Council, 11 July 2016**



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## 1. Introduction

The City of Melton (Council) welcomes the opportunity to comment on planning permit application no. PA2016/5118 (Permit Application) and EPA works approval application no. 1002191 (Works Approval Application) (collectively, the Applications).

Council has reviewed the documentation exhibited with the Applications and objects to the proposal due to the absence of information regarding:

- identification, auditing and management of potential landfill gas migration;
- traffic modelling that demonstrates the proposed transport network will be able to accommodate the proposed increase in activity;
- mitigation and management of any offsite amenity impacts;
- scale of the proposed expansion;
- addressing of visual impacts;
- provision of appropriate buffers to adjoining land; and
- native flora and fauna.

### 1.1 The Site and Surrounding Area

The Applications relate to land at 408-546 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall, which accommodates an existing quarry and landfill. The footprint of the Permit Application exceeds that of the Works Approval Application, with the Permit Application seeking an extension of 311ha and the Works Approval Application seeking an extension of 210ha.

The site is broadly bounded by Hopkins Road to the west, the Ballarat Railway Line to the north, Christies Road to the east and Middle Road to the south. Riding Boundary Road runs through the middle of the site in an east-west direction, however only a portion of this road has been constructed.

Two high voltage transmission lines traverse the site – one through the south-east part and the other through the north-west corner of the site. Further, a grassland reserve of about 95ha (known as Northern Grassland) is located within the north-east corner of the site.

The existing quarry has been in operation since 1964 and extracts basalt for use in the construction industry. The first stages of the quarry have already been filled by the existing landfill. The active area of the quarry is to the south of Riding Boundary Road. The remaining, future areas of the quarry will progress generally north across Riding Boundary Road along the western portion of the site. *Refer to Attachment 5.1 for a plan showing the extent of the approved quarry activity.*

The existing landfill is located in the south-east corner of the site, south of Riding Boundary Road. The landfill is a major commercial facility which receives waste from most parts of Melbourne. It does not currently accept waste from the general public but instead takes waste from commercial operators, municipalities etc. The landfill is licensed to accept the following waste:

- Putrescible waste
- Non – putrescible (or solid inert) waste
- Contaminated soil (low level)
- Pneumatic tyres shredded into pieces of less than 250mm.



The landfill also collects biogas from completed cells and converts this into energy which currently serves the energy needs of about 4,000 dwellings. The power generated on site is fed into the national grid.

The site has been located within the Urban Growth Boundary (UGB) since 2010.

Land to the west of the site (opposite Hopkins Road) is currently rural in nature and accommodates a few existing dwellings. The Metropolitan Planning Authority (MPA) has exhibited a precinct structure plan for this area – known as the Mt Atkinson and Tarneit Plains Precinct Structure Plan (PSP). This PSP is bounded by Hopkins Road, the Western Freeway, the future Outer Metropolitan Ring Road (OMR) and the OMR connector road to the Deer Park Bypass. The PSP is expected to deliver a mix of land uses, including business, industrial and residential development, together with an activity centre and a possible new railway station.

Land to the south of the site (opposite Middle Road) is currently rural in nature and accommodates a number of existing dwellings. The area is also identified as a potential location for the Western Interstate Freight Terminal (WIFT).

The Regional Rail Link (RRL) runs along the eastern boundary of the site parallel with Christies Road. East of the RRL are two prisons, the Dame Phyllis Frost Centre for women and the Metropolitan Remand Centre for men, and a number of grassland reserves.

Land to the north of the site (between the railway line and the Western Freeway) currently contains a range of industrial / commercial and residential uses. This area is proposed for future industrial development (Warrawee PSP).

*Refer to Attachment 5.2 for a locality plan.*

## 1.2 Details of Existing Planning Approvals

The following planning approvals are considered most relevant to the quarry and landfill operations currently being conducted on the site:

<b>Quarry / Extractive Industry</b>		
<b>Permit</b>	<b>Date issued</b>	<b>Details of what permit allows</b>
61060	August 1972	Develop the south-east portion of the site for Extractive Industry (Quarry).
PA2000/231	November 2000	Develop a Concrete Batching Plant ancillary to the existing Extractive Industry.
PA2001/249	April 2002	Develop the remainder of the site for Extractive Industry, including the creation of the Northern Grassland Reserve.
PA2001/288	February 2002	Develop a Concrete Paver Manufacturing facility ancillary to existing Extractive Industry.

PA2015/4807	November 2015	Use and development for the purpose of earth and energy resources (quarry processing plant)
<b>Landfill/ Recycling</b>		
<b>Permit</b>	<b>Date issued</b>	<b>Details</b>
P2091/97	July 1998	Develop the south-east portion of the site as a Municipal Waste Landfill (in six stages). The permit was amended in June 2004 to allow for 24 hour landfill operation.
PA1999/79	November 1999	Buildings and works
PA2000/36	May 2000	Develop an Organics Recycling Facility – Pinegro Products.
PA2000/154	February 2001	Training Facility
P2005/454	September 2005	Develop facilities to convert landfill gas from completed cells to energy.
PA2009/2180	June 2009	Develop a Resource Recovery Facility to process dry commercial and industrial waste to minimise waste to landfill.
PA2013/4056	December 2013	Development of a Refuse Transfer Station.
PA2014/4499	September 2014	Building and works associated with an existing landfill by constructing a stairway and landing to the weighbridge entrance

### 1.3 The Proposal

The Applications are to extend the existing landfill operation within the approved area of the quarry.

The Applications differ from the application to amend planning permit no. PA2091/97, which was refused by Council on 27 May 2014, in the following ways:

- The footprint of the proposed extension to the landfill (in the Permit Application) has been reduced from 617ha to 311ha.
- A 1km buffer is proposed to future residential communities in the Mt Atkinson and Tarneit Plains PSP area based on the current draft PSP, with a 500m buffer being internal to the current quarry site, and a further 500m to future residential communities in the Mt. Atkinson and Tarneit Plains PSP area.
- Buffers to the surrounding communities of Burnside, Deer Park and Ravenhall have been increased.
- The Works Approval Application was lodged concurrently with the Permit Application, providing a greater level of technical information.

*Refer to Attachment 5.3 for a buffer plan.*

The Works Approval Application seeks permission for 16 new landfill cells:

- seven cells south of Riding Boundary Road (Cells 1 to 7); and
- nine cells north of Riding Boundary Road (Cells 8 to 16).

The cells would be progressively capped in stages as each cell is completed, in accordance with the *Best Practice Environmental Management – Siting, Design, Operation and Rehabilitation of Landfills* (EPA Publication 788.3, August 2015) (Landfill BPEM).

The Planning Permit Application Report that accompanied the Permit Application states at section 3.6 in relation to staging and operation:

*“...The specific staging of the landfill is dependent on the staging of the quarry, as it fills the next available airspace created by the quarry. The staging of the proposed landfill therefore generally follows the staging of the quarry.*

*The nature of quarrying means that its staging across the Planning Permit Application Area is difficult to determine with precision. When and where quarrying occurs is dependent on the demand for different products and resources over time and the location and quality of stone across the site.*

*Notwithstanding this, a conceptual Landfill Sequence Plan has been prepared by Golder and Associates as part of the Works Approval application and Planning Permit Application, based on the current quarry extraction plan.*

*At this stage, the conceptual staging of the landfill is to generally follow the following sequence:*

1. *South of Riding Boundary Road, progressing from the existing landfill to the west*
2. *North of Riding Boundary Road, west of Clarke Road reserve...”*

At its highest point, the landfill would extend approximately 40 metres above the natural surface level. The Landscape and Visual Assessment that accompanied the Permit Application has the perceived height set at 70m from some angles due to the change in ground level from surrounding sites.

Each landfill cell would take approximately two years to fill. The Works Approval Application estimates that:

- the cells south of Riding Boundary Road would take approximately 13 years to fill with 23.3 million cubic metres of waste; and
- the cells north of Riding Boundary Road would take approximately 17 years to fill with 29.7 million cubic metres of waste.

This totals approximately 53 million cubic metres of waste over a 30 year period within the extension area.

Under its current EPA licence (no. 12160), the existing landfill has approximately seven to 10 years of capacity remaining. The extension is accordingly proposed to commence in approximately 2025 and be operational for approximately 30 years until 2055.

The Works Approval Application does not seek any changes to the waste stream types currently accepted by the landfill.

## 1.4 Permit Application documentation

The Permit Application is accompanied by technical reports assessing:

- Needs
- Transport impact
- Noise
- Air quality
- Hydrogeology
- Landscape and visual impact
- Ecology.

A summary of the key points made by each report is provided below:

### *Needs Assessment*

- The current landfill has a capacity of 7-10 years which is considered a very short period of time in landfilling terms.
- The *Statewide Waste and Resource Recovery Infrastructure Plan Victoria 2015-44* (SWRRIP) identifies 6 waste and resource recovery 'hubs' of state wide significance. Three of them are either closed, or due to close in the short to medium term.
- The three long term facilities to cater for Melbourne's waste needs are Wollert, Werribee and the landfill the subject of the Applications – the Melbourne Regional Landfill.
- To a significant extent, waste generation is driven by population, so long term population trends are a key factor in determining waste disposal needs. Based on a business as usual scenario, the total waste generation in Victoria will rise from the current level of 12.176 million tonnes (based on data from 2011-12) to more than 20 million by 2043-44.
- The landfill site currently accepts approximately 780,000 tonnes of waste per year (14/15), making this the largest landfill in Victoria. It is expected that this will increase to 1.4 million tonnes by 2020, 1.5 million by 2025 and 1.7 million by 2041.
- It is possible for the demand in airspace to precede the quarry operation creating the void. In this instance there will be a heavy reliance on other facilities to accommodate this waste, which could result in a shortage of landfill options. Alternatively, improvements in waste compaction could result in more tonnage capacity.

### *Transport Impact Assessment*

- Data from March 2015 showed that a maximum of 47 vehicles per hour entered the site at the peak time which occurs around 10am – 12pm. On weekends the peak is much lower at approximately 19 and 10 per hour between 9am – 10am on Saturday and Sunday respectively.

- The proposed Community Transfer Station on the site (approved under planning permit no. PA2013/4056) is designed to receive up to 20,000 tonnes of waste annually. The site is expected to have peak arrivals on the weekend of up to 400 smaller vehicles per day. This facility will be accessed via a separate, new access point.
- The current heavy vehicle movements will increase from 810 per weekday in 2015 to 1130 per weekday in 2035.
- Reference is made to both the PSP design guidelines and Clause 56.06 of the Melton Planning Scheme which indicate that the cross-section of Christies Road exhibits characteristics similar to that of a 'connector' road which can carry an indicative traffic volume of 7000 per day. This is much higher than the projected post development traffic volumes of approximately 3250.
- The report concludes that there is no reason on traffic and parking grounds why a permit for the development should not be issued.

#### *Noise Assessment*

- Noise modelling has been conducted based on current and future activity on the site by Marshall Day Acoustics.
- There are a number of mitigation measures that have been recommended within the report such as:
  - o Not accepting trucks with reversing beepers on site during the night time period. Third party trucks are to be fitted with broadband reverse alarms for night time.
  - o A different type of dozer is required to be used during the evening and night time to reduce noise.
  - o Additional silencing of mobile plant to be carried out by selecting equipment based mitigation packages (ie sound panels on compactors or exhaust attenuation on other plant).
  - o Additional mitigation includes the construction of 4m high earth berms in proposed cells 3 and 4 in the south western part of the site.
- These mitigation measures will ensure that the proposal complies with the State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1.

#### *Air quality assessment*

- The key sources of odour are:
  - o Fresh waste as it is delivered and placed in an active cell. Intermediate cover material reduces this emission but does not eliminate it entirely.
  - o Landfill gas from capped cells. If not adequately controlled by appropriate gas capture systems it has the potential to be carried off site.
  - o Leachate, which drains internally through cells into leachate storage but contains odourous compounds that need to be managed.
- The key sources of dust are:
  - o Wheel-generated dust from vehicle movements
  - o Disturbance from earth moving machinery

- Wind erosion from dusty exposed surfaces.
- A spike in the number of complaints received by the EPA in March 2014 correlates with the application to amend the existing permit to expand the landfilling area to the quarry extraction boundary, which was refused by Council in May 2014.
- The composting activity on the site which ceased in 2015 was a strong source of odour from the site.
- The current and proposed operations at the site are operated by Landfill Ops in line with current best practice methods.

#### *Hydrogeological Assessment*

- The landfill cell liners are more than 2m above the natural watertable level, in accordance with Landfill BPEM requirements. It is not clear to Council whether the groundwater elevations determined in section 5.3 of the Hydrogeological Assessment provide the appropriate measure for this Landfill BPEM requirement.
- The report indicates that the resultant groundwater salinity will increase, 50 years after the closure of the last cell but the extent and impact will be such that there will be no offsite impact on beneficial use.
- The assessment confirms that the current landfill operation has not adversely impacted on the beneficial uses of groundwater to date.
- The report concludes that the site is suitable for landfill activities.

#### *Landscape and Visual Impact Assessment*

- The flat surrounding terrain means that the extension would likely be seen from a large proportion of surrounding land but visibility may be reduced by vegetation and development.
- A photomontage of the proposed extension (post construction) shows that the city skyline and views across the plains would be interrupted by the mounds.
- The report makes the assertion that once the extension is completed and the site is successfully rehabilitated the visual impact of the site may be considered positive.
- The visual impact of the mounds can be reduced during the construction phase by replacing the white reflective geotextile covering with a light brown or sepia toned geotextile to reduce the visual impact.
- The assessment recommends the progressive planting of vegetation and the creation of stormwater ponds, however there are minimal details relating to the implementation of the rehabilitation plan.

#### *Ecological Assessment Report*

- The site has been the subject of previous ecological assessments which resulted in the creation of the Northern Grassland in the north-east corner of the site.



- The quarry has a 60m landscape buffer adjacent to the northern and southern boundary of Riding Boundary Road, the northern boundary of Middle Road, and the western boundary of Christies Road. The quarry also has a 100m landscape buffer adjacent to the east of Hopkins Road.
- No extraction or excavation can occur within these buffers.
- The site has approval under the *Environment Protection and Biodiversity conservation Act 1999* which provides conditions relating to the protection and management of Plains Rice-flower and the Striped Legless Lizard
- An offset for the removal of native vegetation will be required.

## 1.5 Works Approval Application documentation

The Works Approval application was accompanied by some additional reports that did not accompany the permit application. A summary of the key points made by these reports is provided below:

### *Greenhouse Gas Estimate*

- The maximum efficiency assumed under the National Greenhouse and Energy Reporting scheme is 75%.
- The collection efficiency of the gas systems to be installed at the proposed MRL facility is expected to exceed 75%.
- It should be noted that this efficiency level is being achieved for the current landfill operations.

### *Leachate Management Plan*

- The Extension design incorporates a leachate collection system over the base and side liner to capture and remove leachate from the landfill for storage and management.
- The system is designed to comply with the Victorian Environment Protection Authority (EPA) publication 788.3 'Best Practice Environmental Management for the Siting, Design, Operation and Rehabilitation of Landfills' (BPEM)
- Leachate storage ponds could be replaced by a leachate treatment plant. The construction of a leachate treatment plant would not be required for at least 10 years. Significant technical development in leachate treatment is expected during this time which would impact on the approach to leachate treatment on the site.

### *Landfill Gas Management Plan*

- Based on the surrounding geology and subsurface infrastructure the following pathways were identified;
  - Gas migration through the sub-surface geology into buildings and structures.
  - Gas migration through the sub-surface geology into underground service trenches and pits and then into buildings.
  - Direct release to atmosphere

- The landfill gas collection, management and treatment options were evaluated in accordance with the estimated LFG generation rates projected for the proposed site. Provided that Landfill Ops implements the outcomes from this Landfill Gas Management Plan it is considered that landfill gas control measures proposed for the Extension are in accordance with the BPEM objectives and required outcomes and relevant legislation.

#### *Stormwater Management Plan*

- Skeleton Creek is located to the south west of the site and designated as Land Subject to Inundation by the Melton Planning Scheme. There is no defined creek bed or bank, and stream flow only occurs after heavy rainfall events. This intermittent flow is referred to as an ephemeral stream, often dry with periods when it is wet during heavy rainfall events.
- It is proposed the Discharge Ponds will discharge to external stormwater systems on Riding Boundary Road, Middle Road and Hopkins Road.
- The Plan recommends, the operator undertake a detailed stormwater design for each of the new cells in order to implement the design measures outlined in this SMP.

#### *Monitoring Program*

- The monitoring program aims to ensure potential environmental impacts are monitored and demonstrate compliance with relevant policies and regulations.
- To assist the monitoring program, Landfill Ops will be required to maintain the following records:
  - o Waste inspection register;
  - o Site incident register;
  - o Site inspection sheets;
  - o Landfill complaints register;
  - o Landfill rectification requests and instructions;
  - o Landfill employee and contractor induction checklist;
  - o Training records;
  - o Groundwater management records;
  - o Leachate management records;
  - o Surface water management records; Landfill gas management records;
  - o Dust, noise and odour management records; and
  - o Plant and equipment management and maintenance records.Timing/frequency for monitoring the above have not been provided within this report.
- The operator will be required to submit an Annual Performance Statement (APS). Audits of operational performance will be conducted by an independent Environmental Auditor subject to periodic risk assessment review. The APS will be accompanied by monitoring results, the monitoring program and an analysis of performance against each licence condition for the previous financial year.

### *Aftercare Management Plan*

- All aftercare management activities will be conducted in accordance with the EPA Licence or Post Closure PAN that is in-place at the time of closure.
- The aftercare management period begins once the landfill cap, vegetation and rehabilitation works are complete.
- The operator will need to ensure that the Landfill Aftercare Management Plan is implemented until an Environmental Audit demonstrates that the site no longer poses a risk to the environment, or for at least 30 years after the site has stopped receiving waste.
- EPA may serve a pollution abatement notice on the site to ensure ongoing management of the site and place the site on a Priority Sites Register to ensure that all potential future stakeholders are aware of the ongoing management requirements of the site.

## **1.6 Policy Assessment**

### ***State Planning Policy Framework***

The following State planning policies are considered relevant to Council's assessment of the proposal:

Clause 13.04-1 refers to 'Noise Abatement' and seeks to ensure that community amenity is not reduced by noise emissions by using a range of building design, urban design and land use separation techniques as appropriate to the land use functions and character of the area.

Clause 13.04-2 refers to 'Air Quality' and seeks to ensure, wherever possible, that there is suitable separation between land uses that reduce amenity and sensitive land uses.

Clause 14.02-2 refers to 'Water Quality' and includes a strategy to '*Encourage the siting, design, operation and rehabilitation of landfills to reduce impact on groundwater and surface water.*'

Clause 17.02-2 refers to 'Design of industrial development' and seeks to provide adequate separation and buffer areas between sensitive uses and offensive or dangerous industries and quarries to ensure that residents are not affected by adverse environmental effects, nuisance or exposure to hazards.

Clause 19.03-5 refers to 'Waste and resource recovery' and includes strategies to maximise resource recovery and ensure buffers for waste and resource recovery facilities are defined, protected and maintained.

### ***West Growth Corridor Plan***

In August 2010, Amendment VC68 expanded the Urban Growth Boundary (UGB) to include the site and surrounding area. Much of the surrounding area was rezoned to Urban Growth Zone; however, areas immediately abutting the site were included in the Farming Zone in recognition that appropriate buffers would be required between the quarry and any future sensitive uses.

The West Growth Corridor Plan prepared by the then Growth Areas Authority was released in June 2012, to provide a broad strategic framework for future PSPs and subsequent development of the growth corridor.

The West Growth Corridor Plan identifies the site as a 'Quarry' and designates the future use of most of the surrounding land as 'Industrial'. The area affected by the Mt Atkinson and Tarneit Plains PSP is identified as 'Business and Industrial', with the inclusion of a Specialised Town Centre.

The growth corridor plans attempt to ensure:<sup>1</sup>

*"... approved and operational landfills referred to in The Metropolitan Waste and Resource Recovery Strategic Plan and potential organic waste treatment/recovery are protected from encroachment by sensitive uses. Any development within 500m of putrescible landfill sites will be subject to an environmental audit to ensure that any potential landfill gas migration is mitigated. Some existing quarries may also have the potential to be utilized for landfill purposes in the future upon completion of extraction of the resource at the site. In this case buffer requirements will also need to be taken into account when planning these PSPs to ensure appropriate land uses and separation distances are maintained."*

Specifically, the West Growth Corridor Plan seeks to ensure:<sup>2</sup>

*"... approved and operational quarries are protected from encroachment by sensitive land uses and identifies industrial or commercial development activities adjacent to the existing Holcim and Boral quarry sites within/adjacent the UGB... The Plan ensures that approved and operational landfills referred to in the Metropolitan Waste and Resource Recovery Strategic Plan and potential organic waste treatment/ recovery are protected from encroachment by sensitive uses. Any development within 500m of the putrescible landfill sites at Werribee and Deer Park will be subject to an environmental audit to ensure that any potential landfill gas is mitigated."*

The West Growth Corridor Plan does not specify who is responsible for such audits.

### **Local Planning Policy Framework**

The following local planning policies are considered relevant to Council's assessment of the proposal:

#### **Clause 21.03 – Municipal Strategic Statement**

In support of the overarching vision, one of Melton City Council's key land use planning objectives is to create an environment conducive to economic growth and wealth generation.

Clause 22.02 – A Sustainable Environment Policy seeks to Protect and conserve the environmental resources and assets of the City for the benefit of current and future communities.

Clause 22.05 – Employment Policy seeks to create an environment conducive to economic growth and wealth generation. It recognises the expansion of local employment opportunities in the municipality is necessary to ensure the development of a viable and sustainable community in the long term.

<sup>1</sup> Chapter 3, section 3.7.5 'Planning for Landfills', page 34.

<sup>2</sup> Chapter 4, section 4.7 'Other Infrastructure', page 55.

### **Zone and Overlays**

The site is zoned Special Use – Schedule 1 which relates to 'Earth and Energy Resources Industry'.

A permit is required for the proposed use (Refuse Disposal) and associated buildings and works.

Small portions of the site are also affected by the Urban Floodway Zone, Environmental Significance and Land Subject to Inundation Overlays. The proposal does not apply to those areas.

### **Particular Provisions**

Landfill is a listed use under Clause 52.10 of the Melton Planning Scheme, which defines types of industries and warehouses which if not appropriately designed and located may cause offence or unacceptable risk to the neighbourhood.

There is no threshold distance prescribed under this Clause for a landfill. Instead, Note 1 applies, which means 'The threshold distance is variable, dependent on the processes to be used and the materials to be processed or stored'. Pursuant to Clause 66.02-7, the Environment Protection Authority is a determining referral authority for applications to use land for an industry or warehouse for a use shown with a Note 1 in Clause 52.10.

A permit is also required for the removal of native vegetation under Clause 52.17. This Clause seeks to broadly ensure the clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity by appropriately managing its removal.

### **Statewide Waste and Resource Recovery Infrastructure Plan Victoria 2015-44**

The SWRRIP sets out Victoria's long term vision and roadmap to guide future planning for waste and resource recovery infrastructure to achieve an integrated system that:<sup>3</sup>

- *effectively manages the expected mix and volumes of waste*
- *reflects the principles of environmental justice to ensure that impacts on the community, environment and public health are not disproportionately felt*
- *supports a viable resource recovery industry*
- *reduces the amount of valuable materials going to landfill.*

The SWRRIP identifies this site (described as the Deer Park Precinct, TPI Landfill and Boral Quarry) as an 'existing hub of state significance' for the following reasons:<sup>4</sup>

- *This site is the largest MSW [Municipal Solid Waste] landfill in the state and reprocesses significant tonnes of C&D [construction and demolition] materials and organics.*
- *It is well located close to the metropolitan Melbourne area and major transport routes.*

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<sup>3</sup> Page 11.

<sup>4</sup> Page 36.



- *There is potential to expand all activities onsite, including organics reprocessing, using existing buffers subject to meeting planning requirements and EPA approval.*
- *Urban encroachment and balancing community expectations in relation to the operation of the site is a future risk to the functionality of the site. If the site is to be maintained in the long term as a hub then planning needs to ensure the preservation of adequate buffer distances and that incompatible land uses are not established in proximity to the hub and activities on the site are conducted in a manner that does not impact on the community, environment and public health of surrounding land users.*

*Community engagement is needed to determine the outcomes for this hub including potential benefits to the community of this site remaining available for resource recovery activities, and to reassure the community that activities will have minimal impact on local amenity.*

With respect to 'existing hubs of state significance', the SWRRIP notes that:<sup>5</sup>

*Any impact on the functionality of these sites is likely to affect the waste and resource recovery system at the state level, which needs to be recognised when making local and regional planning decisions.*

### ***Metropolitan Waste and Resource Recovery Strategic Plan and Implementation Plan***

*The Metropolitan Waste and Resource Recovery Strategic Plan (2009) precedes the SWRRIP. The draft Metropolitan Waste and Resource Recovery Implementation Plan (2015) (MWRRIP) supersedes the 2009 Plan and aligns with the SWRRIP timeframes and initiatives. It more specifically sets out how the waste and resource recovery infrastructure needs of metropolitan Melbourne will be met over at least the next 10 years.*

While the focus of the MWRRIP is on resource recovery, it is also recognised that landfills will continue to have a role for the foreseeable future but that it is desirable to have fewer landfills that are well located and managed in accordance with best practice.

The MWRRIP specifically highlights the subject facility as a 'waste and resource recovery hub'. It notes:<sup>6</sup>

*"If this site does not continue its landfill operations in the medium term (beyond the current 5-10 years of approved airspace), Melbourne is at risk of having inadequate landfill capacity to manage waste for which there is no current resource recovery alternative.*

*The Deer Park precinct has potential capacity to operate beyond 2026. The site also has the potential to accommodate resource recovery operations over the long term..."*

### ***Waste Management Policy (Siting, Design and Management of Landfills) and Landfill BPEM***

All landfills in Victoria must comply with the *Environment Protection Act 1970*, its regulations, and relevant Waste Management Policies and State environment protection policies (SEPPs).

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<sup>5</sup> Page 94.

<sup>6</sup> Page 65.



*The Waste Management Policy (Siting, Design and Management of Landfills)* applies to all landfills receiving solid non-putrescible waste and/or Category C prescribed industrial waste.

A critical element of this policy is the implementation of best practice. The Landfill BPEM is the source document for best practice environmental management measures for landfills. Landfill owners and operators must have regard to this document in planning for works approval or licensing of future landfill sites and design of new landfill cells.

The Landfill BPEM additionally advises planning and responsible authorities on landfill buffers. For landfills such as the one in question that accept municipal (putrescible) waste, the Landfill BPEM advises that a default buffer of 500 metres should be provided between the landfill and any buildings and structures.<sup>7</sup> This buffer is stated to be 'required for landfill gas migration, safety and amenity impacts'.

The Landfill BPEM allows for the default buffer distance to be reduced based on a risk assessment that considers design and operation measures and evaluation demonstrating the environment would be protected and amenity not adversely affected.<sup>8</sup>

The Landfill BPEM advises responsible authorities considering a planning permit application for development within a landfill buffer to either require an environmental audit to be conducted under section 53V of the *Planning and Environment Act 1970* that assesses the risk of harm to the proposed development or use relevant information, where sufficient, from a previous assessment or audit.<sup>9</sup>

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<sup>7</sup> Page 13.

<sup>8</sup> Page 13.

<sup>9</sup> Page 14.

## 2. Key Issues

There are a number of key issues which Council submits should be addressed prior to any decision being made on the Applications. These issues could potentially have a significant impact on existing and future residential communities, the viability of industries, investment and the ability to implement the objectives of the Mt Atkinson and Tarneit Plains PSP.

### 2.1 Environmental sustainability

The Application materials state that the existing landfill is currently operating within the relevant legislative requirements and guidelines. Whilst this is the view expressed in the materials accompanying the application, Council is aware that there have been complaints received, particularly with regard to odour and litter escape from the site, which must be appropriately addressed before any decision is made to expand landfill operations on the site. Council also submits that alternative technologies should be investigated for this site, which would reduce the reliance on the current practices being dependent on such a large land supply.

Council's submission to the draft MWRRIP stated:

*"Council strongly supports implementation of alternate waste technologies that will reduce our reliance on landfill. Our community does not wish for the City of Melton, and in particular the Ravenhall hub to be turned into the primary disposal location for all of Melbourne's waste....we must move to a system where pre-sorting or alternate technologies are used first, with only residual inert waste requiring landfill".*

Council supports the expansion of the renewable energy production on site.

Council has voiced concern in previous submissions to the State government in relation to waste and resource recovery about this site being identified as one of three of the most important landfill sites for Melbourne with waste expected to come from all over Melbourne. Council acknowledges the site has been identified as a State significant resource and recovery site, is currently being quarried and is already operating as a landfill. However, reliance on so few sites for Melbourne's future waste and resource recovery needs may result in a landfill operation at this site which is larger than what may be required if other sites were sourced.

Council requests that the operators should be required to develop a detailed plan for the next 5-10 years which provides sustainable solutions for the collection, disposal and resource recovery for its waste collection – which coincides with Council's 2011-2016 'It Starts with Zero' waste management strategy.

Council also submits that the State Government rescinds this site as a major regional landfill for future expansion and that this landfill should cease operating once the current permit has expired – and that a fairer distribution of landfill sites needs to be provided across Melbourne.

There are also environmental impacts and inefficiencies in adopting a single point of landfill for a metropolitan area that extends an approximate 80 kilometres in width.

## 2.2 Timing of the planning permit compared with the works approval

The *Planning and Environment Act 1987* provides that permits expire if development or specified stages are not completed within the specified period of time. The default period is two years but this will be longer for landfills which often have a longer life. The purpose behind this provision is to allow stale proposals to be reassessed against changes in planning policy over time.

A proposal such as this makes it difficult to estimate reasonable timeframes for particular stages, or the development as a whole. The life of the facility is estimated to provide airspace for over 50 years.

There may be major changes to the way waste is managed across regions over time, and as such it is desirable that there are periodic opportunities to review the future development of landfill stages having regard to the manner in which policy changes and in which the surrounding area develops over time.

Council submits that this landfill should cease operating once the current permit has expired. The strategic directions developed through the consultative process for the SWRRIP will guide strategic planning to meet the infrastructure needs of Victoria and provide certainty to industry on the Victorian Government's plan for the next 30 years. Within the SWRRIP it is acknowledged that during this 30 year timeframe it is expected that the type and volume of waste generation will change.

As a result it is difficult to plan strategically beyond that horizon and that flexibility should be maintained for changes in technology, population growth, development patterns etc.

## 2.3 Rehabilitation of the landfill and landscaping of the site

The landfill would be progressively rehabilitated as each stage is completed. The applicant advises that there are opportunities for a number of new uses on the rehabilitated landfill site but these uses would be determined at the time of the landfill closure.

The Applications are accompanied by a future rehabilitation plan prepared by ERM.

The future rehabilitation of landfills and their after use is an important consideration in landfill planning. On a site of this scale, it is desirable that the future use and development of particular areas of the landfill is planned and staged in an orderly and coordinated manner, whilst providing an appropriate degree of flexibility. Some areas may be developable and other areas may be proposed as public open space, or for other uses but this is unknown at this stage.

Further detail regarding the future rehabilitation and use of the landfill is required, but given the life of the proposal, it is difficult to know with any certainty how the future rehabilitation of the landfill is likely to evolve.

Council submits that a detailed report is required relating to the implementation of the rehabilitation plan, including the costs involved with rehabilitation once the site has been decommissioned as well as the responsible stakeholders for the cost of the rehabilitation of the site.



Due to the lifespan of the quarry, Council submits that detailed landscaping plans be required to be submitted a short time after the closure of each cell to allow for a more progressive landscape approach across the entire site. The detailed plans would respond to the particular dimensions and slope of the cell.

The ERM report offers broad guidance on species and location, however it is submitted that any detailed plans should be approved by the EPA to ensure that the location, species and density of planting will not adversely impact on the operation of the capped cell.

The timing of completion for the landscaping should occur within 6 months of a cell being capped.

The Applications also propose to apply shared paths on the landfill site, including along Hopkins Road with a view to connecting to the path network proposed in the Mt Atkinson and Tarneit Plains PSP area. There are no details regarding the timing, delivery and cost of establishing this network on the landfill site. The provision of open space is determined by demand, which could create concerns if the rehabilitated landfill is expected to be taken over by Council. This could be surplus to Council's requirements and create a resource burden.

Considering this, Council submits that alternative plans should be identified for use and/or ownership of these areas, with consideration given to retaining these areas in private ownership or, given the landfill site is considered to be of State significance, it may be more appropriate for the State to take control in the long term (ie. Parks Victoria). It is noted that Parks Victoria is managing former landfills in the south-east of Melbourne.

Council recently adopted the *Significant Landscape Features Strategy* which identified a number of key views and landscapes that should be protected under the Significant Landscape Overlay. A number of volcanic cones and waterways were identified for protection.

Council submits that an assessment of the expected future impacts of these key features, particularly Mt Atkinson and Mt Cottrell, should be provided as part of the Planning Permit Application. Council would be concerned if views identified for protection are compromised as part of the final mounding, should the landfill expansion be approved. Council therefore recommends that mounds above ground level should be eliminated to preserve any significant view lines of Mt Atkinson, Mt Cottrell and the Melbourne CBD.

The proposal to vegetate the mounding should be carefully considered given the area in which the landfill is located is the Western Plains Grassland where trees are scarce, particularly given elevated areas are volcanic.

The landscape and visual impact assessment identifies the need for use of a light brown / sepia toned geotextile over the cells, rather than standard white material. This should form a requirement as part of a permit condition, should the Applications be approved.

It is acknowledged that there is established landscaping along the Hopkins Road frontage which also includes an earth mound that provides a visual barrier to the site from Hopkins Road. Council submits that the quality of landscaping and the maintenance of this area should be improved given the interface between this site and land uses to the west.

## 2.4 Buffers within the site's boundaries

Council is concerned that the proposed expansion provides buffers that extend beyond the site's boundaries and impact adjoining land parcels.

The site is located directly adjacent (east) of the Mt Atkinson and Tarneit Plains PSP, with Hopkins Road separating the two areas.

The PSP land was brought into the UGB in 2010 by the Minister for Planning and was identified for business and residential uses in the West Growth Corridor Plan in August 2012. Considering the land has been identified for urban uses for over six years, Council disputes the background analysis in the Application documents that assumes the PSP area to be a rural area. This incorrect assumption may have resulted in inaccurate modelling and recommendations which support the proposed use, and implications on surrounding land uses that weren't taken into consideration.

The Mt Atkinson and Tarneit Plains PSP has been prepared by the Metropolitan Planning Authority (MPA), with public exhibition concluding on 30 May 2016 (as part of Planning Scheme Amendment C162 to the Melton Planning Scheme).

Council approved a submission in response to the PSP at its Ordinary Meeting of Council on 27 June 2016. This submission has been sent to MPA with unresolved PSP matters expected to be heard at a Planning Panel hearing scheduled to commence on 12 September 2016.

The draft PSP proposes mixed residential and employment uses with a future population of around 19,000 people and delivery of approximately 18,000 jobs. The PSP area will be supported by a future Specialised Activity Centre, local town centres, Government and non-Government schools, community centres, and open space areas, and has been recognised as a State Significant Industrial Precinct.

Within the PSP documentation, the MPA acknowledges the possibility of a landfill expansion and proposes to mitigate odour impacts of any future approved landfill, should the permit application be approved. To achieve this the PSP applies business and commercial uses in the northern portion of the precinct to ensure sensitive uses and residential areas will be located over 1km from the proposed landfill edge.

Given the complexities of the proposal, it is Council's view that the buffers which affect the PSP area should be moved to be located entirely on the landfill site. This would require a boundary change to the cells proposed as part of the Applications.

It is acknowledged that placing the buffers solely within the boundaries of the subject site would limit the amount of landfill space available, however it is recommended that further consideration be given to avoiding the spill of landfill buffers onto adjoining land, where practicable.

If this is not supported, Council submits that an audit under section 53V of the *Environment Protection Act 1970* should be required to determine the mechanisms which would facilitate a reduction in the default 500m buffer to allow development to occur in the PSP area. The application as it currently stands will unfairly impact on the development potential of the land within the PSP.

There is also concern with the proposed buffers to the Caroline Springs area. It is considered that the buffers should be increased to at least 3km to reflect the buffer changes made to the Burnside, Deer Park and Ravenhall areas.

## 2.5 Landfill gas migration

The issue of landfill gas migration and its potential offsite impacts does not appear to have been given sufficient consideration. This is considered to be a potentially significant risk if not identified and managed correctly.

In considering any planning scheme amendment or planning permit application, in accordance with the *Planning and Environment Act 1987*, the planning or responsible authority must have regard for the effects of the environment, including landfill gas, on the development.<sup>10</sup>

The Landfill BPEM states relevantly as follows:<sup>11</sup>

*“Proposed developments and any works within the recommended landfill buffer can pose a safety risk by potentially providing preferential pathways for landfill gas migration, or providing an environment where landfill gases can accumulate to dangerous levels.*

*All buildings and structures should be considered, including:*

- buildings and structures used for sensitive or non sensitive uses*
- change of use*
- infrastructure installation*
- installation of pipelines’*

It further states:<sup>12</sup>

*“Responsible planning authorities need to be provided with sufficient information by the proponent to satisfy them that the proposed new development or rezoning will not be adversely impacted by its proximity to the landfill site.*

*Where the proposed development (or planning scheme amendment that would have the effect of allowing development) encroaches into the recommended landfill buffer area or increases the extent of development within the already encroached buffer area, EPA recommends that the planning or responsible authority require an environmental audit be conducted under Section 53V of the Environment Protection Act. The audit must assess the risk of harm to the proposed development posed by the potential offsite migration of landfill gas and amenity impacts resulting from the landfill”.*

To this end, Council submits that an audit under Section 53V should be required to determine the impact that landfill gas migration is likely to have outside the boundaries of the subject site. This should be an obligation on the landfill operators as any mitigation measures required to be implemented should be at a cost and responsibility of the operator rather than affected land owners/occupiers.

It is understood that landfill gas will travel along the path of least resistance where the pathways lead to migration of the gas off-site to surrounding land and a build-up of methane

<sup>10</sup> Sections 12(2)(b) and 60(1)(e).

<sup>11</sup> Page 14.

<sup>12</sup> Page 14.



gases in enclosed spaces, such as service conduits, sub-floor voids, basements and wall cavities.

The subject site is located within an area close to major gas transmission lines running north-south along the western side of Hopkins Road and east-west along Middle Road. There is also major water infrastructure running north-south on the southern side of Middle Road. These trenches may be capable of being a conduit for landfill gas up to 30 years beyond the life of the landfill.

Council is very concerned that its residents and business owners/investors not be exposed to the risk of landfill gas migration.

Any mitigation measures required to contain landfill gas onsite should be at the cost and responsibility of the applicant, and not any existing or future land owners surrounding the site.

The 500m buffer required for this type of facility in accordance with the Landfill BPEM effectively sterilises land outside of the property boundary and could significantly impact on the ability to implement the proposed Mt Atkinson and Tarnet Plains PSP. It may also impact on the State significant Western Interstate Freight Terminal (WIFT).

The draft Mt Atkinson PSP has been prepared on the basis that all landfill gas migration will be managed entirely on the landfill site. Conversely, the Applications identify the need for a 500m buffer as detailed above. A large portion of this 500m buffer will directly affect the PSP area. The applicant recognises that this buffer distance could be reduced following an audit, but has not committed to undertaking this audit.

Council does not agree with the MPA's assumptions regarding landfill gas migration within the PSP. MPA has formed the opinion that landfill gas migration will be managed entirely on the landfill site. Given no decision has been made on the Permit Application, and given the Applications have not been through a consultation process, Council submits the MPA should not assume that this is the case and should at least recognise the potential for landfill gas within the PSP, and put in place planning controls to manage the associated risk.

Although land has not yet been specifically identified for the WIFT, it is nominated in the West Growth Corridor Plan as being in a location south of the site. This is a significant piece of infrastructure that has funding of \$5 million (from Federal and State government) for a pre-feasibility study. If given the final go-ahead, the project would include the construction of an interstate terminal and freight precinct at Truganina in Melbourne's west, as well as a rail link to the Interstate Rail Freight Network.

Council additionally notes the Landfill BPEM requires a buffer of 100 metres between a landfill of this type and surface water.

The Skeleton Creek corridor, covered by the Environmental Significant Overlay, is located within 100m of the proposed landfill area. The applicant has advised that the creek is in fact devoid of water and the physical alignment of the creek isn't very clear. There is a slight depression on the western side of Hopkins Road and a culvert that provides a path for water underneath the road. The eastern extension of Skeleton Creek as depicted by the Overlay is much harder to identify. This is possibly due in part to the natural shallow nature of the creek in this section or possibly the earthworks undertaken to create the landscape mounds forming part of the site, or a combination of the two.

Council submits that further investigation is required in regards to the compliance with the Landfill BPEM relating to the minimum 100m buffer from surface water.

## 2.6 Native Flora and Fauna

Council has concerns regarding the data that has been used to assess whether the Striped Legless Lizard is found on site.

Council considered this report to be unsatisfactory in assessing the aspects of the proposal relating to native vegetation removal. Subsequent reports were provided, however Council retains some concerns regarding the data that has been used to assess whether the Striped Legless Lizard is found on site.

Council agrees that the flora is predominately exotic and the vegetation quality poor, however past surveys of the land have revealed that the Striped Legless Lizard was widely and abundantly found on the site during survey work between 2004-2007.

The contention that areas outside the current *Environment Protection and Biodiversity Act* (EPBC) approval are insignificant for flora or fauna has not been proved to the satisfaction of Council officers and requires additional investigation.

Council agrees that the flora is predominately exotic and the vegetation quality poor, however past surveys of the land have revealed that the Striped Legless Lizard was widely and abundantly found on the site during survey work between 2004-2007.

There are two consultants' reports (Conole & Barlow 2004; Quin et al. 2007), that don't appear to be referenced in the response to Council's request for further information, or in any material pertaining to the EPBC approval 2002/862 on which the applicant relies. Data contained in the reports was available when the EPBC referral was made, but not included.

Final EPBC approval came in 2005, after the 2004 report was available, but not supplied. These reports were part of ecological assessment work commissioned by Boral Resources. Amongst other matters these reports show the results of surveys for Striped Legless Lizards (*Delma impar*) (SLLs) within the EPBC approval area and proposed landfill expansion area, which contradict assertions made in the Ecology & Heritage Partners May 2016 report (#8024). It appears that the information contained in the Ecology Australia reports by not being referenced by Ecology & Heritage Partners has led to incorrect assertions being made about distribution and habitat use by SLLs within the area of interest.

The contention that areas outside the current EPBC approval are insignificant for flora or fauna has not been adequately addressed to Council's satisfaction and as such Council submits that additional work should be required to be undertaken in this regard.

## 2.7 Amenity Impacts

The current landfill has resulted in complaints from surrounding residents, particularly in relation to the escape of odour and litter from the site. Council acknowledges attempts by the landfill operator to mitigate these issues, most recently with the removal of the composting activity and other measures to address both the odour and litter issue. Council would be concerned if there were ongoing off-site amenity issues as a result of odour emission and litter escape, particularly impacting on sensitive land uses in the vicinity of the site and adjoining residential communities of Caroline Springs, Deer Park, Derrimut and the future communities proposed by the Mount Atkinson and Tarneit Plains Precinct Structure Plan area. The landfill operator has much work to do in order to sufficiently address these issues.

Council therefore does not support the application on the basis of the current ongoing odour issues that continue to come from the site and the ongoing community concerns about the detrimental and negative health effects on the community and its residents.

The Applications do not clearly demonstrate how the operator will manage roads surrounding the proposed expansion on an ongoing basis. Dust and mud, litter, noise and pollution will increase as landfill traffic increases. The Applications should clearly detail how the operator will ensure localised road networks are not negatively impacted by truck movements and associated management issues on an ongoing basis, including the party who will be responsible for ongoing roadside management and how they will perform that role.

The Hydrogeological Assessment submitted does not provide any assessment on the impact that stormwater runoff may have external to the site. The site shares drainage channels and tributaries with surrounding areas, including the PSP area to the west. It is unclear in the plans if the draft Drainage Service Schemes for the PSP area to the west of the site have been considered, in particular the draft Truganina DSS. Comments from Melbourne Water will be required in this regard.

Given the strategic context, the Applications need to clearly identify if there will be any increased impacts/threats to surrounding land as a result of drainage and stormwater management of the landfill use. It is noted that rainfall from external catchments will be diverted around the landfill site and there may be discharge of stormwater to surrounding infrastructure and landholdings. This raises concerns around a possible increase in flows, impacts on drainage infrastructure, stormwater runoff quality or impacts to drainage within surrounding area. The stormwater Management Plan submitted with the Works Approval suggests further detailed design is required to be prepared at the appropriate time for approval by Council.

Council can provide draft conditions for the consideration of the Panel to assist if requested.

## 2.8 Traffic and Transport

The proposed use will result in increases in traffic, particularly within the City of Melton's road network. The Transport Impact Assessment notes the increase in traffic along Christies Road to enter the site at Riding Boundary Road and highlights the expected increase in traffic in relation to the Caroline Springs train station and transfer station.

The Assessment also notes that current heavy vehicle movements will increase from 810 per weekday in 2015 to 1130 per weekday in 2035, but does not appear to consider a number of other traffic generating uses within the surrounding area. This includes the development of land in Palm Springs, Warrawee PSP and the growth of any other future PSPs in the local area. Consideration also needs to be given to the Western Interstate Freight Terminal (WIFT) and likely additional traffic to be generated from this particular project. If these were not considered as part of the traffic modelling, they may result in annual traffic generation greater than the 2% adopted within the Transport Impact Assessment.

Any resultant congestion around the Christies Road interchange may lead to truck traffic seeking alternative routes to get to the site and could impact other roads including Middle Road, the Hopkins Road interchange and Hopkins Road. Combined with PSP development, the impacts on localised roads may not have been adequately captured.

Traffic capacity and safety is a major concern in the area and Council does not believe that the current road network will not be able to cater for the additional traffic anticipated.



### 3. Comments and Recommended Changes

The following table provides a summary of Council officers' comments on the proposal and any subsequent recommendations:

Issue/Comment	Recommendation
Alternative/additional sites and alternative technologies need to be considered for waste management	<ol style="list-style-type: none"> <li>1. State government to investigate additional landfill or expansion site options to respond to Melbourne and Victoria's growth, and that the landfill ceases to operate once the current permit has expired.</li> <li>2. Investigate better technologies to manage waste so that traditional landfilling is not relied upon into the future.</li> <li>3. State Government initiate an independent study to ensure that all environmental, social and health effects of this application have been considered thoroughly and that this report is available to residents.</li> <li>4. State Government support the waste industry to find alternative methods of waste disposal other than the traditional exposed landfill sites.</li> </ol>
Traffic and transport impacts	<ol style="list-style-type: none"> <li>1. Traffic capacity and safety is a major concern in the area and Council does not believe that the current road network will be able to cater for the additional traffic anticipated.</li> <li>2. The applicant to demonstrate that the current access arrangements will safely accommodate both the quarry and landfill activities or provide a proposal that outlines any proposed changes to access.</li> <li>3. Traffic modelling, taking into account future end uses and traffic demand, to be undertaken prior to any decision being made. This modelling needs to consider the cumulative effect of the various surrounding land uses.</li> </ol>
Impact of stormwater, overland flows and drainage on adjoining sites.	<ol style="list-style-type: none"> <li>1. Additional information to be provided to demonstrate that the proposal will not adversely impact on stormwater, overland flows or drainage infrastructure. This also needs to take into account any potential for localised flooding on surrounding land or roads.</li> </ol>
Landscaping of the mounds and reducing visual impact	<ol style="list-style-type: none"> <li>1. Light brown or sepia coloured geotextile to be used in the construction phase of mounds to reduce the visual impact.</li> <li>2. Mounds to be eliminated above ground level for any future landfill to preserve any significant view lines of Mt Atkinson, Mt Cottrell and the Melbourne CBD.</li> <li>3. Detailed landscape plans to be submitted and implemented within 3 months of a cell being completed to allow for the progressive landscaping/rehabilitation of the site.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Landscaping, rehabilitation and any other embellishments such as lookouts, paths etc over the closed landfill are to be undertaken by the operator not Council.</li> <li>5. Additional landscaping and an increased maintenance regime to be undertaken within the existing landscaping area along Hopkins Road to improve the interface with the proposed land uses to the west of the site.</li> </ol>
Native flora and fauna	<ol style="list-style-type: none"> <li>1. Further studies to be undertaken for the Striped Legless Lizard and any recommendations regarding translocation or preservation of areas to be adopted.</li> <li>2. Evidence to be provided that the applicant has satisfied any native vegetation offset obligations.</li> </ol>
Timing of the planning permit v the works approval	<ol style="list-style-type: none"> <li>1. The landfill should cease operating once the current permit has expired.</li> </ol>
Buffers applied to the landfill	<ol style="list-style-type: none"> <li>1. Landfill buffers to be contained wholly within the boundaries of the site.</li> <li>2. Proposed buffers to the Caroline Springs area should be increased to at least 3km to reflect the buffer changes made to the Burnside, Deer Park and Ravenhall areas.</li> </ol>
Landfill gas migration	<ol style="list-style-type: none"> <li>1. An audit under Section 53V of the <i>Environment Protection Act</i> to be undertaken prior to any decision being made on the Applications.</li> <li>2. Any recommendations of the resulting audit report to be complied. The responsibility for this to rest with the landfill operator.</li> <li>3. The views of APA (gas pipeline) and Melbourne Water to be sought.</li> <li>4. The landfill operator to confirm that the proposal complies with the buffers in Landfill BPEM, specifically the 100m from surface water in relation to Skeleton Creek.</li> <li>5. Land Ops should be required to disclose the outcomes from the Landfill Gas Management Plan for the sake of openness and transparency.</li> </ol>
Amenity impacts	<ol style="list-style-type: none"> <li>1. Council does support the proposal on the basis of the current ongoing odour issues that continue to come from the site and the ongoing community concerns about the detrimental and negative health effects on the community and its residents.</li> <li>2. The operator to adhere to all conditions on the Works Approval issued by the EPA.</li> <li>3. The landfill operator to use best endeavours to rectify any amenity impacts as soon as practicable. Any matters presenting a safety risk to be rectified immediately.</li> <li>4. The operator to provide a maintenance plan which outlines the proactive management of windblown litter, mud on roads, dust, emissions etc.</li> <li>5. Mitigation measures recommended in the Noise Assessment to be implemented.</li> </ol>



	<p>6. Appropriate measures need to be implemented to control odour emissions from the site so that they don't adversely impact surrounding communities.</p>
<p>Timing of the Panel in relation to the PSP Panel</p>	<p>1. It is requested that the Panel Hearing for the Applications be heard before the Panel Hearing for the Mt Atkinson and Tameit Plains PSP. The landfill activities have the potential to impact on the viability of the land within the PSP and jeopardise the future implementation of the plan.</p>
<p>Melbourne Regional Landfill Community Consultation Group</p>	<p>1. It is requested that this Group be immediately reinstated to include community members, Council representatives, and other relevant stakeholders to ensure transparency and accountability to the community.</p>

## 4. Conclusion

In conclusion, Council opposes the planning application for the extension of the Melbourne Regional Landfill at 408-546 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall.

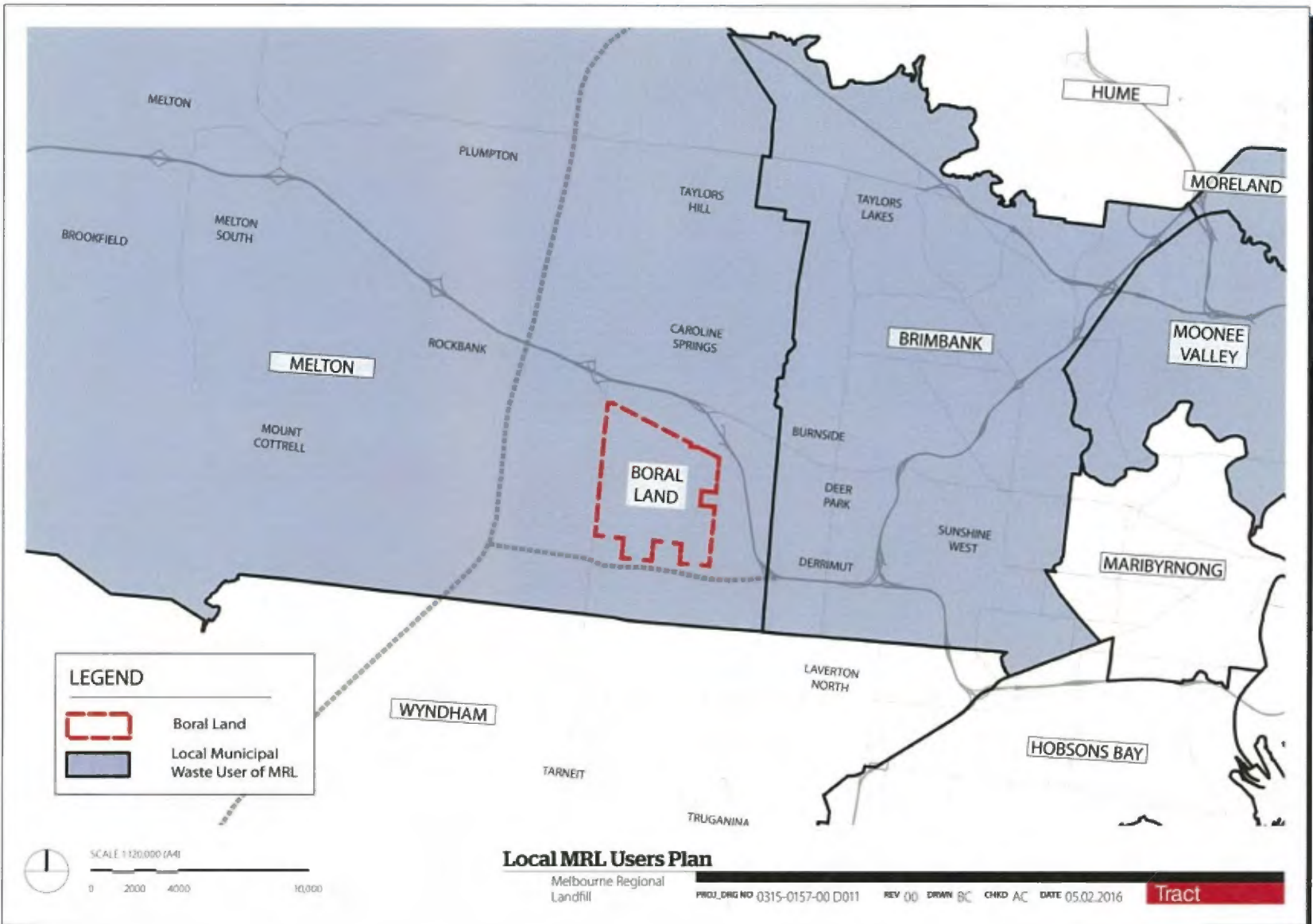
## 5. Attachments

### 5.1 Approved quarry buffer activity (in green)



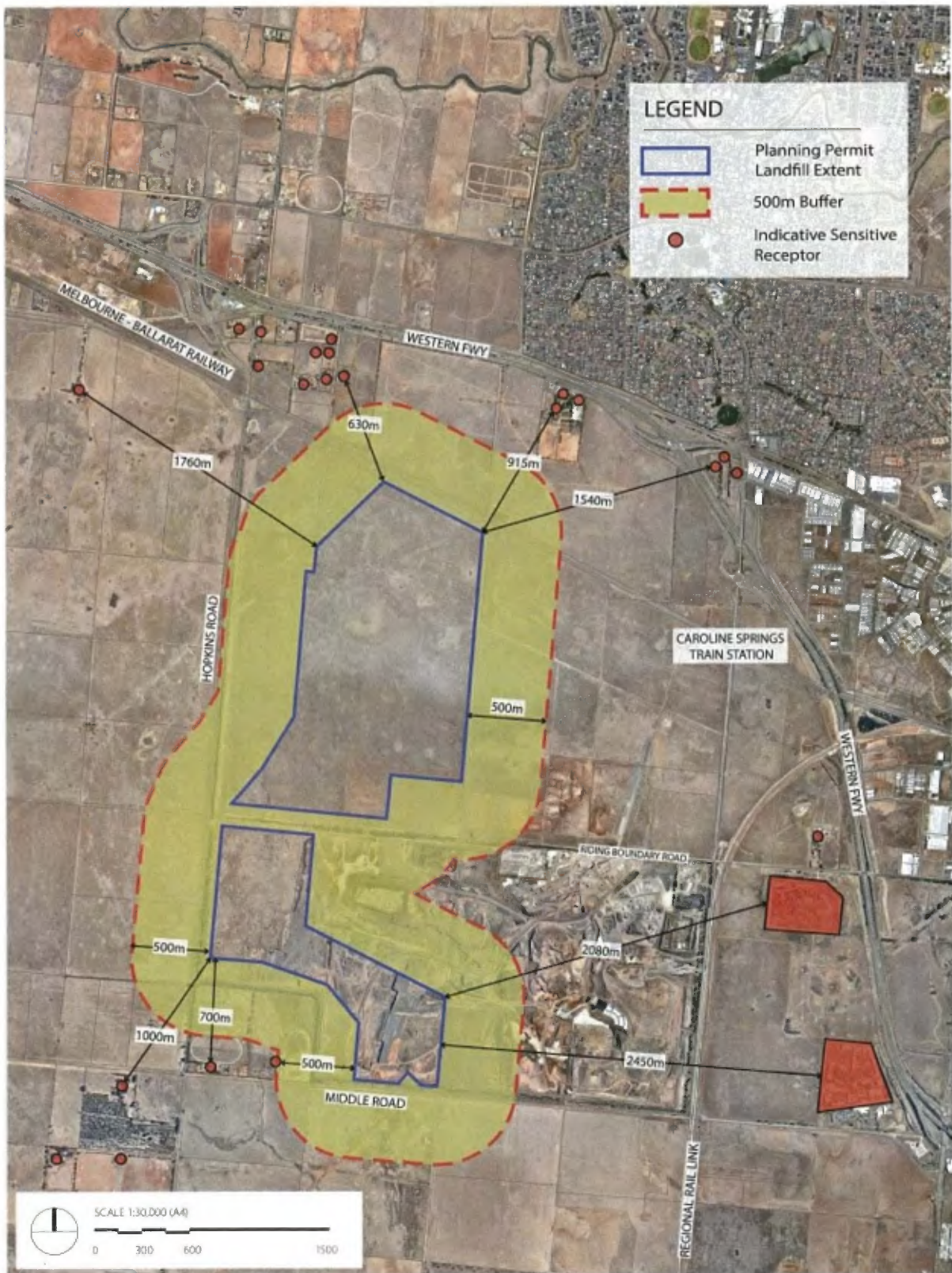
**Existing Conditions Plan**

5.2 Locality Plan





### 5.3 Buffer Plan



**Buffer Plan**

# Submission Cover Sheet

# MRL00063

Do you wish to be heard?

Yes

Full name

**Michelle Lee**

Name of organisation:

Metropolitan Waste and Resource Recovery Group

Address:

Level 4 Tower 4 World Trade Centre      18-38 Siddeley Street  
Melbourne

Address Affected

Comments

MWRRG's written submission to the MRL Ravenhall site combined works approval application 1002191 and planning permit application PA2016/5118 is attached

Attachment Name

MWRRG-MRL-Combined-Applications20160714.pdf, type application/pdf, 1.5 MB



14 July 2016

Hon. Richard Wynne MP  
Minister for Planning  
Level 20,  
1 SPRING STREET  
MELBOURNE 3000

Dear Minister,

### **MRL RAVENHALL COMBINED PLANNING AND WORKS APPROVAL APPLICATIONS**

The Metropolitan Waste and Resource Recovery Group (MWRRG) appreciates the opportunity to provide comment on the combined planning permit and works approval applications for the Melbourne Regional Landfill Ravenhall Site (Ravenhall Site).

The Ravenhall Site is a strategically significant waste and resource recovery infrastructure site for the greater metropolitan region. MWRRG's comments are focussed on the need to acknowledge and protect the Ravenhall Site as a long term waste and resource recovery site of regional and state importance, and to ensure best practice operations are achieved at the site at all times.

#### ***Victorian Waste and Resource Recovery Infrastructure Planning Framework***

MWRRG's comments are provided under the Victorian Waste and Resource Recovery Infrastructure Planning Framework (The Framework) set out in the *Environment Protection Act 1970* (EP Act) (Division 2AB).

The Framework supports the following objectives:

- to ensure long term strategic planning for waste and resource recovery infrastructure at state and regional levels
- to enable waste and resource recovery infrastructure planning to be effectively integrated with:
  - land use and development planning and policy
  - transport planning and policy.

The Framework is comprised of:

- the *Statewide Waste and Resource Recovery Infrastructure Plan* (State Infrastructure Plan), prepared by Sustainability Victoria
- seven *Regional Waste and Resource Recovery Implementation Plans*, prepared by regional Waste and Resource Recovery Groups.

The State Infrastructure Plan was released by Government on 11 June 2015. It sets a long term vision, goals and strategic direction for the Victorian waste and resource recovery system over a 30 year period.

Under the Framework, MWRRG is responsible for developing the *Metropolitan Waste and Resource Recovery Implementation Plan* (Metropolitan Implementation Plan) which sets out how the waste and resource recovery infrastructure needs of the greater Melbourne region will be met over at least a ten year period. This plan must also set out how the strategic directions listed in the State Infrastructure Plan will be implemented for metropolitan Melbourne.

Following the release of a public consultation draft in November 2015, MWRRG has now completed the consultation phase and has submitted the *Metropolitan Waste and Resource Recovery Implementation Plan 2016* for approval. MWRRG adopts a 30 year outlook to promote alignment and integration with land use planning, and to provide transparency for decision makers, stakeholders and the community.

The *Metropolitan Waste and Resource Recovery Strategic Plan 2009* (2009 Strategic Plan) remains the statutory waste and resource recovery infrastructure plan for Melbourne until such time that the Metropolitan Implementation Plan is approved.

MWRRG's comments on this combined planning permit and works approval applications consider the:

- *2009 Metropolitan Waste and Resource Recovery Strategic Plan* which is referenced in the State Planning Policy Framework at Clause 19 (Infrastructure)
- *2015 public consultation Draft Metropolitan Waste and Resource Recovery Implementation Plan* (2015 Consultation Draft Plan) including supporting research, analysis and consultation undertaken to inform the final 2016 implementation plan awaiting approval
- *Statewide Waste and Resource Recovery Implementation Plan 2015*, which forms part of the Framework and guides development of the Metropolitan Implementation Plan.

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Sustainability Victoria's submission will provide greater detail on the State Infrastructure Plan.

### ***Metropolitan significance of Ravenhall Site***

The Ravenhall Site has been considered a significant regional site in state statutory waste plans since 1996. When the site commenced landfilling in 1998, it was estimated that the site's life was greater than 50 years. At that time, the site was located outside the Urban Growth Boundary.

The site continues to be a strategically significant waste and resource recovery site for the greater metropolitan Melbourne region.

The State Infrastructure Plan lists the Ravenhall site (referred to as "Deer Park Precinct TPI Landfill and Boral Quarry") as an existing hub of state importance, and comments that these hubs:

*"...currently undertake activities or manage one or more waste or material streams significant at the state level...Any impact on the functionality of these sites would make it more difficult to manage the State's waste management and resource recovery system..."*

The Ravenhall Landfill is scheduled in the Metropolitan Landfill Schedule, which forms part of the 2009 Metropolitan Strategic Plan. The site (referred to as "Boral, Riding Boundary Rd, Truganina") is scheduled until 2018, with a likely closure date post 2040 stated.

MWRRG regards the Ravenhall Site as a strategically significant waste and resource recovery facility. The Ravenhall Site, similar to other metropolitan waste and resource recovery hubs of state significance, has been planned as a long term facility. MWRRG notes that landfills are significant engineering projects that are capital intensive, and this is influenced by the need to invest in technologies and operating practices that can meet the regulatory requirements set through the *Siting, design, operation and rehabilitation of landfills* (the Landfill BPEM) (EPA



publication 788). Consequently landfills are generally planned, operated and rehabilitated over significant periods of time.

A reduction of the planned capacity of these hubs of state significance would be expected to impact the available capacity of the waste and resource recovery network serving metropolitan Melbourne. MWRRG observes that it is difficult to quickly replace lost capacity in the network – the planning and commissioning period of landfills is generally five to seven years.

The 2015 Consultation Draft Plan reflects the strategic significance of the site, and:

- identifies the Ravenhall Site as a significant site that has the capacity to provide for resource recovery, processing facilities and waste disposal over the long term, and has the potential to operate beyond 30 years
- schedules the Ravenhall Site as a landfill accepting putrescible, solid inert and other wastes, noting the site has potential to operate beyond 2026.

The 2015 Consultation Draft Plan also makes clear that Melbourne is at risk of having inadequate landfill capacity to manage its current and projected waste volumes if this site does not continue its landfill operations into the long term.

***Broader strategic context: the 2015 Consultation Draft Metropolitan Implementation Plan***

The 2015 Consultation Draft Plan sets out how Melbourne's future waste and resource recovery needs will be met over the next 10 years.

The 2015 Consultation Draft Plan notes population growth will increase the amount of waste that needs to be managed in metropolitan Melbourne. Ensuring Melbourne has the right infrastructure, in the right place and at the right time to manage its waste is a significant challenge. By 2042 it is projected that waste volumes will grow by 63%, meaning that we will need to manage 16.5 million tonnes a year. In 2014-15, just under 10.5 million tonnes of waste was generated and managed in metropolitan Melbourne.

Approximately 73% of all waste is currently recovered and not landfilled. MWRRG seeks to reduce Melbourne's reliance on landfill through new resource recovery infrastructure and through removing organic waste from landfill. In this context, landfills are expected to progressively manage less waste.

Notwithstanding, it is projected that substantial tonnages of waste will still need to be landfilled in Melbourne over the next thirty years. Strategically significant landfill infrastructure, including the Ravenhall Site, will continue to play a central role in protecting health and environment by safely managing waste materials that have not been, or cannot be recycled.

The 2015 Consultation Draft Plan responds to the challenges of landfills closing in the south east of Melbourne and expected growth in waste volumes driven by population growth. The plan proposes:

- to schedule a boost in resource recovery infrastructure that will slow down landfilling rates
- a priority focus on organics, to reduce the burden that these materials can present to surrounding communities when landfilled
- reducing the need to transport waste through increasing the transfer station network's capacity to recover and compress waste, and through supporting onsite recycling technologies
- a strong expectation and requirement that local government and industry will meet best practice requirements, and will involve communities in decision making



- a clear land use planning strategy that involves industry, councils and communities in planning for the future of hubs, and that defines and protects buffer separation distances.

Given the goal of reducing Victoria's reliance on landfilling, expressed in the Statewide Waste and Resource Recovery Infrastructure Plan and MWRRG's public 2015 Consultation Draft Metropolitan Implementation Plan, MWRRG expects that over time, the Ravenhall Site will incorporate a range of integrated activities. These may include opportunities to recover materials, as well as other, advanced resource recovery technologies. MWRRG considers that any approvals need to facilitate resource recovery opportunities for the site.

### ***Buffers and Alignment with Mt Atkinson and Tarneit Plains PSP Amendment C162***

Buffer distances for the Ravenhall Site are set through the best practice environmental management publication, Siting, design, operation and rehabilitation of landfills (the Landfill BPEM, EPA publication 788). The landfill BPEM requires that a minimum 500 metre landfill gas migration buffer be maintained for operating and closed landfills. Due to the size of the Ravenhall Site and its potential operating capacity EPA Victoria has required a 1000m amenity buffer be identified to inform the planning of sensitive uses around the site. MWRRG supports EPA buffer distance requirements.

As required in Clause 19.03-5 of the State Planning Policy Framework, appropriate acknowledgement and protection of these buffer distances are critical. Identifying and protecting buffers will minimise risk for the adjoining community, and protect current and future waste and resource recovery operations at the Ravenhall Site.

The planning of adjoining sites and land uses in these buffers should consider the strategic importance of the Ravenhall Site and its ongoing role as a waste and resource recovery hub to ensure the long term role is not compromised.

MWRRG has made a submission to the recently advertised Mt Atkinson and Tarneit Plains Precinct Structure Plan and Amendment C162. MWRRG submitted that development within the PSP has the potential to adversely impact the viability of the Ravenhall Site if the landfill buffers extending into the precinct structure plan area are not acknowledged and protected from encroachment by sensitive land uses. MWRRG has submitted to the Metropolitan Planning Authority that it considers it crucial that Amendment C162 acknowledges and protects the Ravenhall sites buffer areas.

A Farming Zone currently extends along the boundary of the Ravenhall Site and its retention would allow this land to act as a buffer to protect the adjoining Mt Atkinson and Tarneit Plains PSP from the potential of off-site impacts for quarry and landfill activities. Amendment C162 proposes rezoning this land to Urban Growth Zone. The future removal and replacement with Industrial and Business zoning needs to ensure the future use of this land for sensitive uses is restricted, the risk of future landfill gas migration is mitigated and the integrity that was provided by the farming zone buffer is maintained under the proposed Urban Growth Zone.

More broadly, MWRRG is working towards protecting buffer areas through the Local Buffer Support Program (LBSP). The LBSP Program seeks to better understand and address encroachment of sensitive land uses into the buffer areas of waste and resource recovery facilities. The Program is being undertaken by the MWRRG in collaboration with the State government waste portfolio and key stakeholders. The anticipated outcomes of the Program are the development and implementation of land use planning approaches that will better protect and maintain buffer areas in local planning schemes.

### ***Works Approval and Best Practice operations***

Communities living near the vicinity of the Ravenhall Site expressed significant concern with operational impacts during the five week Metropolitan Implementation Plan consultation period last year. Concerns include the proposed timelines, scale of the landfill, impact on surrounding place, odour, dust, traffic, and litter.

MWRRG expects the site to operate to best practice standards, and expects EPA Victoria to effectively regulate to achieve this outcome, and this includes the setting of appropriate landfill gas and amenity buffers.

The 2015 Consultation Draft Plan emphasised the need for all operators of waste and resource recovery facilities to meet their regulatory obligations and to operate according to best practice operations. MWRRG supports, through its planning and procurement activities, the promotion of best practice and continuous improvement of operations at the Ravenhall site. MWRRG considers this also includes opportunities for increased resource recovery.

The 2015 Consultation Draft Plan also emphasised the importance of community and stakeholders being engaged in waste and resource recovery decision making. MWRRG expects that ongoing planning and operations of the Ravenhall site includes community and stakeholder engagement.

### ***In conclusion***

The Ravenhall Site is a strategically significant waste and resource recovery infrastructure site for the greater metropolitan region, and has been considered a strategic regional site in statutory waste plans since 1996.

In this context, MWRRG considers that the Ravenhall Site should be acknowledged and protected as a long term waste and resource recovery site of regional and state importance. In recognising the long term role of this site, MWRRG emphasises the importance of the site operator meeting their regulatory obligations, and achieving best practice and continuous improvement in all its operations.

MWRRG considers it critical that buffer distances currently applying to the landfill site, in addition to any buffer distances that may come into effect on any approval of an extension to the landfill, should be clearly articulated and be legible to statutory planners in order to ensure buffers are protected and maintained. Operating buffer distances should inform land use planning decisions on adjoining land and sensitive uses discouraged in buffer areas.

If you have any queries in relation to MWRRG's comments please do not hesitate to contact MWRRG Principal Planner Michelle Lee 86989821 or email [michelle.lee@mwrrg.vic.gov.au](mailto:michelle.lee@mwrrg.vic.gov.au).

Yours sincerely

Robert Millard  
Chief Executive Officer





# Submission Cover Sheet

# MRL00088

Do you wish to be heard?

No

Full name

**Andrew Radojkovic**

Name of organisation:

The Department of Economic Development, Jobs, Transport and Resources

Address:

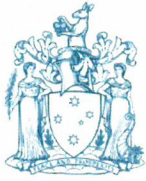
Level 23 / 1 Spring Street  
Melbourne

Address Affected

Comments

Attachment Name

Letter-to-Planning-Panel-15-July-2016.pdf, type application/pdf, 689.6 KB



## Department of Economic Development, Jobs, Transport and Resources

Ref: WA97

GPO Box 4509  
Melbourne Victoria 3001 Australia  
Telephone: 03 9651 9999  
[www.economicdevelopment.vic.gov.au](http://www.economicdevelopment.vic.gov.au)  
DX 210074

### **Melbourne Regional Landfill Expansion Panel**

#### **PLANNING PERMIT APPLICATION NUMBER PA2016/5118 - PROPOSED RAVENHALL LANDFILL EXTENSION**

Dear Panel,

I'm writing with regards to Planning Permit Application Number PA2016/5118 on behalf of the Earth Resources Regulation Branch (ERR) of the Department of Economic Development, Jobs Transport and Resources (DEDJTR).

Planning Permit Application Number PA2016/5118, submitted by Landfill Operations, seeks the approval to use land at 408-546 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall for the expansion of the Melbourne Regional Landfill. The proposal also requires a works approval (Application Number 1002191) from EPA Victoria.

ERR regulates the sustainable development of Victoria's earth resources including the minerals, petroleum, greenhouse gas geological storage, extractives and geothermal industries. ERR is responsible for ensuring that these industries comply with relevant regulations by setting conditions and ensuring compliance through a range of enforcement activities.

Boral is the holder of Work Authority 97, a major quarry on the subject land, and has a planning permit and work authority to quarry rock across the majority of the site.

ERR has considered the application and does not object to the planning permit and works approval application for the proposed landfill.

We note that the EPA licence process following the permit and works approval stages will consider the detailed interplay and timing issues between the quarry and landfill. Please note that ERR does not wish to present to the panel regarding this matter. Should you require further information, please contact Ian McLeod (Operations Manager Metro) on 8392 6053 or at [ian.mcleod@ecodev.vic.gov.au](mailto:ian.mcleod@ecodev.vic.gov.au).

Yours sincerely,

Andrew Radojkovic  
**A/Director Statutory Authorisations**

15 / 7 / 2016

# Submission Cover Sheet

# MRL00076

Do you wish to be heard?

No

Full name

**Michael Prior**

Name of organisation:

Melbourne Water

Address:

990 La Trobe Street  
Docklands

Address Affected

Comments

Melbourne Water provides the attached submission as the regional floodplain management and drainage authority.

Attachment Name

Melbourne-Water-Submission-Final.pdf, type application/pdf, 2.1 MB

15 July 2016

Mr Nick Wimbush  
Panel Chair  
Planning Panels Victoria  
PO Box 500  
EAST MELBOURNE VIC 8002

Dear Mr Wimbush,

**Re: Melbourne Water Submission - Melbourne Regional Landfill Expansion, Ravenhall**

Melbourne Water has considered the proposed regional landfill expansion with regard to State Planning Policy Framework (SPPF). Under the Policy Guidelines of Clause 13.02 – Floodplains, Planning must consider as relevant:

- Any floodplain management manual of policy and practice, or catchment management, river health, wetland or floodplain management strategy adopted by the relevant responsible floodplain management authority.

Melbourne Water, as the responsible floodplain management authority, **objects to the proposal**, as it has not considered the Truganina Development Services Scheme which has been adopted for this catchment.

In addition to State Planning Policy, Melbourne Water has broad functions for stormwater drainage, floodplain management and river health in accordance with our functions as the Regional Drainage, Floodplain Management and Waterway Management Authority under the *Water Act 1989*.

These broad functions for waterway management are summarised under Section 189:

- (a) To identify and plan for State and local community needs relating to the use and to the economic, social and environmental values of land and waterways;
- (b) implement schemes for the use, protection and enhancement of land and waterways; and
- (ba) Carry out works and activities,

To improve the environmental values and health of water ecosystems including their biodiversity, ecological functions, quality of water and other uses that depend on environmental condition.

Further, in Section 199(1A) of the Water Act, Melbourne Water has the following responsibilities specifically related to its regional drainage function:

- (a) to provide, manage, operate, protect and maintain drainage systems into all designated waterways and all designated land and works within its waterway management district;

(b) to develop and implement plans or schemes, and to take any action necessary (i) to bring into operation new drainage systems and (ii) to improve stormwater quality of water in drainage systems; and

(2) An authority must perform its functions in an environmentally sound way.

Melbourne Water's submission details the grounds for objection and alterations required to the application prior to further assessment.



## Section 1.0: Designated Waterways within the Proposed Permit Area

### *1.1 Skeleton Creek*

Skeleton Creek is a 'Designated Waterway' under Section 189A of the Water Act (1989). The current alignment is generally located parallel with Hopkins Road upstream of the site, crossing under Hopkins Road between Middle Road and Riding Boundary Road (see Appendix 1). The catchment area upstream is approximately 450-490 hectares located north-west of the permit site. The upstream catchment is predominantly rural (undeveloped); however this area has been identified for future urban development through Amendment C162 to the Melton Planning Scheme (Mt Atkinson and Tarneit Plains Precinct Structure Plan). Melbourne Water notes that the catchment area of Skeleton Creek is significantly larger than 65 Hectares described in the Stormwater Management Plan (Appendix L, Golder Associates, 2016). This has a significant impact on flow volumes expected through Skeleton Creek in future (discussed further in Truganina Development Services Scheme).

Melbourne Water has identified Skeleton Creek as a priority area for investment under the Healthy Waterways Strategy (Melbourne Water, 2013), with improvements in water quality, vegetation quality, amenity and bird habitat as key targets by 2030. This is consistent with Clause 14.02 (Water) of State Planning Policy. We aim to achieve this by significant investment in control of invasive weeds and re-establishment of native vegetation in broad continuous corridors along the creek. The key to success of this restoration and enhancement is the condition of the headwaters, the upper reaches of the creek (i.e. Ravenhall) which contribute strongly to water quality and flora and fauna diversity in the lower reaches.

It should be noted there are recorded populations of EPBC-listed Growling Grass Frogs (GGFs) in the lower reaches of Skeleton Creek. The expansion of urban development in the catchment means Skeleton Creek will become an important habitat corridor for GGFs to move through the landscape in response to environmental change.

### *1.2 Tributaries of Skeleton Creek*

There are also two Tributaries of Skeleton Creek which are located within the proposed expansion area (see Appendix 1). The catchment area of these tributaries is almost exclusively located within the Boral Resources property. Based on information available at Melbourne Water, the tributaries have been subject to significant disturbance from existing land use. Given the level of disturbance, Melbourne Water does not expect flows in these tributary alignments whilst the quarry and /or landfill are operational. Stormwater run-off is still expected from these catchments; however this would be managed in accordance with a detailed Stormwater Management Strategy.

## Section 2.0: Truganina Development Services Scheme (DSS)

### *2.1 Mt Atkinson and Tarneit Plains Precinct Structure Plan*

The Metropolitan Planning Authority has exhibited a plan for future urban development adjacent to the proposed landfill site – Mt Atkinson and Tarneit Plains Precinct Structure Plan (Amendment C162). Under the proposed PSP's, the current land use will be transformed into a developed, urban catchment (see Appendix 2a).

To ensure Melbourne Water is meeting our functions under Section 199(1A) of the Water Act and Clause 13.02 of SPPF, Development Services Schemes (DSS) have been

developed for the PSP areas (Appendix 2b). A DSS is a conceptual plan of drainage infrastructure required to service future greenfield development. Development Services Scheme's (DSS) ensure new development achieves current flood protection standards and treats stormwater to best practice in accordance with Best Practice Stormwater Management Guidelines (CSIRO, 1999).

Appendix 3 shows conceptual drainage assets in the Truganina Development Services Scheme. All landowners were notified in writing of the DSS, including Boral Resources on 17<sup>th</sup> June, 2013 (Appendix 4). Through extensive consultation with the Metropolitan Planning Authority and other stakeholders, the exhibited Mt Atkinson and Tarneit Plains PSP's are generally consistent with the Truganina DSS.

## *2.2 Outfall for the Truganina Development Services Scheme*

The applicant has provided a proposed cell layout and stormwater management plan for the proposed landfill (Appendix 5). These plans have been developed with no consideration of drainage and stormwater management in accordance with the Truganina DSS.

As development in the Mt Atkinson and Tarneit Plains PSP (specifically Truganina DSS) catchment proceeds, stormwater will flow through a network of pipes, constructed waterways and retarding basins/ wetlands towards the south east (see Appendix 3). At Hopkins Road, water outfalls through existing culverts onto the south western corner of the site.

Melbourne Water has concerns with the proposed location of works in the south western corner of the site (South Portion), particularly Pond 4 and Cell 4 (see Appendix 6). To manage external catchment flow through the property, the Truganina DSS shows approximately 225m of vegetated waterway channel (node SK7>SK8) in the south-west corner of the property (see Appendix 6). This channel would generally be constructed by the developer at the time of subdivision or development. Based on conceptual calculations completed by Melbourne Water (post-development flows), the vegetated channel will need to convey approximately 15 cubic metres/ second in a 1% Average Recurrence Interval (ARI) event. The channel must also connect to the downstream property in accordance with the Truganina DSS.

The location of the Land Subject to Inundation Overlay (LSIO) is shown in the south western corner of the site (Appendix 6). The applicant has indicated 100m setbacks have been achieved from proposed works to the nearest surface water (i.e. Skeleton Creek as shown by the LSIO). This interpretation of surface water is not correct because the measurement has been taken from Cell 4 to the edge of the LSIO which reflects existing conditions.

The current setbacks do not account for the channel and associated waterway corridor required for post-development flows from the Truganina DSS. Melbourne Water is deeply concerned the proposed landfill expansion (South Portion) will impede the outfall of the Truganina Development Services Scheme. Based on information at Melbourne Water, Pond 4 will be located over the conceptual alignment of the required waterway (see Appendix 6). In addition, the setback from Cell 4 to the top of bank of the constructed waterway would be approximately 20m.

The stormwater management plan and waterway setback measurements must be altered to reflect the requirements of the required channel (including waterway corridors) in the Truganina DSS.

### *2.3 Waterway Corridor Width*

In accordance with our function as the responsible floodplain management authority (Clause 13.02 SPPF), Waterway Management Authority (Section 189 Water Act) and strategic objectives under the Healthy Waterways Strategy, Melbourne Water requires a waterway corridor along the DSS channel.

Melbourne Water uses the 'Waterway Corridors: Guidelines for Development Areas within the Port Philip and Westernport Region' to determine the width required. Appendix 7 provides a typical cross-section of a constructed channel under the DSS. Based on the guidelines, Melbourne Water requires a minimum corridor width of 55 metres along the channel (subject to detailed design).

Any proposed works in the southern portion of the landfill must provide adequate setback, including vegetated waterway corridors, for the protection and enhancement of Skeleton Creek. Any bunding or batters for the proposed ponds (particularly Pond 4) must be located outside the waterway corridor to ensure Melbourne Water's objectives are achieved.

### *2.4 Proposed Stormwater Diversions and Outfalls*

Melbourne Water has concerns with proposed stormwater outfalls from Ponds 5 and 7 to the west of the subject site (red circles, Appendix 6). Based on the Stormwater Management Plan (Golder Associates, 2016) stormwater would be diverted west under Riding Boundary Road and then south along Hopkins Road. Melbourne Water has not considered these stormwater inputs to the Development Services Scheme. Stormwater must be conveyed in accordance with the Truganina Development Services Scheme.

Melbourne Water also has concerns with stormwater outfalls from Ponds 1 and 6 to the east (brown circles, Appendix 6). Under the DSS, a stormwater outfall has been provided at node CH9 and A1 in the south-eastern corner of the site (Appendix 3).

If the applicant proposes a change to the scheme (e.g. location of outfall), Melbourne Water requires detailed calculations and functional design plans to demonstrate the increased stormwater inputs can be accommodated within the existing DSS without causing an increase in flows downstream in a 1% ARI event.

Melbourne Water also requires further information of water quality treatment prior to approval of surface water discharge to Skeleton Creek or any Melbourne Water waterway (including proposed Truganina DSS waterways). All stormwater must be treated to best practice environmental management guidelines for stormwater (in accordance with Clause 13.02), prior to discharge in accordance with the Truganina Development Services Scheme.

Stormwater discharge must also be in accordance with Environmental Protection Authority requirements for water quality. Surface water monitoring plans must ensure there is no polluted or sediment laden run-off discharged.

### Section 3.0: Summary

Melbourne Water, as the responsible floodplain management authority, **objects to the application:**

1. The proposed development is inconsistent with State Planning Policy relating to floodplain and catchment management.
2. The proposed development is inconsistent with the catchment management, river health, wetland and floodplain management strategy (Truganina Development Services Scheme) adopted by Melbourne Water as the responsible floodplain management authority.
3. The proposal does not comply with Melbourne Water's 'Waterway Corridors: Guidelines for Development Areas within the Port Philip and Westernport Region'.

In addition, the proposal is inconsistent with Melbourne Water's functions under the Water Act (1989):

1. The proposal is inconsistent with Melbourne Water's waterway management functions under Section 189 of the Water Act (1989).
2. The proposal is inconsistent with Melbourne Water's regional drainage functions under Section 199 (1A) of the Water Act (1989).

### Section 4.0: Amended Information Required

Melbourne Water will consider an amended application. A revised application must address the following requirements:

1. A revised surface water management strategy (including detailed calculations for 1% ARI events) must be submitted to Melbourne Water for assessment. The strategy must be developed in accordance with the Truganina Development Services Scheme (DSS) and must specifically address the following requirements:

- The external catchment flow of Skeleton Creek must be updated to include post-development flows consistent with the Truganina DSS
- The surface water management strategy must include a functional layout of channel node SK7>SK8 in accordance with the Truganina DSS
- Waterway corridors must be provided in the functional design of the waterway
- Any stormwater outfalls from the proposed development must be consistent with the Truganina DSS
- All stormwater discharged from the site must be treated to best practice stormwater management in accordance with State Environmental Protection Policy (Waters of Victoria)

2. Any proposed landfill expansion must include provision for the construction of approximately 225 metres of vegetated channel (node SK7>SK8) and waterway corridor in accordance with the Truganina Development Services Scheme.

- The vegetated channel (constructed waterway) requires a minimum corridor width of 55 metres in accordance with Melbourne Water guidelines
- Any proposed works must be located a minimum of 100 metres from the nearest top of bank of the constructed waterway
- The waterway corridor must be vegetated with suitable plants to enhance and protect the values in Upper Skeleton Creek
- Landscape plans must be submitted to Melbourne Water for approval. The landscape plans must be in accordance with Melbourne Water's Constructed Waterways in Urban Development Guidelines

3. A detailed surface water monitoring program of stormwater outfalls must be developed in accordance with Environmental Protection Authority (EPA) requirements. The monitoring program must be submitted to Melbourne Water for comment.

For further clarification of Melbourne Water's requirements, please contact Michael Prior on 9679 6657 or [Michael.prior@melbournewater.com.au](mailto:Michael.prior@melbournewater.com.au)

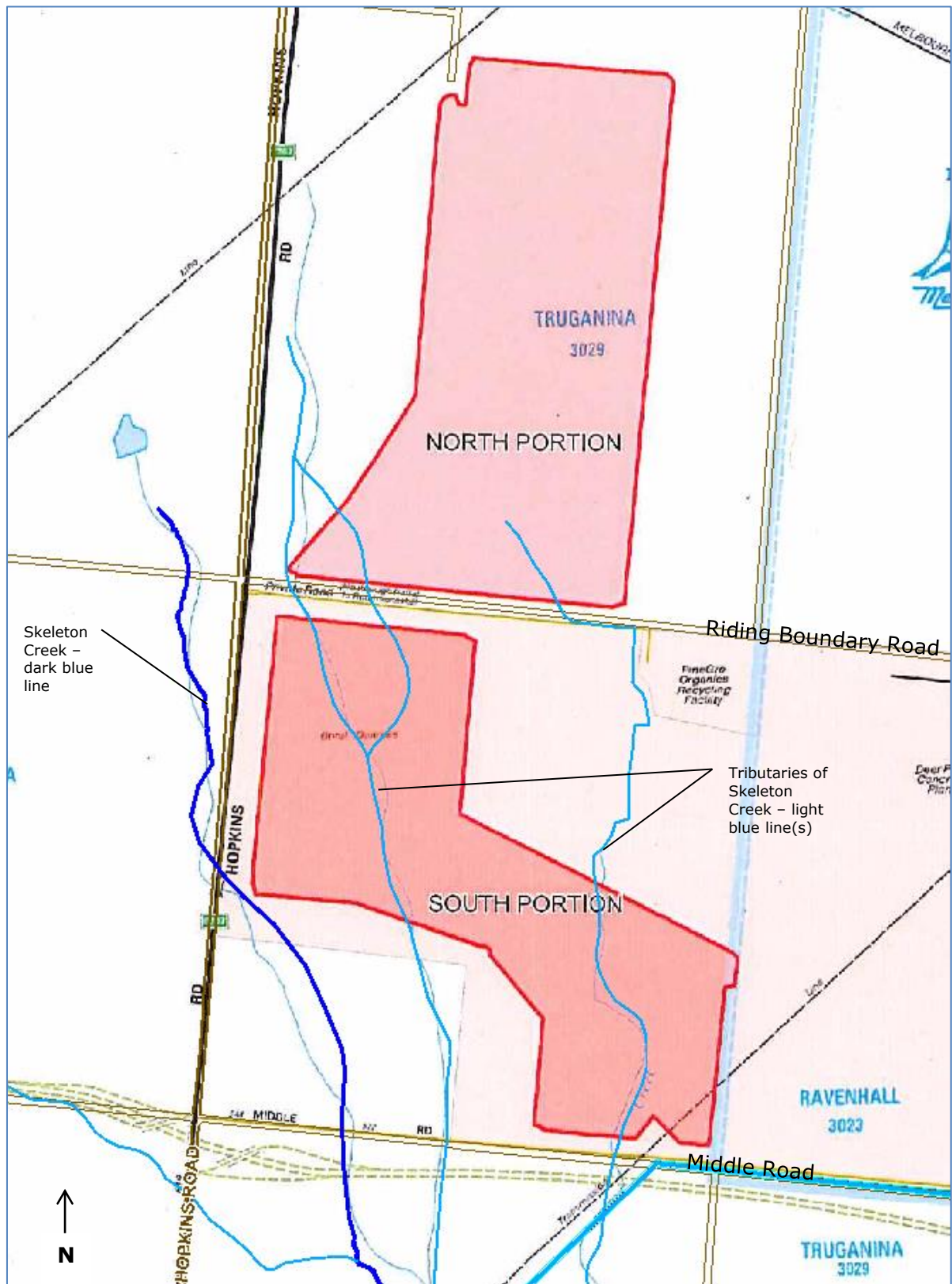
Yours sincerely,

MICHAEL PRIOR

DEVELOPMENT SERVICES,  
MELBOURNE WATER

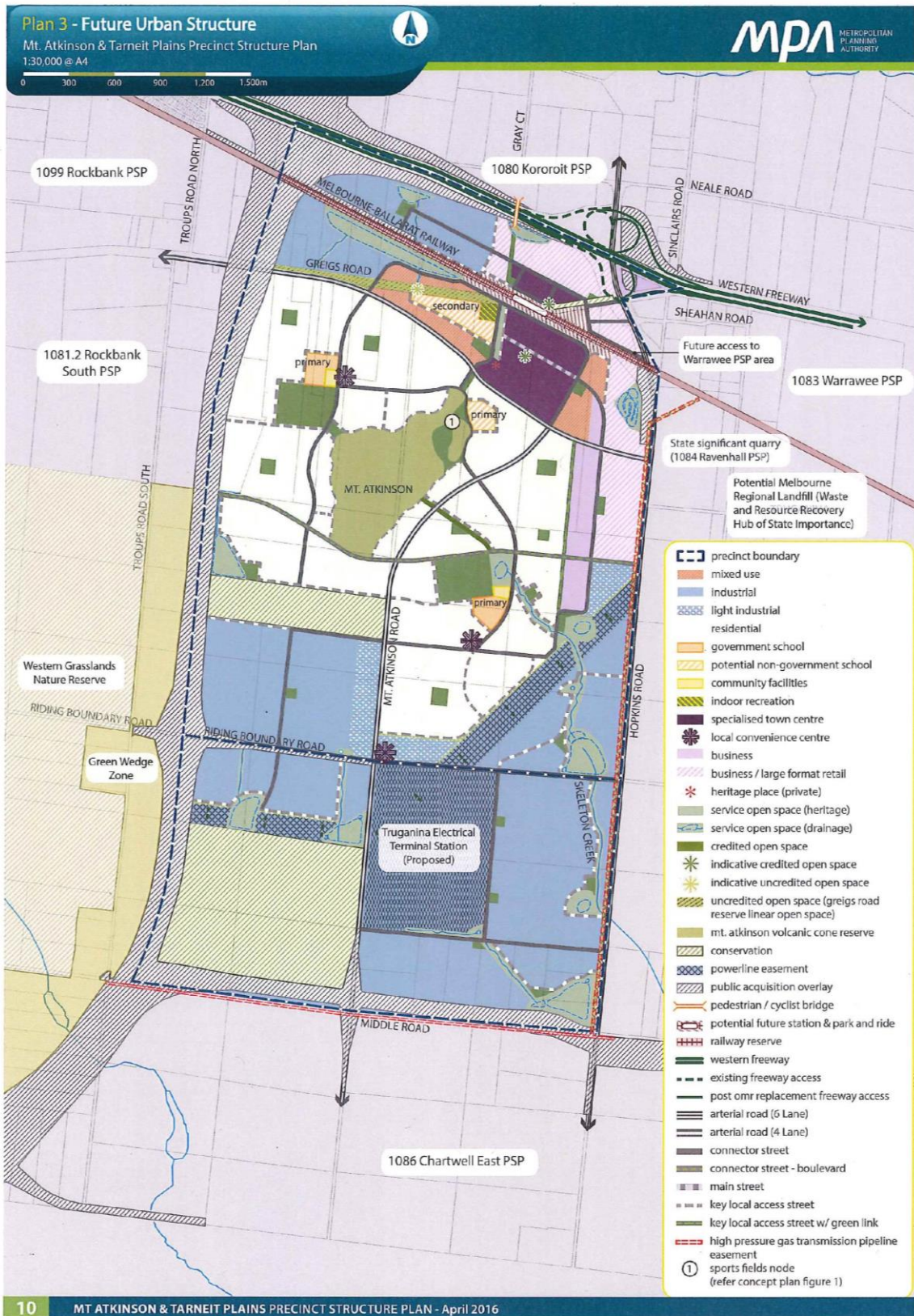


**Appendix 1 - Location of Melbourne Water Designated Waterways within the proposed landfill area**



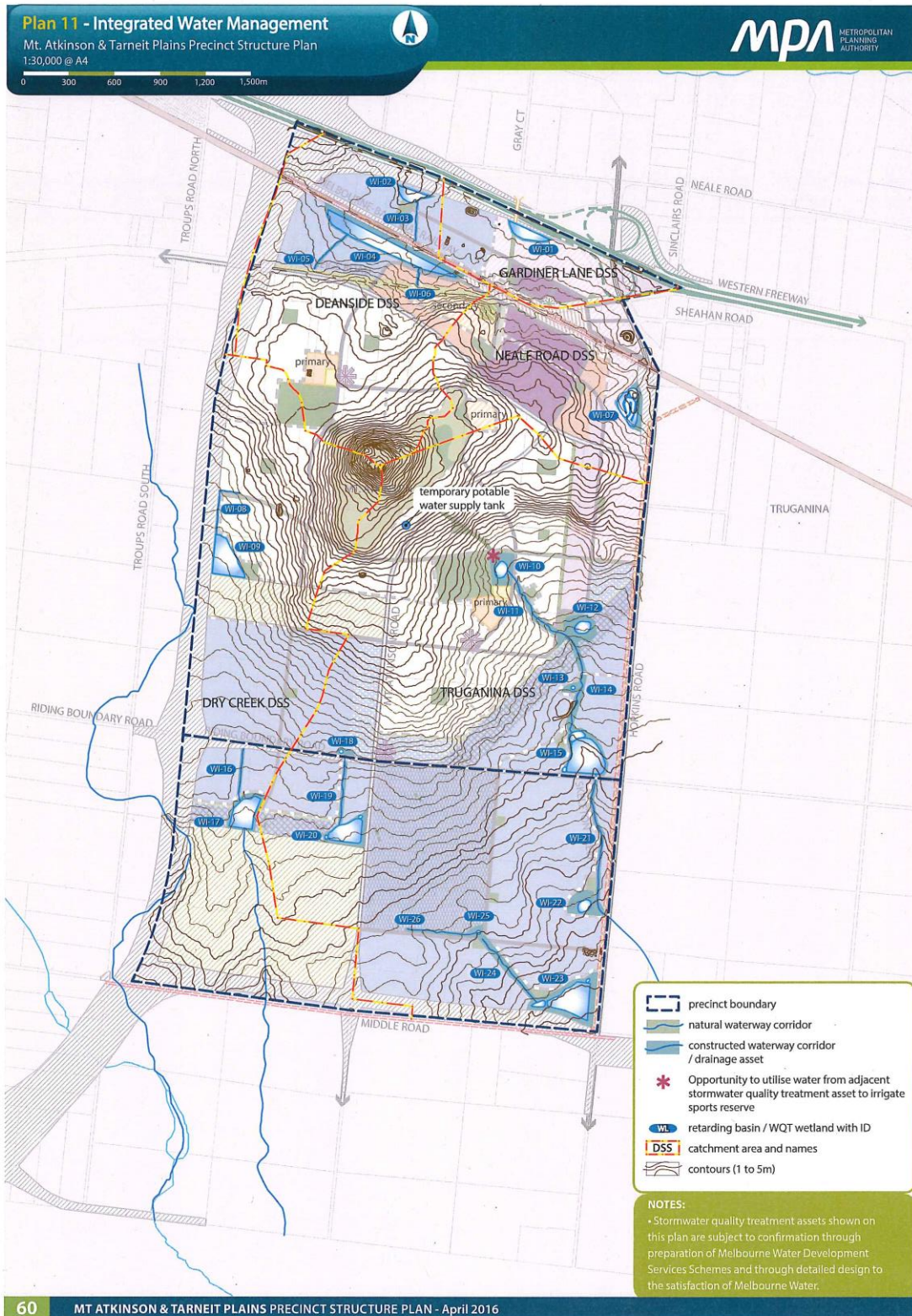
(Melways used with permission)

## Appendix 2a: Future Urban Structure - Mt Atkinson and Tarneit Plains Precinct Structure Plan



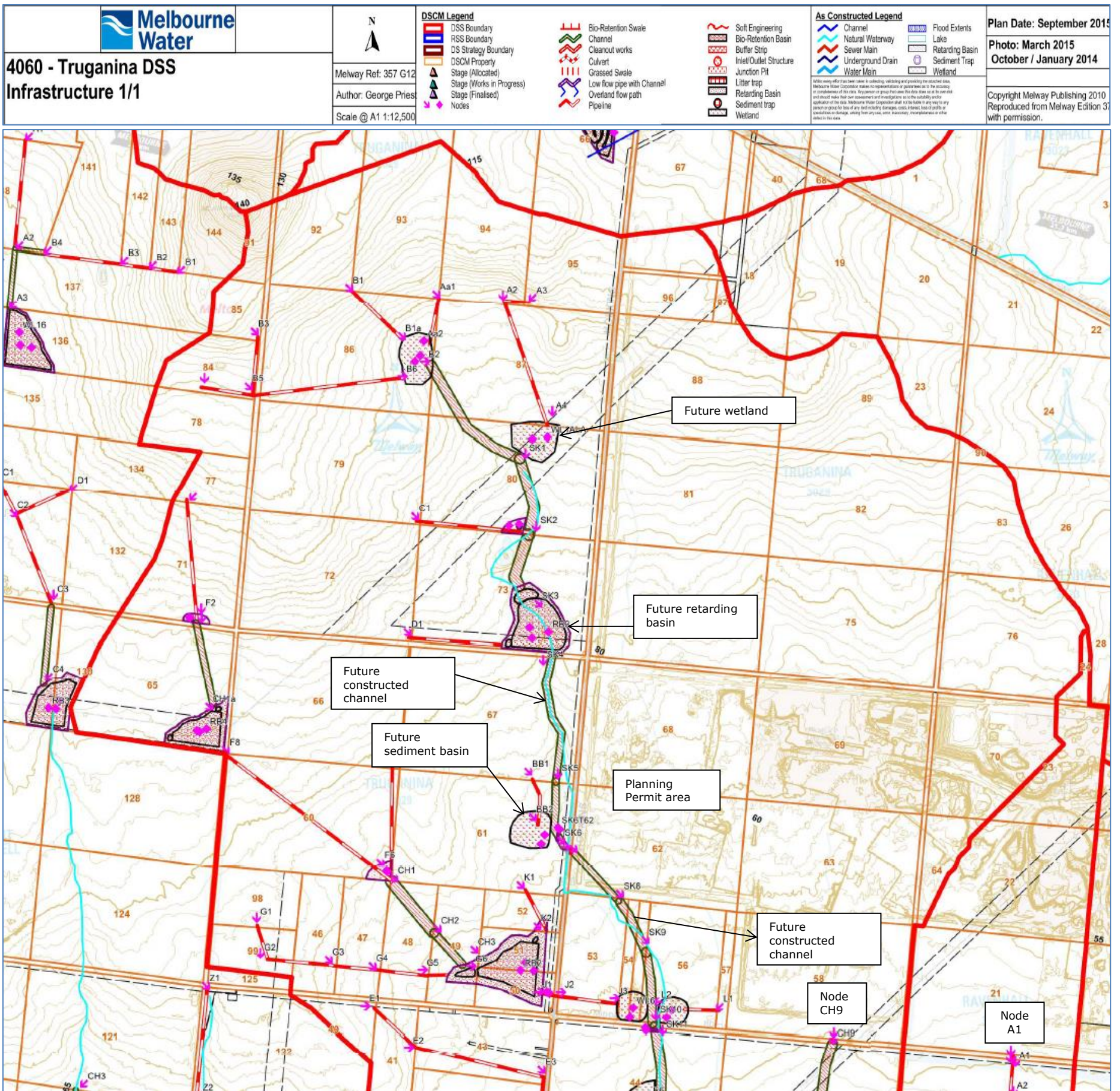


## Appendix 2b: Integrated Water Management Plan - Mt Atkinson and Tarneit Plains Precinct Structure Plan





**Appendix 3: Truganina Development Services Scheme Layout**





## Appendix 4 – Melbourne Water notification of Development Services Scheme



17 June 2013

Boral Resources VIC Pty Ltd  
Locked Bag 3  
Port Melbourne VIC 3023

Dear Sir/Madam,

### **Truganina Development Services Scheme (DSS) preliminary contribution rate and conceptual design**

In late 2012 we contacted you to let you know that we were starting to investigate a DSS for your catchment area. The DSS is required because of the land rezoning due to the change in the Urban Growth Boundary.

Since we last contacted you we have undertaken environmental studies, hydraulic modelling and engineering designs. This information has led to the development of a conceptual design which captures the area's future drainage infrastructure; and a preliminary contribution rate. The preliminary contribution rate is applicable for land that is developed prior to the final DSS approval.

Our records show that you are the owner of property **58, 62, 63, 68, 69, 70, 74, 75, 76, 81, 82, 83, 89, 90, 96 & 97** identified in the attached Truganina Development Services Scheme plan. Please also find enclosed a FAQ document with further information relating directly to your property.

The proposed drainage assets for your property, if any, are shown on the enclosed plan. Assets may include drainage pipes, retarding basins, constructed waterways, wetlands and other treatment systems. They are designed to support future urban development, protecting people and property from flooding and maintaining the health of the area's waterways. The Scheme assets proposed on your property are: Constructed Waterway.

The preliminary contribution rate is \$76,034/ha. This rate is applicable if the land is subdivided or developed prior to final approval of the DSS. It is not a tax and it will not appear as a charge on your water bill.

I encourage you to contact me on (03) 9679 7343 or [aaron.dowling@melbournewater.com.au](mailto:aaron.dowling@melbournewater.com.au) by 17<sup>th</sup> July, 2013 if you require further information, or if you wish to provide any comments about the scheme. Your input will be considered during the review of the final scheme.

Once the DSS is finalised we are required to seek approval from other authorities including your council. Once the DSS is approved we will contact all landowners with the final conceptual design and developer contribution rate. The time period of this process can vary. Please contact us if you have any questions during this period.





Yours sincerely

AARON DOWLING  
CATCHMENT PLANNER – DEVELOPMENT PLANNING  
MELBOURNE WATER

**Contact us**

**Phone:** (03) 9679 7343

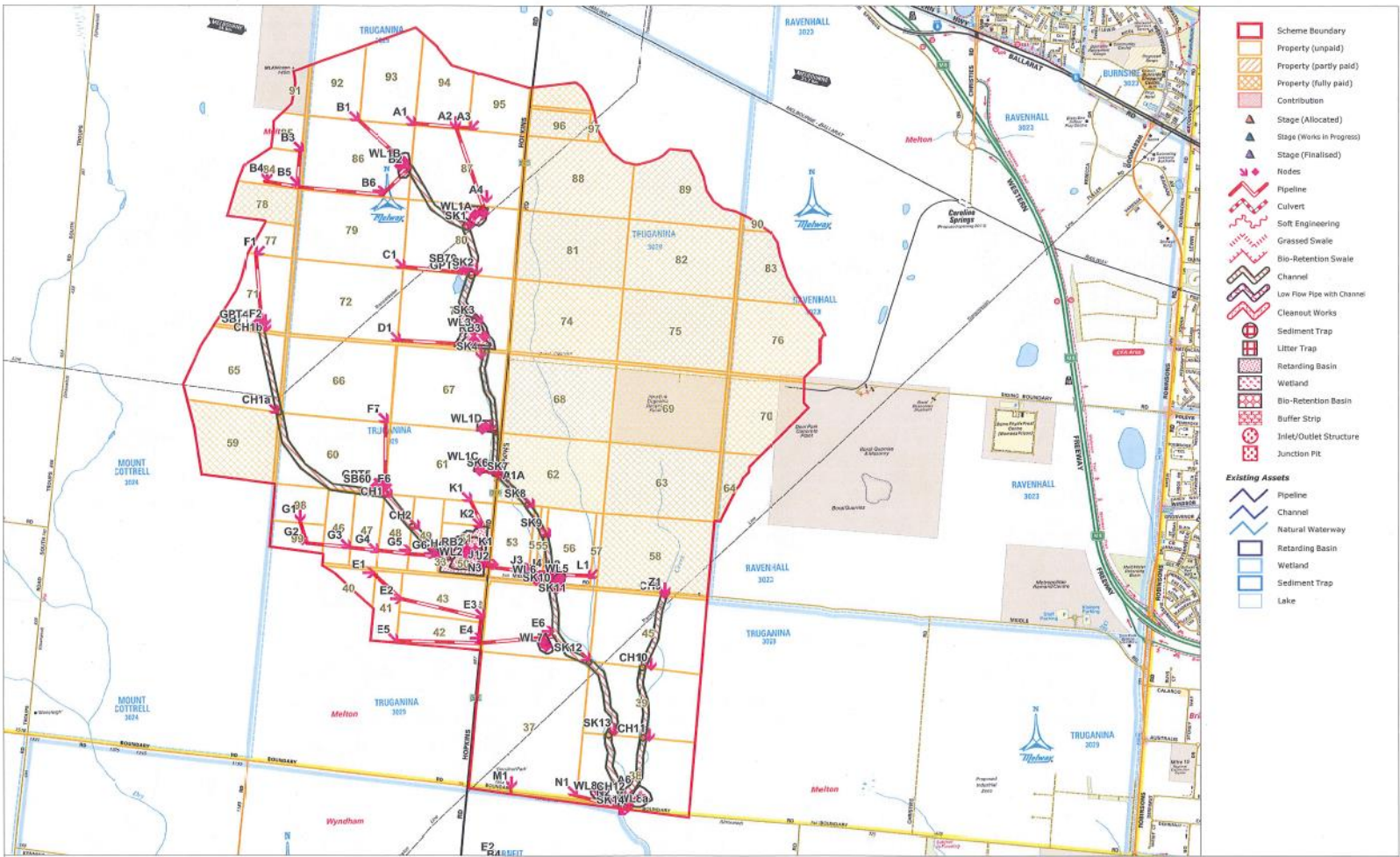
**Email:** [aaron.dowling@melbournewater.com.au](mailto:aaron.dowling@melbournewater.com.au)

**Post:** Attention Development Planning Team, PO Box 4342, Melbourne, VIC 3001

**More information can be found at:** <http://ldm.melbournewater.com.au>

**Enclosed:**

- Truganina Development Services Scheme overall plan
- A plan showing your property in relation to the scheme layout
- DSS FAQ – preliminary contribution rate and conceptual design



**Truganina DSS - Melton Properties**

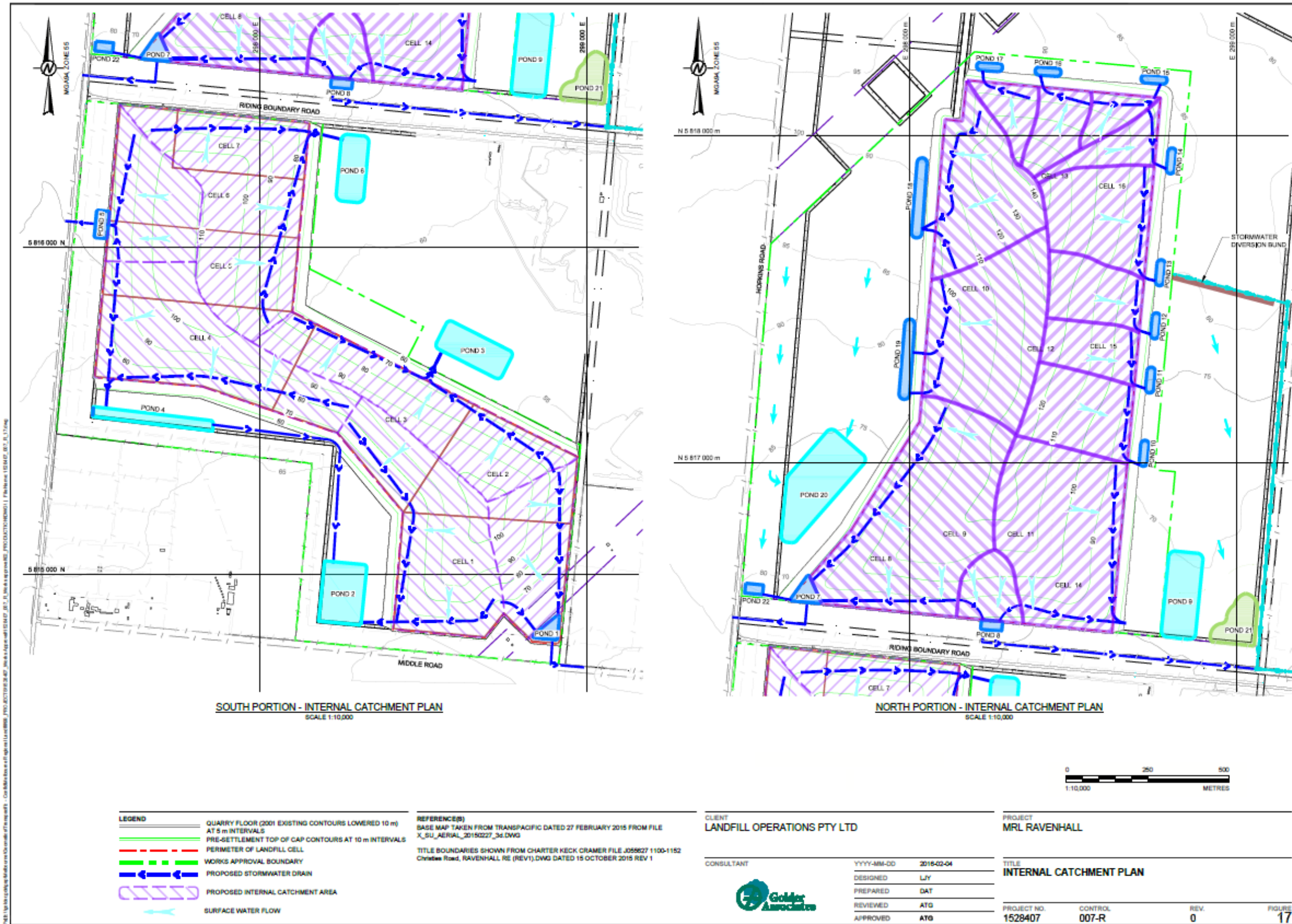
Whilst of due skill and attention has been used Melbourne Water Corporation shall not be liable in anyway for loss of any kind including damages, costs, interest, loss of profits or special loss or damage, arising from any error, inaccuracy, incompleteness or other defect in this information. By reviewing and accepting this information the recipient acknowledges that Melbourne Water Corporation makes no representation as to the accuracy or completeness of this information and ought carry out its own investigation if appropriate.

N  
 MGAS5  
 17/06/2013

Map at A3  

 Melbourne Water

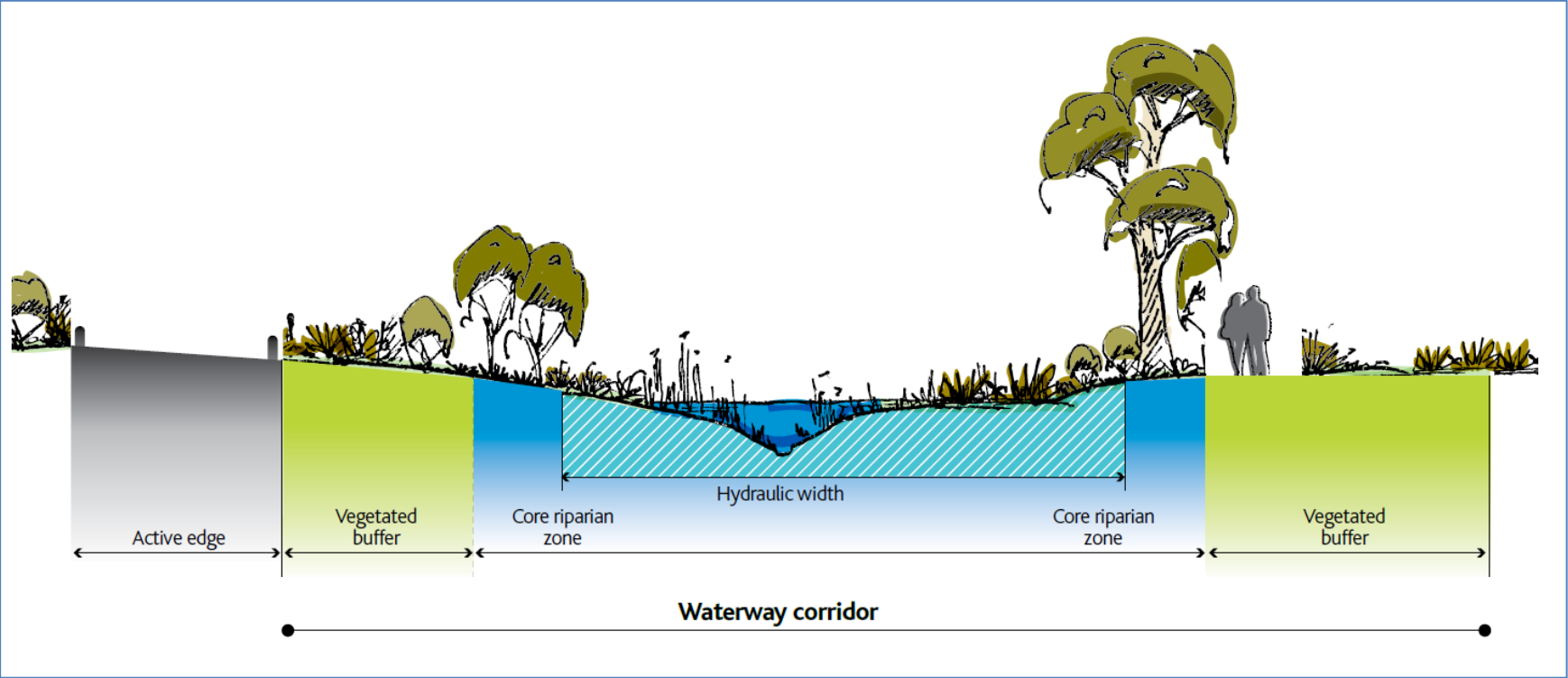
Appendix 5: Proposed Internal Stormwater Management Strategy (Golder Associate, February 2016)







**Appendix 7: Typical cross-section of constructed waterway**





**List of Referenced Documents:**

CSIRO, 'Urban Stormwater: Best Practice Environmental Management Guidelines', 1999

Golder Associates, 'Stormwater Management Plan' (Appendix L), Report No. 1528407-019-R-Rev0, February 2016

Melbourne Water, 'Healthy Waterways Strategy: A Melbourne Water strategy for managing rivers, estuaries and wetlands', November 2013

Melbourne Water, 'Waterway Corridors: Guidelines for development areas within the Port Philip and Westernport Region', October 2013

Melbourne Water, 'Constructed Waterways in Urban Development Guidelines', May 2009

Metropolitan Planning Authority, 'Mount Atkinson and Tarneit Plains Precinct Structure Plan', Public Exhibition April 2016

21 October 2016

Mr Nick Wimbush  
Panel Chair  
Planning Panels Victoria  
PO Box 500  
EAST MELBOURNE VIC 8002

Dear Mr Wimbush,

**Re: Further information submitted in response to Melbourne Water panel submission**

Melbourne Water made a submission to the Melbourne Regional Landfill Expansion Planning Panel on 15<sup>th</sup> July 2016. Based on the information available, Melbourne Water objected to the proposed expansion.

Melbourne Water received further information from the applicant (Golder Associates Pty Ltd) to address items contained in the objection. The information provided was: Draft Figure 30 and 31; Project No. 1528407; Rev 0; Date: 2016-09-14.

The key issues addressed were:

- The amended plan (referenced above) makes conceptual provision for a constructed waterway and associated corridor in accordance with the Truganina Development Services Scheme (DSS).
- The stormwater management plan (including stormwater outfalls) has been amended so that it is generally in accordance with the Truganina DSS.

Based on further information received, Melbourne Water withdraws our objection to the proposed landfill expansion. The applicant has demonstrated Melbourne Water's requirements can be achieved in the conceptual plans submitted.

**Recommendations**

Melbourne Water would still require further engineering, landscape and water quality monitoring detail with any future functional/ detailed design.

Depending on the outcome of the planning panel, Melbourne Water requests the panel consider the following recommendation to address detailed Melbourne Water requirements: The applicant enter into an agreement with Melbourne Water for the provision of drainage works and other matters in accordance with the statutory powers of Melbourne Water Corporation.

Should you require clarification please don't hesitate to contact me on 03 9679 6657 or Michael.prior@melbournewater.com.au.

Yours sincerely

MICHAEL PRIOR  
DEVELOPMENT SERVICES



# Department of Environment, Land, Water & Planning

Your Ref: PA2016/5118  
Our Ref: **SP457123 & LA/03/3012**

19 July 2016

Mr Stephen Swart  
Acting Director  
Planning Services and Impact Assessment

[fawn.goodall@delwp.vic.gov.au](mailto:fawn.goodall@delwp.vic.gov.au)

Port Phillip Region  
PO Box 137  
Heidelberg Victoria 3084  
DX211902  
Telephone: 136 186  
[portphillipregion.planning@delwp.vic.gov.au](mailto:portphillipregion.planning@delwp.vic.gov.au)

Dear Mr Swart

## **MELTON PLANNING SCHEME**

**APPLICATION FOR A PLANNING PERMIT NO: PA2015/5118**

**ADDRESS: 408-546 Hopkins Road Truganina, 1154-1198 Christies Road, Ravenhall**

**PROPOSAL: Use the land for refuse disposal, construct a building and construct or carry out works and remove vegetation, including native vegetation (Melbourne Regional Landfill extension)**

Thank you for your letter of 27 June 2016, referring a copy of the above mentioned application to the Department of Environment, Land, Water and Planning (DELWP) pursuant to Clause 66.02-2 and Clause 66.04 of the Melton Planning scheme.

### **Background**

The Port Phillip Region of DELWP notes that the property is located within the Melbourne Strategic Assessment program area and is subject to the requirements of the endorsed program and Biodiversity Conservation Strategy. Please note that any land proposed for subdivision, building and/or works is required to meet these requirements.

### **Melbourne Strategic Assessment Area (MSA)**

DELWP requests that Council re-refer any approved permit to DELWP again at Statement of Compliance. The land at Ballan Road, Wyndham Vale is located in the growth corridors subject to the requirements of the MSA Program. Please find attached a copy of the Department's "Introduction to Biodiversity Conservation Strategy letter [explaining this process](#).

### **Permit Note**

On 5 September 2013 and 11 September 2014, approvals under Part 10 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) were granted. The approvals apply to all actions associated with urban development in growth corridors in the expanded Melbourne 2010 Urban Growth Boundary as described in page 4 in the Biodiversity Conservation Strategy for Melbourne's Growth Corridors (Department of Environment and Primary Industries, 2013).

#### **Privacy Statement**

*Any personal information about you or a third party in your correspondence will be protected under the provisions of the Privacy and Data Protection Act 2000. It will only be used or disclosed to appropriate Ministerial, Statutory Authority, or departmental staff in regard to the purpose for which it was provided, unless required or authorised by law. Enquiries about access to information about you held by the Department should be directed to the Privacy Coordinator, Department of Environment, Land, Water and Planning, PO Box*



The Commonwealth approvals have effect until 31 December 2060. The approvals are subject to conditions specified at Annexure 1 of the approvals. Provided the conditions of the EPBC Act approval are satisfied individual assessment and approval under the EPBC Act is not required.

Please contact the undersigned on 📞 9450 8790 if you wish to discuss this further.

Yours sincerely

Emile Kyriacou  
Senior Statutory Planner, Regional Planning  
Port Phillip Region

Attach.





# Department of Environment, Land, Water & Planning

8 Nicholson Street  
East Melbourne Victoria 3002

Dear Applicant

The land proposed for subdivision, building and/or works is located in the growth corridors subject to the requirements of a Part 10 approval granted for the Melbourne Strategic Assessment program by the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

The Melbourne Strategic Assessment program streamlines Commonwealth and state planning, approval and biodiversity requirements. Undertaking an action in accordance with the Commonwealth approval is subject to conditions that include meeting offset requirements – known as habitat compensation obligations – and the restriction of urban development in conservation areas designated for the protection of biodiversity values.

Habitat compensation obligations are calculated using the habitat compensation layer dataset maintained by the Department of Environment, Land, Water and Planning (DELWP), and applying the relevant fees. The current fee prices are published on the DELWP website at [www.depi.vic.gov.au/msa](http://www.depi.vic.gov.au/msa). Fees are payable to DELWP and satisfy both Commonwealth and state offset requirements. The habitat compensation layer dataset also identifies whether the land is within a conservation area.

The habitat compensation obligations for land parcels located in the south-eastern, northern, north-western and western growth corridors can be estimated using DELWP's online tool, the Native Vegetation Information Management system, available at: [nvim.delwp.vic.gov.au/bcs](http://nvim.delwp.vic.gov.au/bcs).

Habitat compensation obligations must be met prior to the commencement of works. If the land parcel is subject to staged residential subdivision, the landowner may apply to DELWP to take the benefit of its staged obligations policy, which enables habitat compensation obligations to be staged in proportion with the staging of the subdivision. Under the staged obligations policy, habitat compensation obligations are required to be met, through payment of fees to DELWP, prior to Certification for each stage.

For information about the Melbourne Strategic Assessment, please visit the DELWP website at: [www.depi.vic.gov.au/msa](http://www.depi.vic.gov.au/msa). For further information about habitat compensation obligations please email [msa.habitatcompensation@delwp.vic.gov.au](mailto:msa.habitatcompensation@delwp.vic.gov.au).

Sincerely

**Kirsty Henry**

Program Manager, Melbourne Strategic Assessment Team

**Privacy Statement**

*Any personal information about you or a third party in your correspondence will be protected under the provisions of the Privacy and Data Protection Act 2000. It will only be used or disclosed to appropriate Ministerial, Statutory Authority, or departmental staff in regard to the purpose for which it was provided, unless required or authorised by law. Enquiries about access to information about you held by the Department should be directed to the Privacy Coordinator, Department of Environment, Land, Water and Planning, PO Box 500, East Melbourne, Victoria 8002*



**APPENDIX D      SECTION 22 NOTICE  
DATED 7  
SEPTEMBER 2016  
AND LETTERS  
CLARIFYING  
SECTION 22 NOTICE  
DATED 21 OCTOBER  
& 6 DECEMBER 2016**

- D.1    Section 22 Notice of 7 September 2016
- D.2    Clarification letter of 21 October 2016
- D.3    Clarification letter of 6 December 2016

**ENVIRONMENT PROTECTION ACT 1970  
SECTION 22(1)  
NOTICE TO SUPPLY FURTHER INFORMATION**

**TO: PENNY CRESWELL**

**OF: LANDFILL OPERATIONS PTY LTD  
C/O CLEANAWAY WASTE MANAGEMENT LTD  
LEVEL 4, 441 ST KILDA ROAD  
MELBOURNE  
VICTORIA 3004**

**WHEREAS** an application by you for a works approval in respect of premises situated at 408-506 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall, Victoria was received by the Environment Protection Authority ("the Authority") on 13 MAY 2016

**AND WHEREAS** we consider the information specified herein is necessary and relevant to the consideration of the application

**NOW TAKE NOTICE** that pursuant to section 22(1)(a) of the Environment Protection Act ("the Act") you are **HEREBY REQUIRED** to supply to the Authority by 4.00pm on the 20 day of September 2016 the information specified in Attachment A of this notice.

**DATED: 7 September 2016**

.....  
QUENTIN COOKE  
DELEGATE OF THE  
ENVIRONMENT PROTECTION AUTHORITY

## ATTACHMENT A

Landfill Operations Pty Ltd should respond in detail to all submissions received by PPV and provide EPA with a schedule of responses to the submissions.

Additionally and in particular, the further requests are made as detailed below.

### Understanding the Baseline Environment

The following requests are made:

1. Further baseline information as set out below to confirm the long term depth of the undisturbed groundwater beneath the proposed landfill extension cells:
  - provide information to demonstrate that the groundwater contours shown in Figure 5-5 are undisturbed groundwater levels;
  - provide a map for the area showing long term undisturbed groundwater level contours (in m, AHD); and
  - provide the anticipated base level of the leachate sumps (in m, AHD) for all the cells (Cells 1 to 16).
2. Clarification of how the Boral quarrying activities and the proposed landfill activities will be co-ordinated to ensure the proposed sequence in Table 4 and Figure 21 -24 of the Information to Support Works Approval Application document is followed? Details of any plans and contingencies in the event that quarrying does not occur as per the proposed sequence should be provided.
3. Provision of the most recent six monthly groundwater monitoring data and associated interpretative reports .
4. Provide additional groundwater analytical data and interpretation to demonstrate that levels of contaminants in groundwater are background levels in accordance with SEPP (Groundwaters of Victoria), including off-site upgradient.
5. Provide information regarding the depth of Skeleton Creek and distance from the site, to confirm the potential for groundwater interaction with surface waters.

### Design Information

The following requests are made:

1. Geotechnical stability of side wall and the side wall liner of the landfill. The supplementary information document (s.13.7) states that "*The geotechnical stability of the subgrade and liner will be assessed during detailed design*". Details are requested of the measures that will be installed to ensure that the geotechnical stability of side walls and the side wall liner will be maintained.
2. Identification and consideration in a cost benefit analysis, including an assessment of additional environmental benefits, of further design and operational measures to reduce potential off-site landfill gas migration.

## Defining the potential impacts to the Receiving Environment

The following requests are made:

1. Additional design and management measures. If the information provided in response to (1) Understanding the Baseline Environment above indicates that a 2m separation between waste and the long term undisturbed depth to groundwater is not achieved (for any area within the landfill), please provide additional design and management practices that would be adopted to show compliance of clause 16(2) of the WMP. Note that those measures must be acceptable to the Authority.
2. Specific details of the controls and what actions will be taken to control mosquitos, flies, vermin and birds visiting the site. Whilst statements are given that for example mosquitos will be monitored, no information is then given on what actions would be taken to reduce any issues detected. As a minimum the principles of a Vermin Management Plan should be provided.
3. Cross sections of the rehabilitation plan showing final topographical profile of the site after settling and an indicative staging plan for site rehabilitation with approximate timeframes.
4. Details of any future community liaison group to be initiated to ensure there is a community engagement mechanism to facilitate any future two-way dialogue between Landfill Operations and the local community.



21 October 2016

Alexandra Guild  
Special Counsel  
Norton Rose Fulbright Australia  
Level 15, RACV Tower  
485 Bourke Street  
MELBOURNE VIC 3000

Dear Ms Guild

As indicated in its letter to you on 14 October 2016, EPA is not satisfied with the responses to some of the information sought in the s22 Notice dated 7 September 2016. Details of the information EPA continues to require are attached.

The outstanding information sought in response to the Notice, takes into account the information already provided in response to the Notice as well as the discussions that have occurred at the Planning Panels Victoria Hearing currently being conducted in relation to the planning permit application and s20B conference.

Yours sincerely

Quentin Cooke

Team Leader  
Development Assessments  
EPA Victoria

Incl.

*Details of information sought following Cleanaway response on 23 September 2016*



**Environment  
Protection  
Authority Victoria**

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Melbourne VIC 3001

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**Details of information sought following Cleanaway response on 23 September 2016**

Understanding the Baseline Environment	
1.	<p><b>Depth to groundwater to determine compliance with clause 16(2) of the WMP<sup>1</sup>.</b></p> <p>Provide information to justify that the groundwater contours shown in Figure 5-5 are long term undisturbed groundwater levels.</p> <p>Provide a map for the area showing long term undisturbed groundwater level contours (in m, AHD).</p> <p>Provide the anticipated base level of the leachate sumps (in m,AHD) for all the cells (Cells 1 to 16).</p> <p>Provide groundwater information upgradient of site—in the same aquifer—that confirms the groundwater segment classification as Segment C</p>
2.	<p>In reviewing the potential groundwater pollution from the existing landfill cells, it is noted that there are a number of 53V environmental audits that have been completed (page 18 AECOM). There are a number of suggestions in the WA documents that there are background levels of contaminants (e.g. sulphate, nitrate) present at the site. However, there is very limited detailed discussion or sufficient data presented that demonstrate that these are background levels in accordance with Clause 9(2) and the definition in SEPP (GoV). For example, increases in concentrations of manganese in groundwater (page 55 AECOM) are also not well explained.</p> <p>Provide additional information to demonstrate that levels of contaminants in groundwater are background levels in accordance with SEPP(GoV).</p>
3.	<p>Clarification of potential groundwater interaction with surface waters.</p> <p>Provide data to support your statement</p>

<sup>1</sup>To show compliance with clause 16(2) of the WMP, it is necessary to show long term undisturbed groundwater level. From the hydrographs shown in Figure 5-1 it appears that groundwater elevations in some of the bores have dropped by more than 2m from Nov 2011 to Aug 2014. It is also noted that significant amount of groundwater has been extracted from 2012 to 2014 (i.e. 63,174 KL of groundwater in 2012 and 67,734KL in 2013 etc., refer to Table 4-5 of the Hydrogeology Report). Groundwater contours shown in Figure 5-5 appear to be based on the water levels measured in April to May 2014. Therefore it is necessary to assess whether the water level drop is due to groundwater pumping (or not) and that groundwater contours shown in Figure 5-5 are not 'disturbed' groundwater levels (and they are long term undisturbed groundwater levels).

From the information presented, it appears that the Cell floor is likely to vary from 52.5m AHD in Cell 1 to 94.5m AHD in Cell 10. From the hydrographs shown in Figure 5-1 and the comments provided above, it is likely that the long term undisturbed groundwater elevations are likely to be above 50-51m AHD in certain areas, and probably not having a 2m separation. Therefore it is important to determine leachate sump base levels to confirm that they are placed 2m above the undisturbed groundwater level.

<p><u>Design information</u></p> <p>1.</p>	<p><b>Geotechnical stability of side wall and the side wall liner of the landfill</b></p> <p>The supplementary information document (s.13.7) states that "The geotechnical stability of the subgrade and liner will be assessed during detailed design".                  Provide details of measures that will be in place to ensure that the geotechnical stability of side wall and the side wall liner of the landfill will be maintained.</p>
<p><u>Defining the potential impacts to the Receiving Environment</u></p>	
<p>1.</p>	<p><b>Additional design and management measures</b></p> <p>If the 2m separation between the waste and the long term undisturbed groundwater level is not likely to be met (for any area within the landfill), provide additional design and management practices to show compliance with clause 16(2) of the WMP. Note that those measures must be acceptable to the Authority.</p>
<p>2.</p>	<p>Any proposed landfill expansion must include provision for the construction of approximately 225 metres of vegetated channel (node SK7&gt;SK8) and waterway corridor in accordance with the Truganina Development Services Scheme.</p>

6 December 2016

Our Ref: SO1002191

Alexandra Guild  
Special Counsel  
Norton Rose Fulbright Australia  
Level 15, RACV Tower  
485 Bourke Street  
MELBOURNE VIC 3000

Dear Ms Guild

### **Melbourne Regional Landfill Section 22 Notice Outstanding Items**

Following our meeting on 30 November, please find below the outstanding items that we require further information on from our formal section 22 Notice request of 7 September 2016. As per the discussions at the meeting we have sought below to provide clarity on the outstanding further information required to satisfy the notice.

#### Understanding the Baseline Environment

The following requests are made:

1. Provide a map for the area showing long term undisturbed groundwater level contours (in m, AHD) with justification of the groundwater contours shown.
2. Provide additional groundwater analytical data and interpretation to demonstrate that levels of contaminants in groundwater are background levels in accordance with SEPP (Groundwaters of Victoria), including off-site upgradient and in particular how the 2014 s53V Environmental Auditor's conclusions and recommendations regarding the groundwater quality information at the existing landfill (which have been used in this hydrogeological assessment) have been addressed.

#### Defining the potential impacts to the Receiving Environment

The following requests are made:

1. Provide an assessment and measures on the geotechnical stability of the side wall and the side wall liners of the landfill, in particular where the landfill does not adjoin the quarry batter. Details are requested of the measures that will be installed to ensure that the geotechnical stability of side walls and the side wide liner will be maintained.

#### Demonstrating Environmental Best Practice

The following requirements are made with regard to:

1. Additional design and management measures. If the information provided in response to (1) Understanding the Baseline Environment above indicates that a 2m separation between waste and the long term undisturbed depth to groundwater is not achieved (for any area within the landfill), please provide additional design and management practices that would be adopted to show compliance of clause 16(2) of the WMP. Note that those measures must be acceptable to the Authority.



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We look forward to receiving the requested information.

Yours sincerely

Quentin Cooke  
Team Leader  
Development Assessments  
EPA Victoria



# **APPENDIX E      REFERRAL RESPONSES RECEIVED IN RESPONSE TO CONSULTATION**

E.1 – DHHS

E.2 – SV

E.3 – MW



## Department of Health and Human Services

50 Lonsdale Street  
Melbourne Victoria 3000  
Telephone: 1300 650 172  
GPO Box 4057  
Melbourne Victoria 3001  
[www.dhhs.vic.gov.au](http://www.dhhs.vic.gov.au)  
DX 210081

Our Reference WA1002091  
Your Reference SO100291

Mr Quentin Cooke  
Development Assessments Unit  
EPA Victoria  
GPO Box 4395  
MELBOURNE VIC 3001

**Response to Section 22(1) Notice to Supply Further Information**  
**Works Approval application WA1002091: Landfill Operations Pty Ltd – Proposed Melbourne Regional Landfill extension at 408-546 Hopkins Road, Truganina and 1154-1198 Christies Road, Ravenhall**

Dear Mr Cooke

On 15 July 2016, the department provided a response to the Environment Protection Authority (EPA) Victoria for this works approval application.

The EPA has since provided the department with their environment public health risk assessment dated 10 January 2017, which was based on further information provided by the proponent to the EPA in response to a request made under section 22 of the Environment Protection Act 1970.

The department does not object to this application on public health grounds provided the Environment Protection Authority is satisfied that relevant State Environment Protection Policies and environmental guidelines will be met by the proponent.

A literature review jointly commissioned by the EPA and the department in 2016 confirmed the findings of the RMIT (2013) review, that available data and published studies does not show that living near a non-hazardous waste landfill is associated with adverse health effects.

If you have any queries regarding this matter, or are aware of changes to the application that may pose an additional health risk, please contact Mr Bradley Peel of our Environmental Public Health Program on 9096 0456.

Yours sincerely 

Sandra Falconer  
Manager Environmental Public Health  
17/1/2017

## Richard Hook

---

**From:** Sam Trowse <Sam.Trowse@sustainability.vic.gov.au>  
**Sent:** Thursday, 12 January 2017 9:06 AM  
**To:** Richard Hook  
**Cc:** Amanda Elliott; SWRRIP Referrals; Karen Wilson  
**Subject:** RE: EPA Referral request to SV on the Further Information provided by Landfill Operatons

Hi Richard,

Thank you for sending through the referral request to Sustainability Victoria. We have reviewed the further information and have no issues of concern.

We acknowledge that, in summary, the recommendations of the Environmental Audit require MRL to:

- Upgrade the groundwater monitoring network, and
- Revise the Monitoring Program

It is considered that this will aim to ensure the quality of the ground water in the area.

If you have any further queries please do not hesitate to contact me at SV office.

Regards

### Sam Trowse

Project Lead | Waste & Resource Recovery Land Use Planning

**Ph:** 03 8626 8853

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---

**From:** Richard Hook [mailto:Richard.Hook@epa.vic.gov.au]  
**Sent:** Monday, 19 December 2016 5:17 PM  
**To:** Karen Wilson <Karen.Wilson@sustainability.vic.gov.au>  
**Cc:** Amanda Elliott <Amanda.Elliott@sustainability.vic.gov.au>; Sam Trowse <Sam.Trowse@sustainability.vic.gov.au>; SWRRIP Referrals <SWRRIP.Referrals@sustainability.vic.gov.au>  
**Subject:** RE: EPA Referral request to SV on the Further Information provided by Landfill Operatons

Thanks Karen

Have noted the changes.

Kind regards and have a great festive break.

Richard

### Richard Hook

Senior Project Manager - Works Approval  
Development Assessments

### Environment Protection Authority Victoria

200 Victoria Street, Carlton VIC 3053 | GPO Box 4395, Melbourne VIC 3001 | DX 210082

☎ 0396952794 | M 0475974791 | E [richard.hook@epa.vic.gov.au](mailto:richard.hook@epa.vic.gov.au) | [www.epa.vic.gov.au](http://www.epa.vic.gov.au)

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---

**From:** Karen Wilson [mailto:Karen.Wilson@sustainability.vic.gov.au]  
**Sent:** Monday, 19 December 2016 5:15 PM  
**To:** Richard Hook

**Cc:** Amanda Elliott; Sam Trowse; SWRRIP Referrals

**Subject:** RE: EPA Referral request to SV on the Further Information provided by Landfill Operatons

Thanks Richard,

I will log this request and have ccd in Amanda and Sam who are coordinating responses. I expect that we will be able to respond within the timeframe. Please note that Alastair Smith is no longer with SV and Sam Trowse is now SV's land use planner.

Please note our referrals email address ([SWRRIP.Referrals@sustainability.vic.gov.au](mailto:SWRRIP.Referrals@sustainability.vic.gov.au)) – it would be great if you and your team could send referrals directly to this email address (as well as cc relevant staff as appropriate)

Regards, Karen

**Karen Wilson**

Manager | Waste & Resource Recovery Planning

**Ph:** 03 8626 8863 | **M:** 0409137057

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---

**From:** Richard Hook [<mailto:Richard.Hook@epa.vic.gov.au>]

**Sent:** Monday, 19 December 2016 4:52 PM

**To:** Karen Wilson <[Karen.Wilson@sustainability.vic.gov.au](mailto:Karen.Wilson@sustainability.vic.gov.au)>

**Cc:** Alastair Smith <[Alastair.Smith@sustainability.vic.gov.au](mailto:Alastair.Smith@sustainability.vic.gov.au)>

**Subject:** EPA Referral request to SV on the Further Information provided by Landfill Operatons

Dear Karen

Please find attached a referral request to Sustainability Victoria regarding the further information provided by Landfill Operations' Works Approval Application for an Extension to the Melbourne Regional Landfill SO1002191.

We would be grateful if you could respond to the request within 21 days. If you are not able to respond by 9 January 2017, or consider that the request can I please ask that you let me know.

Kind regards

Richard

**Richard Hook**

Senior Project Manager - Works Approval  
Development Assessments



Environment  
Protection  
Authority Victoria



**Environment Protection Authority Victoria**

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7 February 2017

Mr Richard Hook  
Senior Project Manager  
Environmental Protection Authority  
GPO Box 4395  
MELBOURNE, VIC 3001

Dear Richard,

**Proposal:** Application for Works Approval 1002191  
**Property:** 408-546 Hopkins Road, Truganina; 1154-1198 Christies Road Ravenhall  
**EPA Ref:** 1002191

Thank you for your letter of 21 December 2017 regarding an application for a works approval referral with the above details. There are three key documents provided to assist the Environmental Protection Authority understand Melbourne Water's position on the proposed landfill expansion:

- 15 July 2016: Melbourne Water panel submission (objection)
- 21 October 2016: Melbourne Water response to further information received (objection withdrawn by Melbourne Water)
- 31 October 2016: Melbourne Water draft permit conditions for proposed Ravenhall landfill expansion

Melbourne Water provides the following response to the items raised in your letter:

Item 1:

1. Melbourne Water considers that the proposed landfill site would be established or extend into any:

(a) high value wetlands including wetlands of international importance listed under the convention on wetlands (Ramsar, Iran 1971) and listed in a directory of important wetlands in Australia (Environment Australia 2001);

**Melbourne Water response: Desktop investigations at Melbourne Water do not indicate any wetlands of international significance within the subject properties.**

(b) areas of significance for spawning, nursery, breeding, roosting and feeding areas of aquatic species, and fauna listed under the China Australia Migratory Bird Agreement and Japan Australia Migratory Bird Agreement, the Convention on Migratory Species of Wild Animals (Bonn, Germany, 1979) and under the Flora and Fauna Guarantee Act 1988;

**Melbourne Water response: Desktop investigations at Melbourne Water do not indicate the presence of species in the category above on the above properties.**

(c) marine and coastal reserves listed in the National Parks Act 1975;

**Melbourne Water response: The Department of Environment, Land, Water and Planning (DELWP) should be contacted for this information.**

(d) water supply catchments proclaimed under the Catchment and Land Protection Act 1994, unless otherwise approved by the Authority;



**Melbourne Water response: Desktop investigations at Melbourne Water do not indicate any proclaimed water supply catchment areas on the above properties.**

(e) state wildlife reserves listed under the Wildlife Act 1975;

**Melbourne Water response: The Department of Environment, Land, Water and Planning (DELWP) should be contacted for this information.**

(f) critical habitats of taxa and communities of flora and fauna listed under the Flora and Fauna Guarantee Act 1988;

**Melbourne Water response: Desktop investigations at Melbourne Water indicate the possible presence of listed Flora and Fauna (*Flora and Fauna Guarantee Act, 1988*) on the above properties. The Department of Environment, Land, Water and Planning (DELWP) should be contacted for more detailed information.**

(g) areas identified by the Water Act 1989 as water supply protection areas, unless otherwise approved by the Authority;

**Melbourne Water response: Desktop investigations at Melbourne Water do not indicate any areas of water supply protection on the above properties.**

(h) groundwater protection zones prescribed in Schedule A of the State environment protection policy (Groundwaters of Victoria) 1997;

**Melbourne Water response: Groundwater experts at the Environmental Protection Authority (EPA) should be consulted whether there are any groundwater protection zones within the subject properties.**

(i) matters of national environmental significance as identified in the Environment Protection and Biodiversity Conservation Act 1999 (Cth); and

**Melbourne Water response: The Department of Environment, Land, Water and Planning (DELWP) should be contacted for this information.**

(j) surface waters.

**Melbourne Water response: Melbourne Water provided a response to the Melbourne Regional Landfill Expansion Planning Panel (15<sup>th</sup> July, 2016) outlining existing surface waters within the properties (Section 1.0, pg. 3).**

**Melbourne Water provided an updated response to the Planning Panel dated 21<sup>st</sup> October, 2016. Based on drainage information received from the applicant for post-developed conditions, the objection (15<sup>th</sup> July, 2016) was withdrawn.**

Item 2. Melbourne Water feels that there any particular water resources, drainage and waterways you think the EPA should particularly consider?

**The property is covered by the Melbourne Water Truganina Development Services Scheme (DSS 4060). A DSS is a masterplan for surface water management in the catchment post-development.**

**Melbourne Water initially objected to the application as it was not in accordance with the Truganina DSS. Further information was submitted to Melbourne Water on the 14-9-2016 to meet the requirements of the Truganina DSS. The key requirements are summarised as follows:**

**i) Melbourne Water requires the applicant to construct a waterway (Skeleton Creek) in the south western corner of the property (DSS reference SK7>SK8). This waterway is essential because it provides outfall for the developed catchment of the Mt Atkinson and Tarneit Plains PSP (Truganina DSS) located to the north west of the subject site. A critical component of the constructed waterway is a 55 metre wide vegetated waterway corridor.**

**ii) All stormwater outfalls from the property must be designed in accordance with the Truganina Development Services Scheme. This will ensure stormwater is treated to best practice stormwater requirements and does not increase flood levels on surrounding properties.**

Item 3. Melbourne Water considers approval of this application is likely to pose any issues to water resources, drainage and waterways (and if so why)?

**Consistent with our letter of the 21<sup>st</sup> October, 2017, Melbourne Water would have no objection to the application based on further information submitted. The submitted information addressed the key issues of the constructed waterway (i) and stormwater outfalls (ii) above.**

**Melbourne Water provided draft permit conditions to the planning panel for consideration. The draft conditions will ensure the application meets the requirements of the Truganina DSS.**

Item 4. Melbourne Water considers there any technical omissions or errors in Works Approval Application in regard to water resources, drainage and waterways?

**Information submitted by the applicant (see letter of 21<sup>st</sup> October, 2016) was sufficient to address Melbourne Water requirements.**

**Prior to the commencement of works, detailed calculations and drawings must be submitted to Melbourne Water for approval. These requirements are detailed in the draft permit conditions for proposed Ravenhall Landfill Expansion (date: 31<sup>st</sup> October, 2016).**

Item 5. If Melbourne Water continues to object to the proposed Works Approval application or whether the further information supplied has resulted in the removal of its objection.

**Melbourne Water would not object to the proposed application subject to draft permit conditions dated 31<sup>st</sup> October, 2016.**

If you would like to discuss this response further, please call (03) 9679 6629 or [Michael.prior@melbournewater.com.au](mailto:Michael.prior@melbournewater.com.au)

Yours sincerely

MICHAEL PRIOR  
DEVELOPMENT SERVICES

## **APPENDIX F      EXTERNAL PEER REVIEWS**

- F.1    Independent Review of Odour Impact Assessment for proposed MRL Extension
- F.2    Peer Review of Stormwater Management System and Plan

23 January 2017

Environment Protection Authority Victoria  
Ernest Jones Drive Macleod  
VIC 3085

**Attention: Paul Torre**

Dear Paul,

**RE: Independent Review of Odour Impact Assessment for Ravenhall Landfill.**

This letter details my independent review of the odour impact assessment undertaken as part of the Air Quality Assessment to support the Works Approval application for the extension of the Melbourne Regional Landfill (MRL) in Ravenhall.

The scope of the work involved the following:

1. Reviewing the odour impact assessment report prepared by Pacific Environment Ltd (PEL), including both the methods to derive odour emission estimations and the odour impact assessment itself.
2. Reading the EPA's submission for Planning Panels Victoria on proposed Melbourne Regional Landfill Extension Planning Permit Application, for background information on local odour impacts. Herein, this report is referred to as the "EPA Submission".
3. Discussing odour control design improvements at the site with EPA, by phone.

My review has not included any aspects of the PEL report that address the assessment of particulate emissions from the MRL.



## Comparison of Actual Odour Impacts and Model Results

The first aspect that I considered was, **does the modelling in the odour impact assessment support the known degree of odour nuisance from the MRL?** This is always a very important consideration to provide credibility for any subsequent assessment of future odour impacts.

I note the following:

- 1) Alternate causes of complaints
  - a) The implication of Pinegro Composting Facility as a significant cause of off-site odour prior to the site closure in October 2015 appears reasonable.
  - b) The additional implication that complaints numbers in the period February – June 2014 were heightened due to community awareness and concern about the landfill's future is reasonable, and this phenomenon is not unusual.
  - c) Therefore, my review has focussed on odour modelling, complaints and odour field observations following the closure of Pinegro.
- 2) Evidence of offensive odour beyond the MRL site boundary since October 2015.
  - a) Since October 2015, complaints have continued to be received alleging offensive odour in the communities around the MRL. Some of these complaints allege MRL to be the source of the odour, and other complaints do not identify an alleged source. Complaint frequencies appear to be higher during the summer months, which is a common occurrence in such cases.
  - b) EPA has conducted field investigations in an effort to validate odour complaints, however it appears from the EPA submission that officers have not been able to gather much evidence of offensive odour occurring beyond the MRL boundary.
  - c) Nevertheless, it is assumed that the presence of ongoing complaints indicates some level of odour concentration occurring in the community to the north and east of MRL, that is perceived to be offensive by the community members. Whether the degree of odour can be proven to be an offence caused by MRL is a separate matter outside of the scope of this review.
  - d) The analysis of complaint timing in the PEL report indicates that most complaints occur outside of the hours when the active face is working, coinciding with atmospheric conditions less favourable for odour dispersion and also indicating that the intermediate cover and temporary active face cover may be the significant odour sources rather than the working active face.



### 3) Model result plots.

- a) The PEL report provides model contour plots (and tabulated results) only for the total odour sources from the MRL, and does not provide breakdowns of relative contributions to odour by the different source types. This would have helped to isolate whether concerns about the uncertainty in odour emission rates (see below) are significant in the interpretation of model results.
- b) The aerial photo used as a base map for the model contour plots is very old, circa June-September 2009 based on comparison of commercial development to the east of the MRL with historical aerials photos from Google Earth and Nearmap (Appendix 1). The aerial photo is missing substantial commercial/industrial development within the modelled domain. This poses a risk of misleading the interpretation of model results.
- c) No documented comparison has been made of model results with areas where complaints typically arise from. I have attempted to carry out a preliminary comparison by overlaying various figures, see Appendix 2.
  - i) If it can be assumed that the complaint occurrence area generally represents any area that is occasionally affected by offensive odour, and also that the model results are a good representation of actual emissions and dispersion conditions, then the model results indicate that an odour concentration of about 0.5 OU is likely to be representative of the offensive odour threshold.
  - ii) However, the model results do not well represent the apparent impact (as indicated by complaint locations) to the north of the MRL in the Caroline Springs area. If these complaints are considered to indicate offensive odour occurs in this area, then the model may not be adequately simulating dispersion towards this area.
  - iii) From the model input file provided in Appendix D of the PEL Report, it appears that the active face has been assumed to operate 24 hours per day. While this generates a “worst case” odour model output, it is not useful for comparing model results with actual odour impacts.

## Modelling Methodology

4. The modelling has been conducted using AERMOD. Whilst this is the preferred regulatory model for Victoria, it has shortcomings in the modelling of dispersion in low wind speeds for area sources.
5. The method used to overcome these shortcomings, of using volume sources to simulate the area sources, is no longer preferred practice although it is understood that this advice was being provided by EPA in mid-2015. Current good practice would use area sources and the ADJ\_U\* option within AERMET/AERMOD.

6. The meteorological data used as input to AERMOD was prepared by EPA Victoria, and the methodology used by EPA to prepare that meteorological data is outside the scope of this review. This includes the coding of land use data for the site and surrounds, a very important factor for AERMOD.
7. However, it is noted that the minimum wind speed in the meteorology used by AERMOD is 0.5 m/s, so dispersion in calm conditions may not be adequately simulated in the model.
8. In my opinion, the CALPUFF model would have been preferred for this site due to the importance of low wind speed dispersion, and the variation in land use across the modelled domain.
9. The sensitivity of model results to use of wind speeds lower than 0.5 m/s should also have been reviewed, regardless of whether the AERMOD or CALPUFF model was used. It is not known if real wind monitoring data for speeds lower than 0.5 m/s is available (i.e. monitoring conducted with an ultrasonic-type wind sensor rather than a cup-and-vane type), this information should be critical for such a large site with significant potential for odour nuisance in light winds.

## Odour Emission Estimation

10. A lot of effort has been dedicated to quantifying odour emission rates from the landfill sources, particularly the active face. However, as noted in the PEL Report, the active face is not open when complaints typically occur. In addition, there is no information provided in the PEL Report about the relative impact of odour from the active face versus the other odour sources.
11. The following comments are noted regarding the method to quantify odour emissions from the active face as presented in Appendix C of the PEL report:
  - a. The concept of adjusting emission rates with wind speed is appropriate, however the method of doing so (using Equation 1 in Appendix C of the PEL Report) requires assumptions about the value of a coefficient "A" and an exponent "p".
  - b. The basis for selection of values of "A" is probably reasonable (Table C.1), but there must be some allowance for uncertainty in the exact values used.
  - c. Selection and justification of the value of exponent "p" does not appear to be documented, nor is allowance for uncertainty provided.
  - d. The use of a "transect" method to sample odour emissions downwind of the working face and back-calculate the emission rates has a high level of associated uncertainty, due to:

- i. Inherent error in odour concentration measurement method
  - ii. Assumptions about vertical profile of odour concentration at 70m downwind (Figure C.1)
  - iii. Assumptions about contribution from other background odour sources
  - iv. Assumptions from Equation 1 as discussed above.
- e. No discussion is provided about the sensitivity of the emission rate calculations to these potential error factors.
- f. This review has not been able to determine whether the high degree of uncertainty in the odour emission rates for the active face is significant for the assessment of overall odour impacts, because the relative contribution of the active face versus other odour sources has not been provided.
12. The following comments are noted regarding the method to quantify odour emissions from the intermediate cover:
- a. The assumption of an odour flux rate of 0.08 ou/m<sup>2</sup>/s for best-practice intermediate cap (completed cell, not yet final capped) seems reasonable based on the measured odour emission rates.
  - b. However, this odour flux rate has been applied to the intermediate cover for all modelled scenarios, including Base Case 2014 and 2015 (determined by calculation from Tables 5.5 and 5.6 in PEL Report). Based on the odour flux testing results in Appendix C Table C.2, this may underestimate the odour emission rates from current intermediate-capped areas.
  - c. There appears to be no category for odour emissions from areas recently filled and covered. Despite the use of sacrificial LFG collection, it is likely that such areas would have an odour flux rate higher than 0.08 ou/m<sup>2</sup>/s.

## Conclusion

In summary, I consider that there are several issues with the methodology applied for odour assessment:

1. Dispersion model results for current situation do not match well with complaint locations. If the model for the current situation was actually correct, there should be no offensive odours occurring in the Caroline Springs residential area. This disparity brings the credibility of the model results for the future MRL development into question.
2. The meteorology does not include any wind speeds less than 0.5 m/s, not even any calm winds (as per Figure 3.8 of PEL Report).

3. The AERMOD modelling was conducted using volume sources to represent cell areas, rather than area sources and the "ADJ\_U\*" meteorological correction which is the current method recommended by EPA.
4. The modelling should probably have been conducted using the CALPUFF model instead of AERMOD, given the importance of low wind speed dispersion. However, adequate low-wind speed observation data would be required as well.
5. There is a high degree of uncertainty in the method used to determine odour flux rates from the active face.
6. No sensitivity analysis of assumptions regarding model inputs and flux rates, nor assessment of relative contributions of different source types to overall offsite odour concentrations, is provided.

Yours faithfully,

**Air Quality Professionals Pty Ltd**

---

**Tracy Freeman**

Principal Air Quality Consultant



## Appendix 1 – Current and Historical Aerial Photos for MRL and Surrounds, from Nearmap.com



Image date: 12 October 2009





**Image date: 9 January 2014**





Image date: 30 October 2015

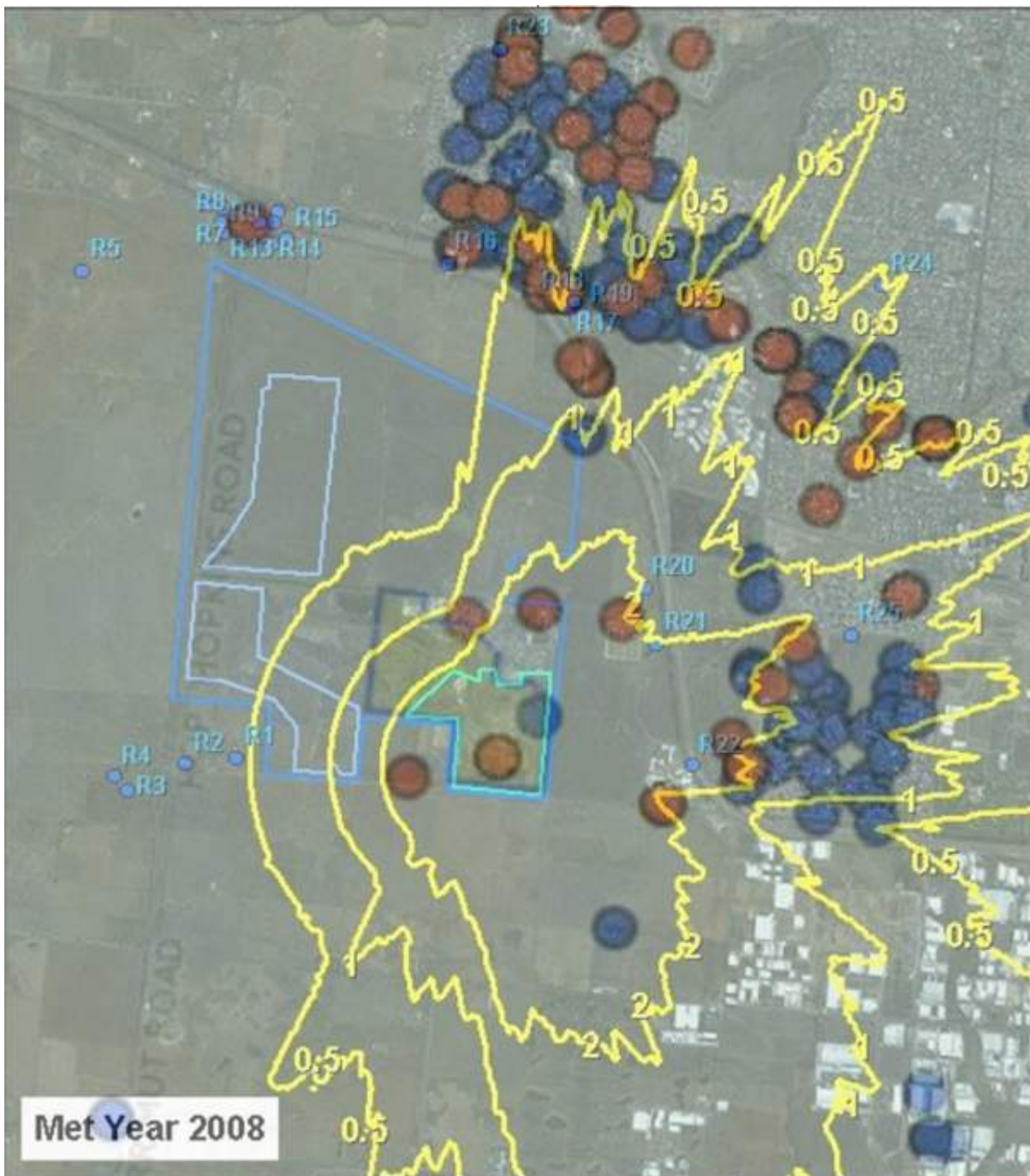


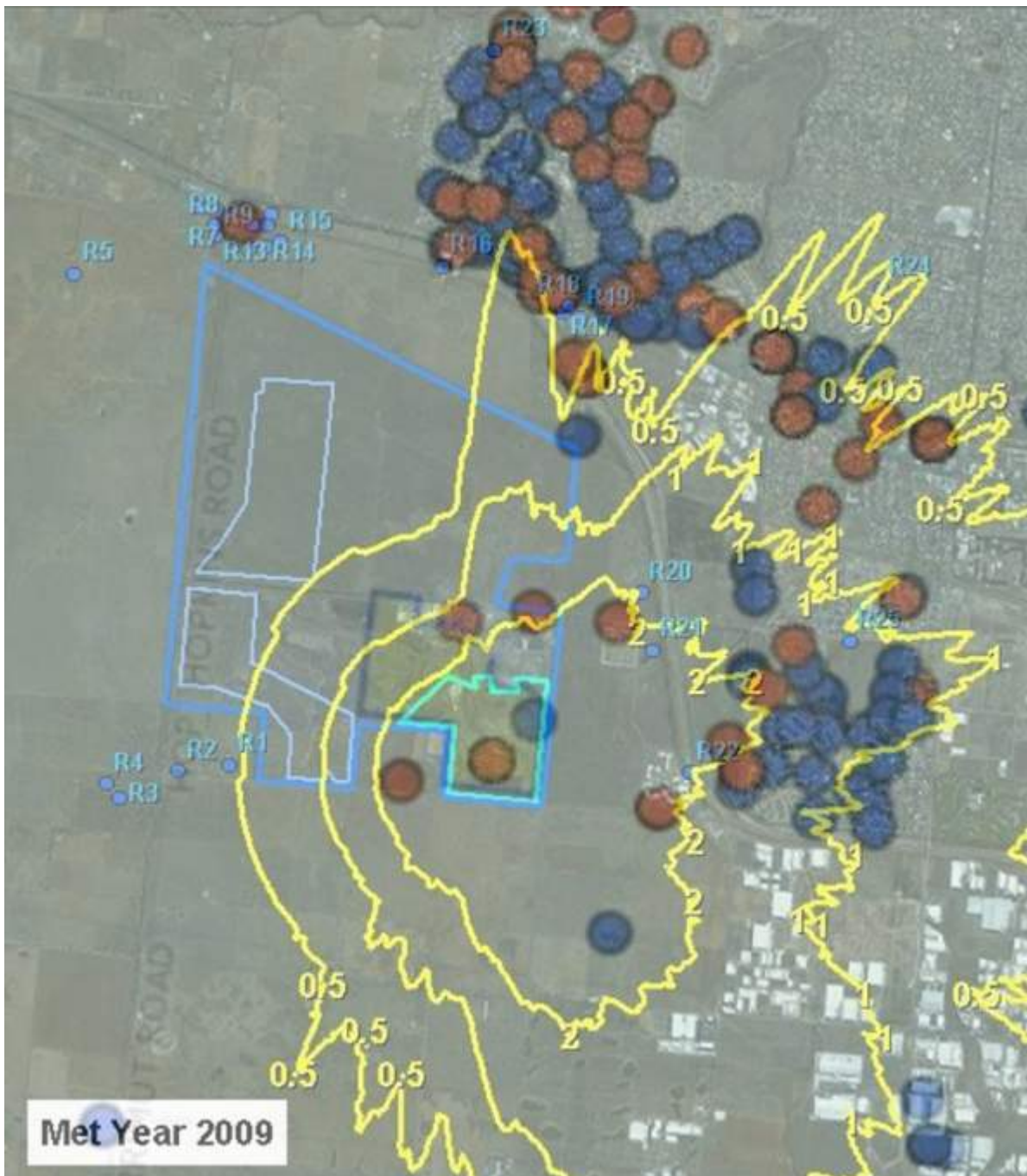


**Image date: 7 January 2017**



Appendix 2 – Odour Model Results for BaseCase 2015 (from PEL Report), overlaid with alleged complaint locations August 2015 – July 2016 (from EPA Submission).









## **Proposed MRL Extension, Ravenhall**

# **Peer Review of Stormwater Management System and Plan**

Revision C  
3 March 2017

Report by: Valerie Mag, B.E. Civil (Hons), M. Eng. Sci.  
**Stormy Water Solutions**

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# 1. Introduction

## 1.1 Purpose of the Review

This report details a peer review which was requested by EPA Victoria to support its technical assessment of Landfill Operations Pty Ltd (“Landfill Ops”) Works Approval Application (WAA) to extend the Melbourne Regional Landfill (MRL). Landfill Ops have applied to EPA and Melton City Council (Council) for Works Approval and Planning Permission to extend their existing landfill at Ravenhall.

The Peer Review of the Stormwater Management System (SWMS) and Stormwater Management Plan (SWMP) is required to confirm that it is:

- A plan which is fit-for-purpose;
- Meets the appropriate legislation/policy/guidance requirements; and
- Based on the accurate modelling and data including consideration of:
  - Delineation of catchments,
  - Modelling used ,
  - Sizing of the discharge and storage ponds, and
  - Sizing and placement of the stormwater network within the site.

## 1.2 Valerie Mag Credentials

I am the author of this report. My name is Valerie-Joy Sally Mag. I am a Civil Engineer and Principal of Stormy Water Solutions. I practice as a consulting hydraulic and hydrologic engineer.

My educational qualifications are as follows:

- Bachelor of Civil Engineering, Monash University (1989)
- Master of Water Resources and Environmental Engineering, Monash University (1993)

I have twenty eight years’ experience and expertise in hydrologic and hydraulic engineering, particularly in the areas of:

- Preparing complex urban and rural flood plain strategies,
- Preparing Water Sensitive Urban Design Strategies,
- Major catchment analysis, including flood flow and flood level estimation,
- Planning and assessment of development within flood plain and overland flow path systems,
- Reviewing drainage strategies prepared by other consultants for Melbourne Water and various councils, and
- Regularly preparing and conducting training in drainage and WSUD for the Municipal Association of Victoria, Vic Roads, Melbourne Water, the Department of Tourism Arts and the Environment (Tasmania), ARRB Group and others.

I have had no previous involvement in the site. However, I have a background knowledge of the catchment which I obtained during my 12 years as an employee of Melbourne Water Corporation

(MWC), specifically in that part of my work involved in assessing and implementing Development Services Schemes (DSS's). I have no known conflict of interest in regard to the review process as defined in this report.

## **1.3 Review Methodology**

### **1.3.1 Documents Reviewed**

As part of the preparation for this report I have reviewed a report entitled "Information to Support Works, Approval Application, Proposed Melbourne Regional Landfill (MRL) Extension, Ravenhall, Golder Associates, February 2016". Specifically Appendix L of this Works Approval Application (WAA) (which details the Stormwater Management Plan (SWMP)) was reviewed in detail. Appendix L is referred to as the SWMP report in this document.

In addition this review considers:

1. Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2016,
2. Melbourne Water Corporation Constructed Wetland Design Manual , Draft, 2015
3. Base map information obtained in AutoCAD format from DELWP being roads, property boundaries, waterways and one metre contour information,
4. The Melbourne Water Corporation Development Services Scheme (DSS) plan affecting the subject (see Appendix A of this report).
5. DELWP's planning scheme overlay map (see Appendix B of this report)
6. Waterway Corridors Guidelines for greenfield development areas within the Port Phillip and Westernport Region, Melbourne Water Corporation
7. MUSIC Guidelines Input parameters and modelling approaches for MUSIC users in Melbourne Water's service area, Melbourne Water, 2016
8. Melbourne Water Corporation Land Development Manual (February 2017 web site version)
9. Environment Protection Authority Victoria (EPA) publication 480 - Environmental Guidelines for Major Construction Sites.
10. A Melbourne Water Corporation letter dated 15/7/16 to Planning Panels Victoria outlining Melbourne Water's objection to the proposal.
11. A Melbourne Water Corporation letter dated 21/10/16 to Planning Panels Victoria outlining Melbourne Water's reasons for withdrawing their objection to the proposal.
12. Two plans entitled "Truganina DSS plan" and "Truganina DSS South Portion" prepared by Golder Associates and dated 14/9/2016 showing the Melbourne Water development services scheme overlain with the landfill proposals.
13. A Melbourne Water Corporation letter to EPA Victoria dated 7/2/17 outlining Melbourne Waters reasons for withdrawing their objection of 15/7/16.
14. Golder Associated Technical Memorandum dated 27/2/17 detailing additional information in regard to the provisions for the external catchment in the south eastern portion of the site.



15. Boral Quarries Drawing VQ17-21-5 (September 2001) detailing extraction limits and buffers for the existing quarry.

### **1.3.2 Review Methodology**

The primary objective of this review is to determine if Clause 15 of the WMP Waste Management Policy is being met. That is does the landfill operator to comply with the BPEM (EPA Publication 788.3) as follows:

- The BPEM represents a default position for siting, design, operation and rehabilitation, with objectives and required or equivalent outcomes.
- Best practice is defined by EPA Publication 1517 Demonstrating Best Practice as a “requirement of statutory policy” and “the best combination of eco-efficient techniques, methods, processes or technology used in an industry sector or activity that demonstrably minimises the environmental impact of a generator of emissions in that industry sector or activity”.

To determine is the above objectives are met by the proponents SWMP, Stormy Water Solutions (SWS) examined the following:

- External catchment definition,
- Existing and post-development flooding and ecological impacts at designated outfall points from the landfill site,
- Skelaton Creek impacts in relation to the SWMP reponse to ensuring full concideration of the usual Melbourne Water Corporation (MWC) requirements for ensuring no offsite flooding impacts,
- Regulatory requirement review including stormwater pollutant retention requirements ,
- The internal cap swale and discharge pond concept design proposals in relation to sediment collection and flood attenuation requirments,
- Storage pond concept design, and
- Review of the sizing and placement of required drainage assets on site.

The first draft of this report was based on documents 1 to 9 (Section 1.3.1). Revision A included reiterating Melbourne Water Corporation (MWC) advice (Documents 10 to 13). This Revision B report further considers advice and clarifications the proponent provided to EPA Victoria and Stormy Water Solutions in meeting held on 10 February 2017 at the EPA Victoria. Revision C further considers documents 14 and 15 above.

### **1.4 Review Findings**

In line with EPA Publication 788.3, the SWMP as presented does detail concept design proposals for the BPEM requirements of (in regard to siting, design, operation and rehabilitation). “Required or equivalent outcomes” are not completely transparent in the SWMP. However, this review indicates that:

- Many of the concept designs are conservative in regard to sizing and land take, and
- There is sufficient area both on the cap and in the quarry areas to ensure system sizes can increase if required.

As such, as the design process proceeds, it is expected that “required equivalent outcomes” will be shown to be met via completing the investigations and calculations as suggested in this report (or equivalent investigations or calculations as required by MWC)

By completing detailed calculations, modelling and site analysis, SWS considers that “fit for purpose” attributes will be completely shown to be met as the design process develops. However, in meeting these requirements additional land take for drainage assets (in addition to what is shown in the current SWMP) may be required.

## **2. Relevant Drainage Issues Requiring Investigation**

### **2.1 Site Description**

The extension is bounded by Hopkins Road to the west, the Melton Rail Line to the north, Clarke Road to the east and Middle Road to the south. The landfill has a total area of approximately 210 hectares, within a works approval boundary of in the order of 350 ha.

The proposed landfill extension comprises two portions referred to as the 'South Portion' (south of Riding Boundary Road) and the 'North Portion' (north of Riding Boundary Road).

### **2.2 Catchment and Waterway Descriptions**

#### **2.2.1 Existing Catchments and Waterway Delineation**

Stormy Water solutions has estimated the pre-development waterway and catchment configurations. The delineation of this information was obtained in AutoCAD format from DELWP being roads, property boundaries, waterways and one metre contour information. In addition, the MWC DSS plan for the area of interest also provided guidance (see Appendix A). The resultant external catchment plan is detailed in Figure 1 below.

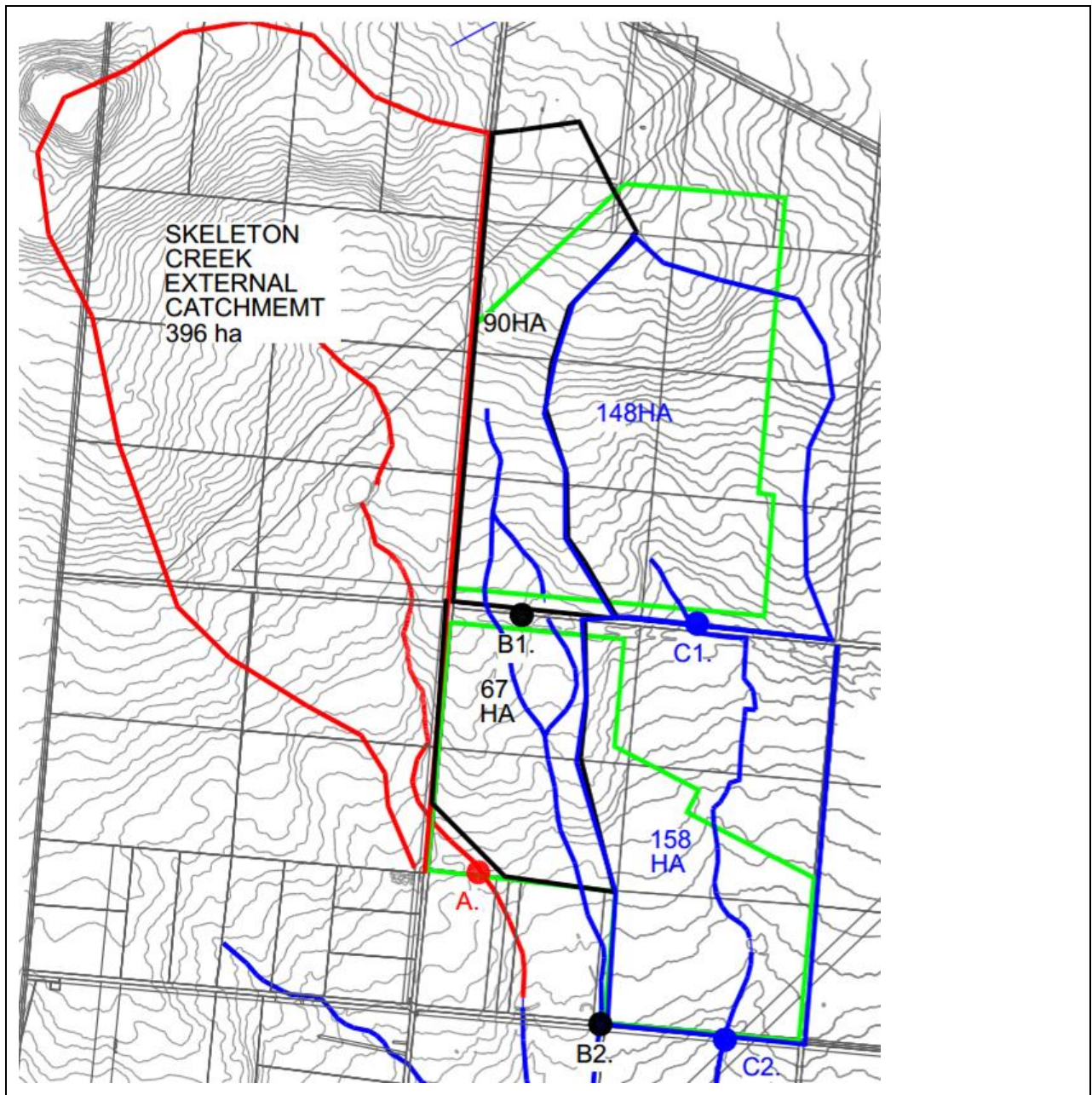
This is a very important step in the development of any SWMP as it:

- Identifies any external catchments affecting the site, and
- Clearly sets the points at the extreme downstream locations of any affected area, thus defining where existing conditions in relation to flow quality and quality are to be met.

The updated September 2016 SWMP plans are generally in line with the external catchment delineation detailed below in regard to external catchments.

In relation to internal catchments, Figure 1 defines what was on the ground before any development of the site. The catchment area of the tributary to outfall point C2 is largely located within areas affected by an existing quarry. A large portion of the catchment to B2 may not be affected by the existing quarry. However, it is understood (EPA meeting held on 10/2/17 and Boral Quarries Plan VQ17-21-5, September 2001, detailing extraction limits and buffers) that it is affected by agreements assuming the quarry will affect this catchment.

It is considered that it would be beneficial for an "existing" catchment plan to be developed to clearly delineate and define "existing" catchment discharging at surface to Points B2 and C2. The "existing" condition would account for the previously agreed quarry development. In this way any changes to existing offsite impacts (from those previously agreed) could be assessed. This is a usual step in any SWMP development.



**Figure 1** Estimated Pre-development External Catchments  
*Black Catchment - 157 ha (pre-development catchment) discharging to B2*  
*Blue Catchment – 306 ha (pre-development catchment) discharging east and diverted away from C2*  
*Red Catchment - External Skeleton Creek Catchment Outfall from Site at Point A.*

### 2.2.2 Post - Development Catchments and Waterway Delineation

Given the Catchment definitions of the updated DSS plans (14/9/16) and the definition of areas where stormwater will be discharged to storage ponds on the quarry floor, SWS formulated a post-development catchment plan as detailed in Figure 2.

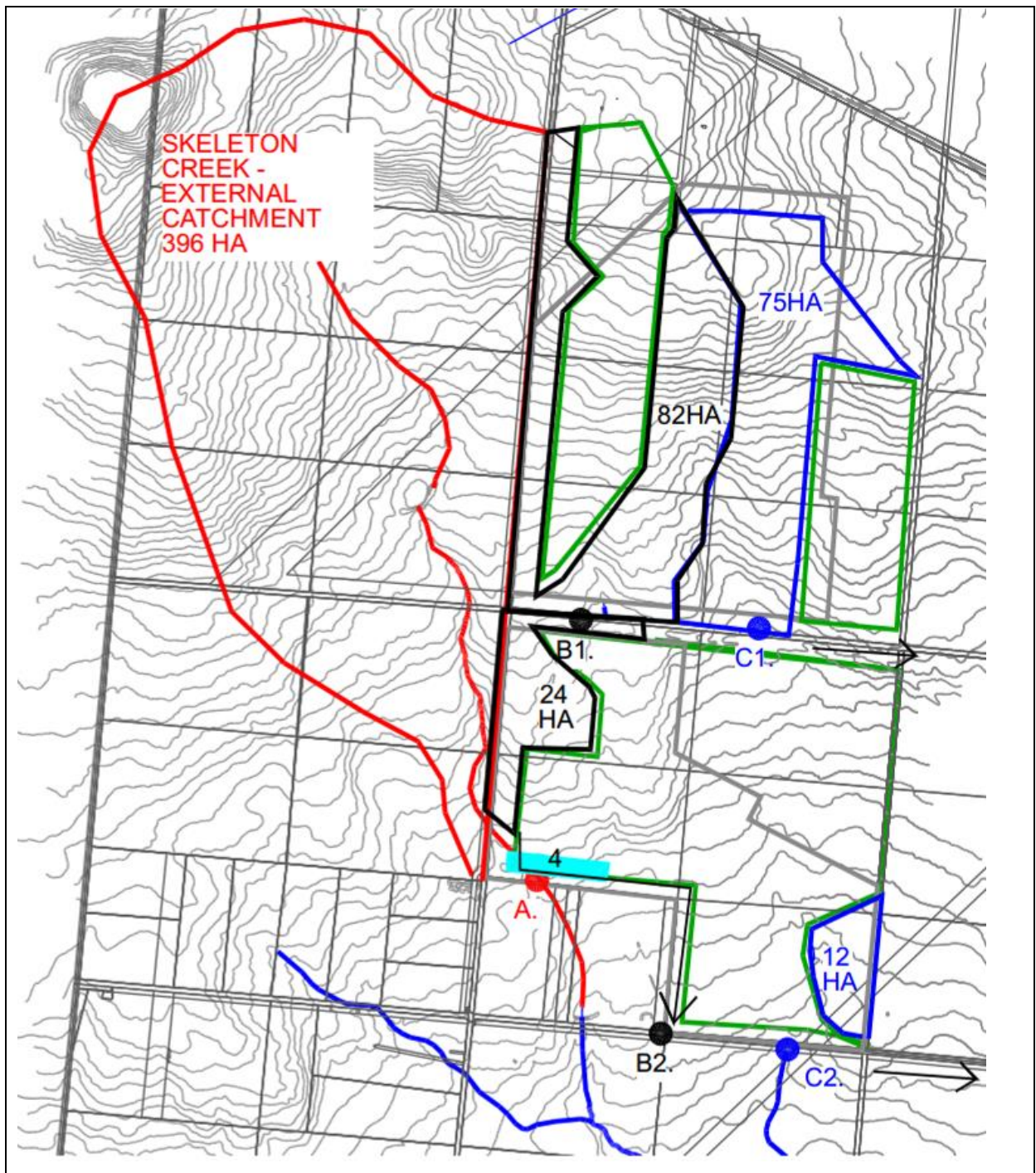
In the EPA meeting of 10/2/17, the proponent indicated that, although stormwater from discharge ponds is defined as discharging off site, some discharge ponds will in fact be discharging to storage ponds (thus retaining stormwater on site). As such, Figure 2 is not completely correct. This misunderstanding

does highlight that the SWMP plans are not completely consistent with the definitions of the SWMP elements in the SWMP report.

Notwithstanding the above, it does appear that post development catchment to B2/C2 will reduce from “existing” conditions when the landfill is complete. The resultant reduction in catchment area may in fact reduce the requirements for some attenuation storage zones in some discharge ponds. SWS considers that the effect of catchment reduction may offset any increase in runoff coefficient. As such, outflows from the site, in all storm events, may decrease. As such, potentially some attenuation zones may not be required in the discharge ponds (although the sediment deposition zones will be required).

The “MRL Ravenhall, Truganina DSS Plan, 14/9/16” appears to show discharge from the landfill site being directed to outfall points B2/C2 and not east as in previous versions. However, a small undefined blue arrow is still indicating some flow east into an adjacent catchment. In the EPA meeting of 10/2/17, the proponent indicated that all site flow will be directed south. This must be clearly shown in future versions of the SWMP.





**Figure 2 Estimated Post-development External Catchments**  
*Black Catchment - 106 ha (Post-development catchment) discharging to B2*  
*Blue Catchment – 87 ha (post development catchment) discharging east and diverted away from C2*  
*Green catchments – internal quarry catchments to site storage ponds – No offsite discharge*  
*Red Catchment - External Skeleton Creek Catchment Outfall from Site at Point A.*

SWS has not seen the MWC permit conditions at this time. However, often the catchment management authority (MWC in this case) would require investigation of significant changes to waterway hydrology (from the existing situation), being effects on:

- Downstream flood flows,
- Downstream water users, and

- Downstream waterway ecology and health.

SWS considers that it would be prudent for the proponent to investigate these issues through appropriate water balance, flood flow, environmental and ecological investigations.

It is considered that the following additional information/modelling should be performed as the design develops.

1. The proponent should review the external catchment plan to adequately define “existing” catchments and waterway outfall points (“existing” being defined as the site used for quarry purposes as currently agreed).
2. An existing hydrological model should be developed (using appropriate modelling techniques such as the RORB runoff routing program) to define the 1% existing flood flows at Points B2 and C2. This then sets the flood retention requirements to ensure no increase in the 1% flood impact downstream of the subject site,
3. A water balance (using at least 10 years of daily rainfall and evaporation data) should be developed to adequately define daily existing runoff from the site. This is required to ensure flow volumes (on a daily time step) are not changed (increased or decreased) substantially in the post development scenario. The water balance component of the MUSIC model would be an appropriate model to complete this task.
4. The proponent should produce an overall post development catchment plan (similar to Figure 2) to adequately delineate catchments discharging stormwater offsite, future outfall point and catchments discharging to storage ponds (resulting in no stormwater discharge off site).
5. A post-development hydrological model should be developed (using appropriate modelling techniques such as the RORB runoff routing program) to define the 1% existing flood flows at Points B2 and C2 (or discharging east from this catchment). The model can include any flood attenuation proposed (if required) in the discharge basins. In addition the models should be extended south and east of the subject site to fully encompass any off site flow impacts (frequent flows and flood flows). Flood flows can be compared to existing flows, and can be used to assess offsite flood impacts (if any).
6. A water balance (using at least 10 years of daily rainfall and evaporation data) should be developed to adequately define daily post-development runoff from the site. This is required to ensure flow volumes (on a daily time step) are not changed (increased or decreased) substantially compared to the existing scenario. If they are, the impacts can now be considered. The water balance component of the MUSIC model would be an appropriate model to complete this task.

RORB and MUSIC are models which MWC usually require to be used for the assessment described above.

It should be noted that the above is the independent view of Valerie Mag of SWS. MWC, as catchment managers MWC appear to have advised Planning Panels Victoria on 15/7/16 that issues involving reducing flows south from B2 and C2 may not be a significant issue for them.

In Document 10 (Section 1) Melbourne Water states that:

- They do not expect flows in these tributary alignments whilst the quarry and /or landfill are operational, and
- Stormwater run-off is still expected from these catchments; however this would be managed in accordance with a detailed Stormwater Management Strategy.

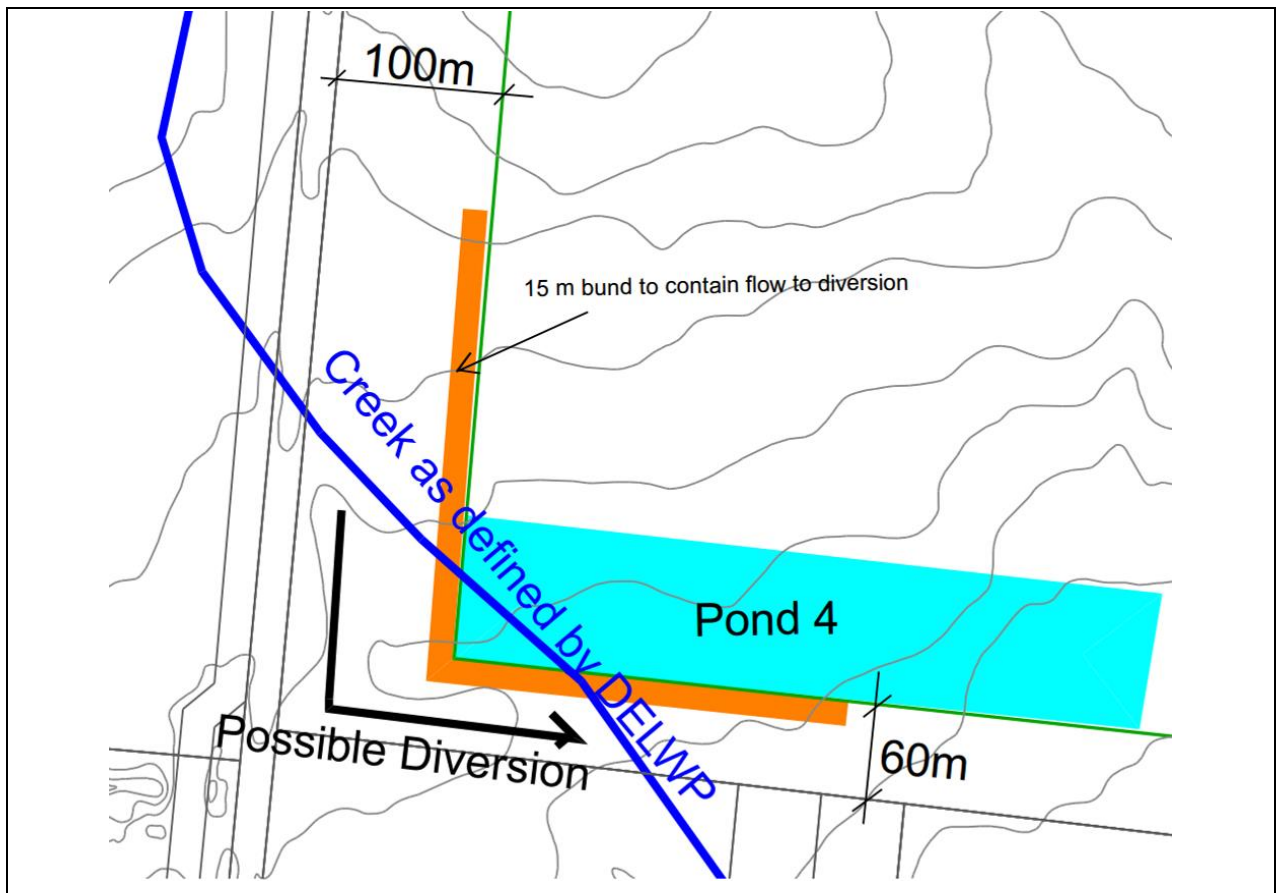
SWS agrees with these statements. If anything catchment will be reduced as the landfill develops. However, transparent and clear investigation of these issues would be beneficial to ensuring no impact on downstream environments going forward.

Notwithstanding the above, the investigation of the SWMP as detailed below indicates that enough space and adequate element concept design sizes have been incorporated at this stage to ensure minimal downstream impact (compared with the existing situation)

### **2.2.3 Skeleton Creek Issues**

The proponent states that, in accordance with the Water Act 1989, Guidelines for Quarries and Mines 2004, a channel with a catchment of 60 hectares or more is identified as a 'waterway'. Thereby, in the context of this application Skeleton Creek is defined as a waterway with a catchment of approximately 65 Ha.

This statement is slightly misleading. The existing creek is a minor drainage line with a high level of disturbance. There is no defined creek bed or bank, and stream flow only occurs after rainfall events. However, as detailed in Figure 1, the catchment is significant at 396 ha (to Point A). The SWMP states "appropriate buffer distances of 100 m are maintained to this designated area". However, as detailed in Figure 3, the 100 metre buffer does not extend to the southern boundary. Here 60 metres is defined. The waterway corridor definition is considered simplistic and not completely accurate as discussed below.



**Figure 3 Skeleton Creek in Relation to site proposals**

Figure 3 is an attempt to clarify the original SWMP site proposals. As detailed the existing DELWP waterway alignment appears to clash with the quarry wall and Pond 4. Obviously a diversion of the waterway is required. To achieve this both a formed waterway and a bund (to ensure flow does not enter the quarry) are required between the property boundaries and the defined buffer line. About 15 meters will be required for the bund if it is assumed to be about 1 metre high, with 1 in 5 batters. Along the southern boundary this leaves 45 metres for the waterway formation.

The plan entitled “MRL Ravenhall, Truganina DSS South Portion, 14/9/16” shows a clear 55 metre delineation for a realigned waterway (within the 60 metre offset) in line with current MWC advice.

Golder Associated Technical Memorandum dated 27/2/17 details additional information in regard to the provisions for the external catchment in the south western portion of the site. The aim of the memorandum is to show that a waterway can be accommodated with a hydraulic width less than 55 metres. SWS has reviewed this information and determined that:

- Golder’s calculation of the total flow of from the total external catchment to Point A is probably conservative at 31 m<sup>3</sup>/s. The rational method is not really an appropriate tool for use in large catchments such as this. Use of RORB (or similar) would probably result in a flow in the order as that advised by Melbourne Water of 15 m<sup>3</sup>/s
- The Manning’s formula assumptions used to size the waterway are, in some cases not as advocated by Melbourne Water for this type of analysis. For instance n = 0.03 represents mown

grass. Melbourne Water usually required a Manning's n of at least 0.05 – 0.075 in situations such as this. In addition, Melbourne Water advocate batters of 1 in 5, not 1 in 4 as used by Golders.

- The design in no way accounts for the fact that the waterway must merge with the existing invert level/low point of the drainage path at Point A. This is a very shallow existing invert, as is a significant constraint on the design of the waterway upstream.

Notwithstanding the above, preliminary calculations undertaken by SWS (assuming a 0.5 m channel depth, a 1 in 300 slope and a Manning's value of 0.05) indicate the waterway can be accommodated within a hydraulic width of 45 metres. It should be noted that the waterway would be deeper at its upstream end, and 0.5 m at its downstream end to minimise (or negate) cleanouts required downstream to get an outfall. As such the depth and base width of the channel would vary.

Given the above, SWS conclude that 60 metres is enough to contain the realigned waterway and bund. However, it is considered that the following additional information/modelling is would be beneficial in regard to ongoing design development.

1. The proponent should review the external catchment plan to adequately define "existing" 1% AEP flows along Skeleton Creek with an appropriate hydrological model (such as RORB).
2. A waterway cross section and longitudinal section should be designed to ensure no increase in the 1% flood level upstream or adjacent to the site. In addition this model must also show no significant increase in 1% flow velocities. MWC may also require the proponent to show no decrease in flood storage through the site. A hydraulic model such as Hec Ras would be appropriate for this analysis.
3. Given the 1%AEP hydraulic width determined above, the appropriate waterway corridor width (incorporating the bund adjacent to the quarry) is required to be set, and the flood level, flood velocity and flood storage requirements above are required to be shown to be met.
4. If this corridor width exceeds 60 metres (along the southern boundary), the boundary of the quarry and location of Pond 4 may be required to be moved further away from the boundary.

RORB and Hec Ras are models which MWC usually require to be used for the assessment described above.

In summary, SWS consider that an allowance of 60 metres for the realignment of Skeleton Creek (and bund) is acceptable, but further hydrological analysis is required as the design develops. SWS has yet to see the MWC permit conditions. However, it is assumed similar calculations would be required by MWC for approvals as the design progresses.



### **3. Site Assessment of Applicant Proposals**

#### **3.1 Storm Water Management Plan Summary**

The SWMP is proposed to comprise of:

- A series of open channel stormwater swale drains that collect rainfall runoff from the final cap and the interim cap and distribute this rainfall runoff into various stormwater ponds located around the perimeter of the North Portion and South Portion landfill caps,
- Runoff from external catchments will be diverted around the site using stormwater management infrastructure including earth bunds and local swale drains.
- Runoff from the quarry floor area outside the landfill cells but within the Landfill Ops managed land will be managed by Landfill Ops.
- Stormwater runoff from the proposed landfill extension will be classified according to the stage of the landfill rehabilitation with the collected stormwater treated by removing sediment from the capping soils and then either discharged to the offsite stormwater network surrounding the site or stored onsite for use by Landfill Ops and Boral.
- Outlet flows from the stormwater ponds may discharge at controlled rates to stormwater infrastructure on Middle Road, Hopkins Road and Riding Boundary Road.

A series of Stormwater Discharge (16) and Storage Ponds (6) are proposed to achieve the above.

The SWMP states that stormwater runoff is collected by cap swale drains and directed towards stormwater ponds located around the perimeter of the landfill (shown on Figure 18 of the SWMP). Two types of ponds were proposed in the preliminary design of the system; Discharge Ponds and Storage Ponds. The Discharge Ponds allow for constant outflow and are expected to be dry during periods of no rainfall. Discharge points are proposed along Hopkins Road and Riding Boundary Road. The Storage Ponds are located on the quarry floor and designed to have the capacity to contain stormwater. The stored stormwater is either pumped for re-use by Boral or Landfill Ops or evaporated.

The various components of the SWMP are discussed below.

#### **3.2 Cap Swale System**

##### **3.2.1 Cap Swales**

The cap swales define the inlet swale system to the proposed discharge ponds.

SWS generally agrees this with application of the swales as they will assist in retention of sediment prior to discharge to the sediment collection (discharge) ponds.

The swales have been roughly sized in the SWMP. Calculations relating to flow (rational method) and swale sizing (Manning's formula) are described in the SWMP. However, no detailed calculations are presented so robust review is difficult.

However, SWS did try to replicate the preliminary swale sizing detailed in Table 2 of the SWMP given the available information. Australian Rainfall and Runoff (ARR) 1987 rainfall intensities were utilised. These are (on average) 1.2% higher than the ARR 2016 IFD intensity values, and as such are reasonable for use in this application.

It is unclear what runoff coefficient was used for the landfill cap. Appendix B of the SWMP suggests that a value of 0.8 may have been used (medium soil, open crop, 100 year ARI intensity for rural catchments). If this value was used then this is considered an overestimate by SWS. The worst case in regard to runoff potential of the cap will be when it is in its interim state and not planted. MWC recommends a 100 year runoff coefficient of 0.3 for "rural" catchments. This is appropriate to represent catchments without impervious areas such as this landfill cap. However, it may be prudent to increase this to 0.5 in this case due to the surface slope of the cap and the lack of vegetation in the interim. However, in the February EPA meeting the proponent confirmed the requirement to assume a post development runoff coefficient of 0.8. As such, in regard to design flows etc., this is a conservative assumption.

A Manning's n of 0.03 representing mown grass was used to size the swales. This is considered a low value by SWS. Unless the proponent can guarantee mowing of the entire swale system every 6 weeks or so, it would be much more prudent to specify a higher Manning n value to represent sedges and rushes or equivalent. In fact, if designed to be planted with sedges and rushes from inception, the swales can be modelled to contribute to sediment (and TSS, TP and TN) treatment from the start of the construction of the cap. This will aid in supplementing the sediment collection mechanism of the discharge ponds. If long vegetation is allowed, for a Manning n in the range of 0.09 to 0.15 may be more suitable in this application.

With the available information SWS attempted to replicate the preliminary swale sizing in Table 2 of the SWMP for SW2 (assumed to be the swale upstream of Pond 7). A time of concentration in the order of 10 minutes was assumed based on a velocity in the inlet swale of 2.9 m/s (cross section as per SWMP Table 2 and Manning n = 0.03). This produced a design flow of 7.5 m<sup>3</sup>/s. SWS could not replicate a flow of 3.3 m<sup>3</sup>/s (as detailed in the SWMP, Table 2) unless a very long time of concentration was used (which would reduce the intensity) and/or the runoff coefficient lower than 0.8.

More transparency in regard to the rational method and swale sizing calculations is required in regard to this aspect of the design.

Whatever the case, SWS does strongly suggest vegetating inlet swales to reduce the flow velocity in these systems. Flow velocities of over 2 m/s (if grassed) will probably result in swale erosion. This will not only be an asset maintenance issue but will add sediment input to the sediment collection zones of the discharge

basins. However, alternative velocity mitigation techniques such as in-line berms, geo-fabric lining etc. can also be used to achieve this objective.

### **3.2.2 Discharge Pond Outlet System**

No information is given on the discharge pond outlet system except that it is implied that it will be a diversion toe drain (SWMP Plate 2). That is, the outlet system from the discharge ponds will also be swale drains, similar to the inlet swales.

It is assumed that outlet swales will combine in series as more and more discharge ponds contribute to them. As such, outlet swales will probably need to be at least the same size (or larger) than contributing inlet swales (depending on the amount of retardation provided in the discharge ponds and how many ponds contribute to each swale).

No information is given in the SWMP plan in relation to the design flows, sizing, longitudinal slope and placement of the discharge pond outlet swales.

### **3.2.3 External Swales/ Diversion Channels**

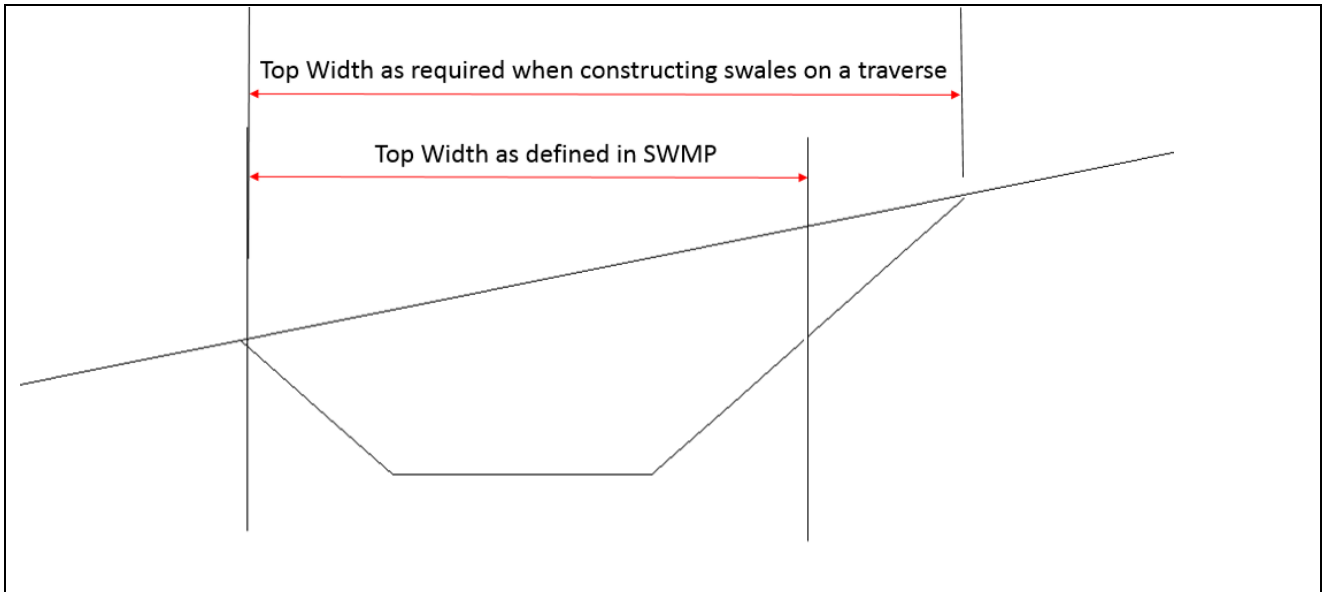
The external swales (referred to as Diversion channels in the SWMP), apart from Skeleton Creek, are probably oversized. The external catchment computation has probably been overestimated (See Section 2.2.2 of this report). SWS agrees that some road drains etc. will be required to be enlarged, primarily to enable relatively deep invert levels for the site outfall system.

### **3.2.4 General comments in Relation to Swale Design**

It should be noted that the 2016 ARR strongly suggests that for catchments of the size detailed, the rational method may not be an appropriate method to determine design flows, as it has proven to be quite simplistic. As such, a more robust model such as RORB (or equivalent) should be used to determine the drainage element sizes in future design development of the swale system. RORB will be able to account for any flood retardation in the discharge basins (if required) and therefore better define both inlet and outlet flows from the discharge ponds.

The definition of the land take required for drainage assets on the land fill cap needs to be better defined as the design develops into the functional design stage of the project.

In regard to the swales (both inlet and outlet) they will need to be constructed on a traverse slope in the order of 1 in 10. As detailed in Figure 4 below this adds to the total width requirement of the asset. If vegetated swales are utilised, SWS preliminary calculations indicate that this could result in swales in the order of up to 12 metres wide being required in some locations.



**Figure 4 Schematic cross section of drainage assets constructed on a traverse requiring land take in addition to the flood water “top width”**

Inlet swales, outlet swales and discharge basins (which will have the same batter issues in regard to construction of a traverse slope) are to be located on the cap of the landfill. The development of drainage asset design clearly delineate this land take on the cap, showing asset extents including cut line requirements (or embankments if required).

In addition all swales will be required to be constructed on a longitudinal slope. In Melbourne drainage swales typically incorporate a 1 in 300 slope (or greater). The outlet system swales cannot just run along the base of the cap at natural surface level as this would result in a swale with no longitudinal slope. The swales must be aimed slightly uphill so that a slope downhill can be assured.

Little information is given in the SWMP report or plans in relation to the sizing, longitudinal slope and placement of swale systems. In addition, placement also affects catchment delineation assumptions etc. All of these aspects of the cap drainage system are required to be clearly delineated to ensure enough space is available on the landfill cap.

No allowance for cap settling and how this may affect the swale assets is detailed in the SWMP. Inspection and maintenance regimes must ensure the integrity of all swales and as the landfill settles.

In the EPA meeting of 10/2/17, the proponent indicated that, although stormwater from discharge ponds is defined as discharging off site, some discharge ponds will in fact be discharging to storage ponds (thus retaining stormwater on site). This misunderstanding does highlight that the SWMP plans are not completely consistent with the definitions of the SWMP elements in the SWMP report. Design development should:

- Be clear in relation to contributing catchment areas to each swale,
- Which swales and ponds are combined in series, and
- Where exactly swales discharge to (off site or into onsite storage ponds).

Notwithstanding the above, SWS considers that there is enough room both on the cap, and within the site, to place the swale systems (even if design development requires a relatively large land take for these assets).

### 3.3 Discharge Ponds

#### 3.3.1 Overall Configuration

The objectives of the discharge ponds are to:

- Store sediment, and
- Slow the water down to discharge offsite at the equivalent of the paddock runoff (i.e. pre-quarry and pre-landfill activity).

Figure 5 reproduces the Conceptual concept plan of a typical discharge pond. The two aspects of the design are discussed below.

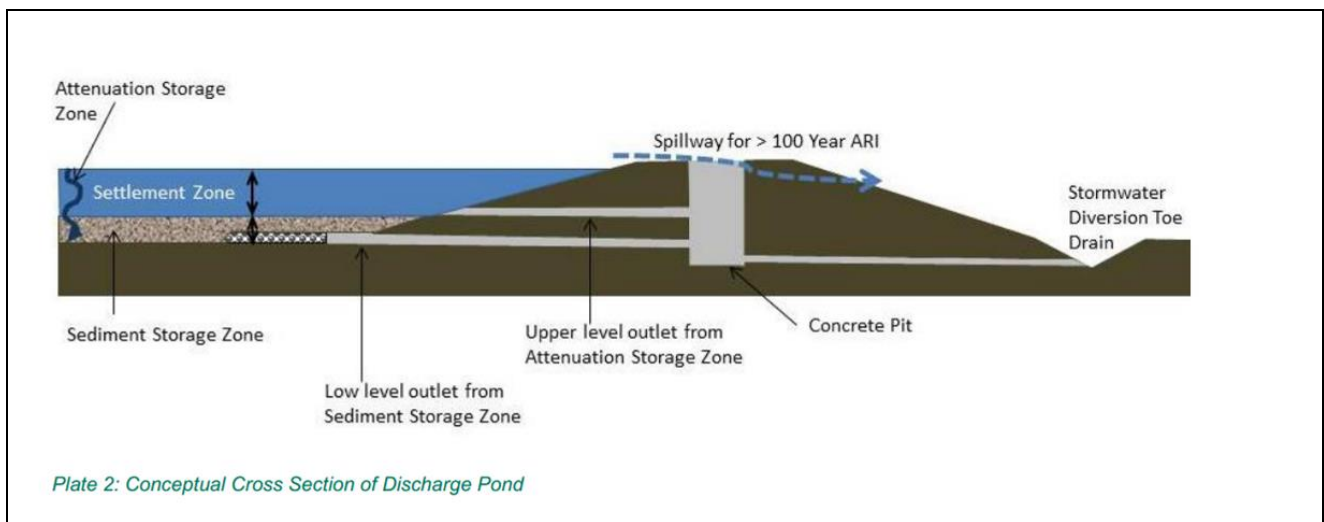
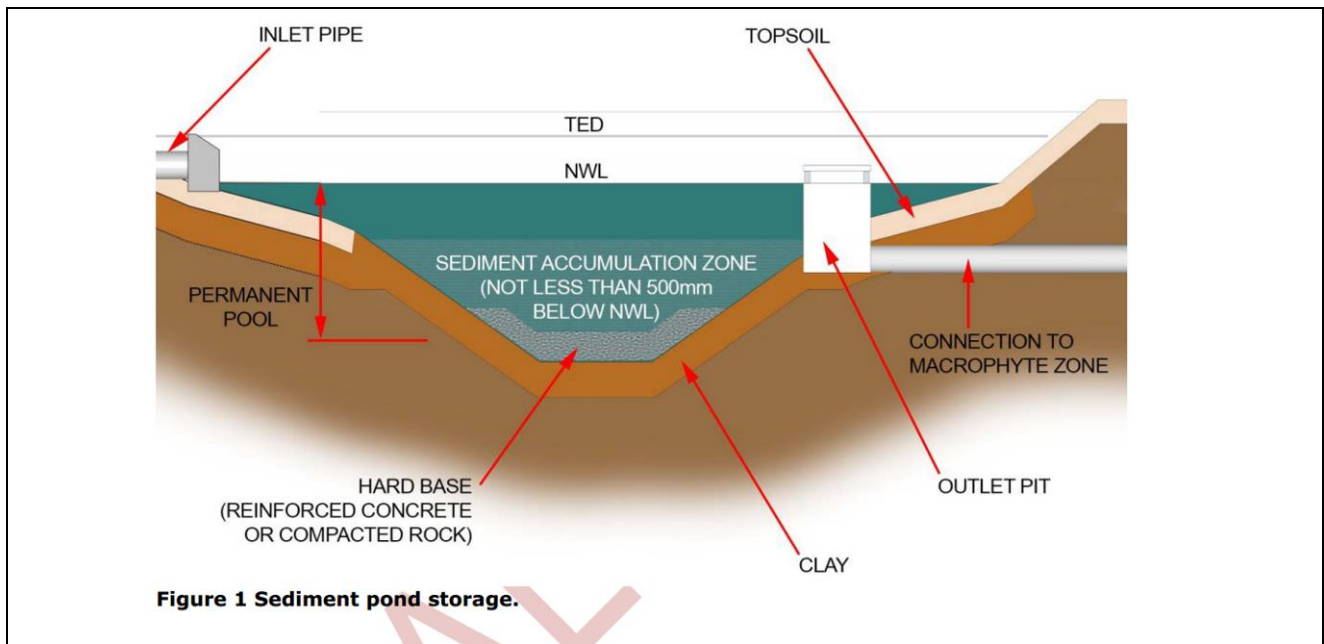


Figure 5 Reproduction of SWMP Plate 2 “Conceptual Cross Section of Discharge Pond”

#### 3.3.2 Sediment Storage Zone

In regard to the general configuration detailed in Figure 5, the low level outlet (and gravel seepage collection pads with a perforated small diameter pipe constructed at the base of the ponds) may not be required. This system base and outlet pipe will be prone to blockage, asset pipe damage during cleanout etc. As detailed in the current Melbourne Water Recommendation (Figure 6), a sediment accumulation zone can be a pond, and does not need to dry out. MWC sediment ponds do not usually incorporate low level outlets from the sediment deposition area.





**Figure 6 Current Melbourne Water Standard Design for Sediment Ponds (Melbourne Water Corporation Wetlands Design Manual (Draft) 2015)**

The Sediment Storage Zone volumes were designed in accordance with the International Erosion Control Association (IECA) of Australasia 2008, Best Practice Erosion and Sediment Control, Appendix B - Sediment basin design and operation. The formula is reproduced below,

$$V_s = 10 \times R_{(Y\%, 5\text{-day})} \times C_v \times A \text{ where}$$

$V_s$  = volume of settling zone ( $m^3$ )

$R_{(Y\%, 5\text{-day})}$  = 1 year, 5-day rainfall intensity default values for the percentile of rainfall depth (Y%) (mm)

$C_v$  = volumetric runoff coefficient

A = catchment area (ha)

SWS has some concerns with the use of this formula. It assesses the efficiency of the system to capture sediment (defined by the sediment pond water volume and area and the runoff characteristics of the catchment). However, investigation of the amount of sediment which can be stored before cleanout (which is a combination of the capture efficiency calculated above and the amount of sediment expected off the catchment) is not addressed.

SWS has compared the sizing of Pond 5 to the usual Melbourne Water recommend sediment pond sizing formula being:

- The Fair and Geyer Equation used to assess capture efficiency, and
- A sediment load assumed to be 10 times the typical urban load to assess cleanout frequency.

This check indicates the sediment deposition zones are adequately sized. However, if the attenuation zones are removed from the design (see 3.3.3 below), then sediment ponds should be at least 1 metre deep to ensure adequate allowance for sediment accumulation.

This is a high level assessment only. For completeness, the proponent should use the Universal Soil Loss Equation to estimate sediment loads into the discharge and storage ponds at all phases of the landfill operation. This formula is defined in EPA publication 480 (Environmental Guidelines for Major Construction Sites).

Notwithstanding the above, the concept design sizing of the sediment storage zones as detailed in the SWMP is probably conservative.

### **3.3.3 Attenuation Storage Zone**

The storage accumulation zone is proposed to slow the water down to discharge offsite at the equivalent of the paddock runoff i.e. pre-quarry and pre-landfill activity. As detailed in Table 4 of the SWMP, this zone makes up the majority of the volume of the discharge ponds.

The XPSWIMM model was used to determine the attenuation storage required. This is a reasonable model to apply for an analysis of this type.

The reporting is unclear of what parameters were used in the hydrological model. Also, no information is given on what the modelling has actually produced. That is, at the outfall points what are the existing and post development flow rates?

The reporting implies that the main change in an increase in runoff coefficient from 0.2 to an unstated value. A graph in Appendix C of the SWMP was referenced indicating a post development runoff coefficient in the order of 0.8 for medium soil, open crop catchments in the 100 year event.

However, SWS considers that, in terms of runoff potential, the final planted landfill cap will have a similar runoff potential as the existing paddock. The only increase in runoff potential would be because the slope of the terrain has steepened. In the interim, there would also be a slightly increased runoff potential due to there being no vegetation on the interim cap. Even so, given current Melbourne Water 1% AEP runoff coefficient recommendations, the following could be deemed reasonable:

- The existing runoff coefficient of 0.3 for paddock grasses,
- An interim cap runoff coefficient of 0.5 to allow for no vegetation and increased slope, and
- A final cap runoff coefficient of 0.4 to allow for planting of the cap.

Although runoff coefficients may increase marginally as described above, the significant changes to the catchment are changes in shape, size and location of discharge points. Also, using a post development runoff coefficient of 0.8 will just ensure overdesign attenuation zones.

As detailed in Section 2.2.2, SWS questions why the SWMP required an attenuation storage zone in each discharge pond. SWS considers that the effect of catchment reduction will may offset any increase in runoff coefficient. As such, outflows from the site, in all storm events, may decrease. As such, potentially no

attenuation zone may be required in some discharge ponds (although the sediment deposition zones will be).

The recommendations detailed in 2.2.2 are suggested to fully investigate this issue.

Notwithstanding the above, SWS considers that the design assumptions for the sizing of the attenuation zones are, if anything, conservative in the SWMP proposals.

### **3.4 Storage Ponds**

Section 8.3.2 of the SWMP states that storage ponds manage runoff from the landfill cap without discharging water offsite. The ponds are proposed where collected water drains onto the quarry floor (approximately 10 metres below natural surface level). The Storage Ponds also aim to collect sediment and store clean stormwater onsite for re-use by Landfill Ops as described in Section 3.5 below.

The SWMP states that the Goldsim Monte Carlo Simulation method was used to determine the attenuation storage required. However the reporting is unclear of what internal hydrological model was used in this application and what parameters were used in the hydrological model. In addition, the output graphs were not intuitive in regard to what results they were trying to convey.

SWS conducted a simplistic check on the design of Pond 3. The water balance component of the MUSIC model was used to investigate the water level expected in this pond over an extended period. This analysis was combined with the runoff volume expected from a 72 hours 100 Year ARI event. This simplistic check confirmed that spillage from this pond was extremely unlikely in the 100 Year ARI event.

Pond 3 appeared to be, if anything, oversized. This will ensure no export of pollutants from contributing catchments off site. However, there may be implications in regard to the stormwater harvesting strategy, and the analysis suggests that much of the time this pond will be dry.

Although further transparency in the modelling process, methodology and parameters used would be beneficial, the site allowance for the storage ponds appears reasonable at this stage.

Section 9.3.2.3 states that “storage pond embankments are assumed to have a crest width of 3 metres”. As explained by the proponent in the February 2017 EPA meeting, this statement is slightly misleading. Stormwater will discharge at the quarry surface into the ponds, with embankments constructed in the low portions of the assets as required to contain water.

This aspect of the storage pond design is not clear and would benefit from a plan (developed as the design process goes forward) detailing:

- Pond base level,
- Pond 100 year level,
- Quarry flood level,

- Longitudinal sections of the swale drains entering the storage pond, and
- A clear plan of top of batters (embankment if required) and the width and location of inlet swales.

Notwithstanding the above, it is clear that the design assumptions for the sizing of the storage ponds are appropriate in the SWMP proposals.

### **3.5 Stormwater Reuse**

The SWMP report Table 12 states the estimated annual water usage on site as:

- Dust Suppression – 21 ML/yr
- Wheel/Truck Washing - 12 ML/yr
- Compacted Clay Liner & Cap Construction 6 ML/yr
- Total Annual Water Use 39 ML per annum

The above demand figures appear reasonable given the proposed uses.

With reference to the SWMP, the proponent states there will be insufficient stormwater captured during the construction and filling of Cells 1 – 4 to service the estimated 39 ML annual demand for water from the Extension. During these initial years it is envisaged that water required for operations or construction will be supplemented from the Existing Landfill stormwater retention ponds and/ or from groundwater production bores. After Cell 4, the proposed Extension catchments are estimated to be large enough for the operation to be self-sufficient in its capture and use of stormwater.

Whatever the final formation of the drainage pond infrastructure, an appropriate water balance (using at least 10 years of daily rainfall and evaporation data), should be formulated during the functional/detailed design stage of the project to clearly define:

- Storage volumes,
- Reliability of supply, and
- The actual volume used.

The MUSIC model water balance component would be an appropriate model to use in this application. The modelling would assist the proponent in site management, rather than address any EPA concerns in regard to this stormwater issue.

The applicant may also be required to apply for (or modify and existing) stormwater harvesting licence arrangements with the appropriate authority. The catchment changes and harvesting proposals may result in a reduction in downstream flow volumes, which may affect existing users of water in the catchment. It is assumed that this issue will be required to be investigated as described above.

### **3.6 Overall Site Plan**

Figure 7 details the SWMP for the site. This has been transcribed from Figure 18 of the SWMP.



**Figure 7 Site Stormwater Management Plan**

The SWMP Figure 18 is considered very high level and not entirely transparent in regard to the following aspects.

- Discharge Ponds 10, 11, 12, 18 and 19 appear to be located in the quarry floor (10 metres below natural surface), and not on the cap surface as described in the SWMP. In the February 2017 EPA meeting the proponent indicated that some discharge ponds do actually discharge to storage ponds, and not offsite. This is unclear in the SWMP drawings. Notwithstanding this, retaining more flow onsite should aid in reducing off site impacts.
- The discharge pond outlet swale systems (indicatively shown as red lines ending in question marks by SWS) are not detailed at all. These need to be clearly shown in regard to “land take”, ensuring



1/300 (min) fall over the swale length, which discharge ponds they pick up in series and where each systems outfall to off site.

- Clearer definition of the inlet swales, outlet swale and discharge pond configuration is required. This includes clearly defining which ponds are connected by swales in series and where these combined systems discharge from the site.
- Adequate delineation of all drainage systems including proposed normal water levels, batter requirements, crest requirements etc. are required to ensure adequate space has been allocated on site.
- Although the updated SWMP shows site discharge directed to the southern boundary of the site, there is still an arrow indicating some flow will be directed east. It is unclear how discharge directed east from Ponds 8 and 1 affects catchments to the east.
- Storage Pond 20 appears to assume significant input from an external catchment west of Hopkins Road. This catchment is probably just the road itself (given the catchment delineation in Figure 1) and this redefinition of the external catchment may affect the stormwater harvesting strategy detailed in the SWMP.
- The SWMP clearly stated that an objective was to “identify locations within the drainage system that may be prone to localised instability due to stormwater erosion and recommend erosion control measures.” This aspect did not seem to be covered in in detail the SWMP report, except though reference to mitigating swale velocities though bunds etc. and implementing the inspection and maintenance program.
- The Cap is stated as probably being prone to settlement over time. The SWMP implies the possible settlement of the cap (and the impact on the integrity of the drainage swales and ponds located on the cap over time) will be covered via implementing the inspection and maintenance program.

Given the above SWS consider that the SWMP drawings are relatively high level. However, as detailed in this report, system concept design sizes are (in the most part) probably conservative. In addition there is adequate site area to modify and change designs over time as the design process goes forward. Therefore, provided transparent and detailed calculations as recommended in the report (or required by Melbourne Watery) are undertaken going forward (as part of the design development process), SWS considered the EPA requirements can be met.

### **3.7 Stormwater Management System**

The SWMP describes the proposed monitoring system for discharge off site.

Surface water from the discharge ponds are proposed to be controlled and monitored to ensure trigger concentrations of contaminants of concern are not exceeded. The following strategies are proposed in response to the contamination of surface waters;

- Sampling of surface water to determine the extent of contamination;
- Containment of the contaminants; and
- Remedial actions.

SWS suggests that inspection and maintenance schedules be required for all drainage systems at the functional design stage of each element (including all swales, discharge ponds and storage ponds). Schedules must clearly define each element, its upstream and downstream inputs, its objectives in the SWMP, and its potential issues.

The asset managers must commit to diligent implementation of these schedules. In addition, audits of treatment systems should be undertaken periodically to:

- Monitor the condition of assets,
- Assess the effectiveness of maintenance,
- Determine likely timeframes for renewal,
- Confirm that discharge of stormwater from the site is only occurring from discharge ponds, and
- Confirm that discharge of stormwater from the site is not contaminated to the relevant authority requirements.

Of course it is assumed that prudent site management of at source sediment loads will occur as implied in the SWMP (e.g. silt fences, berms in the swales etc.).

## 4. Regulatory Requirement Review

The SWMP defines four requirements as discussed below.

### 4.1 EPA Publication 1307.10 – Works Approval Application

EPA Publication 1307.10 – Works Approval Application (WAA) states “Contaminated stormwater and process wastewater must not be discharge to stormwater drains or surface water. Stormwater run-off from process areas are likely to be contaminated.”

It is considered that the SWMP and landfill proposal adequately accounts for this requirement via separating runoff from the cap and quarry from stormwater and leachate developed within the landfill area.

### 4.2 EPA Publication 788.3 - Landfill BPEM

EPA Publication 788.3 Best Practice Environmental Management- Siting, design, operation and rehabilitation of landfills dated August 2015 (BPEM) outlines environment performance objectives for Landfills and sets out design criterion to apply in developing a stormwater management system.

Section 6.5 of the BPEM states:

- “Storage ponds and other drainage measures should be designed to contain and control rainfall run-off for a 1-in-20-year storm event for a putrescible landfill or a 1-in-10-year storm event for a solid inert landfill. Storm events up to 1-in-100-year recurrence intervals should also be considered to ensure that they do not result in any catastrophic failures such as flooding of the landfill or failure of dams or leachate storage ponds.”
- “All dams should have spillways with erosion-control measures such as rocks and erosion-resistant vegetation.
- The discharge of stormwater from the site should only occur from dams, and only after confirmation that the water is not contaminated.”

Notwithstanding issues identified in this report, the SWMP considers the 1% AEP = (100 year ARI) event for sizing of the swales and ponds, which is appropriate in this application.

### 4.3 Waterway Requirements

The proponent states that, in accordance with the Water Act 1989, Guidelines for Quarries and Mines 2004, a channel with a catchment of 60 hectares or more is identified as a ‘waterway’. Thereby, in the context of this application Skeleton Creek is defined as a waterway with a catchment of approximately 65 Ha.

As detailed in Section 2.2.2, all three waterways affecting the site have catchments greater than 60 ha. In the context of the above statement, and the fact that MWC consider waterways of greater than 60 ha

under their jurisdiction (generally), MWC as the catchment management authority for Port Phillip Bay should have been consulted at the time of preparation of the SWMP.

SWS consider that an allowance of 60 metres for the realignment of Skeleton Creek (and bund) is acceptable, but further hydrological analysis is required (as detailed in Section 2.2.3) the design develops.

#### **4.4 Storm Water Pollutant Retention Requirements**

The proponent intend to discharge stormwater to the catchment area of the Skeleton Creek waterway. The proposed design of the Extension is intended to apply best practice design and management controls to protect local waterways to the extent practicable.

The proponent states that all discharges into waters shall be in accordance with SEPP - Waters of Victoria, June 2003. SEPP - Waters of Victoria lists the environmental quality indicators and objectives that shall not be exceeded. This includes the in-stream water quality indicators and objectives for pH, dissolved oxygen, salinity, suspended solids, turbidity, colour, total phosphorous and nitrogen. For toxicants it refers to “the criteria specified in the Australian Water Quality Guidelines for Fresh and Marine Waters published by the Australian and New Zealand Environment and Conservation Council”.

The Stormwater Management Plan classifies the potential types of runoff for the proposed site, including;

- Leachate: surface water runoff from the active waste filling area, and daily cover area,
- Sediment laden runoff: runoff from the cell floor construction area, final landfill cap, and interim capped landfill cells, and
- Clean runoff: runoff from external catchments.

The SWMP states that stormwater that is discharged from the site to Skeleton Creek will meet water quality standards and discharge rates equivalent to greenfield runoff parameters to protect the beneficial uses of the waterway according to Clause 10 of the SEPP (Waters of Victoria). In essence the proposed SWMP should be designed, constructed and maintained in accordance with current best practice to ensure beneficial uses are protected.

In reality, the SWMP only addresses the “sediment laden runoff” by assigning a sediment retention mechanism to all the discharge ponds. In specifying this treatment mechanism the only stormwater pollutant addressed is sediment. Other pollutants such as salinity, suspended solids, turbidity, colour, total phosphorous and nitrogen are not proposed to be treated specifically by the SWMP.

However, given the catchments discharging off site should be smaller than the “existing” scenario, one could reasonably expect an overall drop in pollutant export, especially once the final cap is planted. For completeness, a full MUSIC stormwater pollutant model (to current MWC standards) should be completed to clearly show predicted suspended solids, total nitrogen and total phosphorus level

reduction as all identified site outfall points. It is assumed pollutant reductions should be to current best practice being 80% retention of TSS, 45% retention of TP and 45% retention of TN.



## 5. Conclusions

In summary, the SWS review of the SWMP report and plans indicates that:

- The modelling used by the proponent in regard to formulation of the internal SWMP is generally applicable for the applications proposed, however the reporting of input parameters and output results is not completely transparent,
- SWS consider that there is enough detail, and site area available to ensure appropriate legislation/policy/guidance requirements are met.
- The MWC DSS reserve requirements for Skeleton Creek are appropriate for the concept design stage of the project, but further investigations are required to clearly show no increase in off site flood levels, on site flood velocities or no loss in flood storage.
- The definition of the land take required for drainage assets on the land fill cap needs to be better defined as design development continues.
- Investigations, requirements and approvals in regard to stormwater harvesting, catchment changes and not affecting downstream landowners in regard to an increase or decrease in stormwater flood volumes, stormwater pollutants or frequent flow volumes will need to be further investigated as the design development continues. As most system concept designs are conservative at this stage, SWS assumes these “usual” requirements” can be shown to be met in the future.

In line with the SWMP, a detailed inspection and maintenance schedule for each drainage asset (as it is commissioned) should be implemented to address:

- The impact on drainage assets in regard to possible future settlement of the cap, and
- Potential locations within the drainage system that may be prone to localised instability due to stormwater erosion. The schedules should include ongoing design and maintenance recommend erosion control measures.

In line with EPA Publication 788.3, the SWMP as presented does detail concept design proposals for the BPEM requirements of (in regard to siting, design, operation and rehabilitation). “Required or equivalent outcomes” are not completely transparent in the SWMP. However, this review indicates that:

- Many of the concept designs are conservative in regard to sizing and land take, and
- There is sufficient area both on the cap and in the quarry areas to ensure system sizes can increase if required.

As such, as the design process proceeds, it is expected that “required equivalent outcomes” will be shown to be met via completing the investigations and calculations as suggested in this report (or equivalent investigations or calculations)

By completing detailed calculations, modelling and site analysis as suggested as appropriate in this report (or as may be required by Melbourne Water in the future), SWS considers that “fit for purpose” attributes will be completely shown. However, in meeting these requirements additional land take for drainage assets (in addition to what is shown in the current SWMP) may be required.

## 6. Abbreviations

Table 1 lists some common abbreviations and drainage system descriptions and their definitions which are referred to in this report.

**Table 1 Common Drainage Abbreviations**

<b>Abbreviation Descriptions</b>	<b>Definition</b>
AHD - Australian Height Datum	Common base for all survey levels in Australia. Height in metres above mean sea level.
ARI - Average Recurrence Interval.	The average length of time in years between two floods of a given size or larger
ARR	Australian Rainfall and Runoff
BPEM	Best Practice Environmental Management
Flood Volume	The total volume of surface runoff associated with a flood event = the area under the relevant flood hydrograph (m <sup>3</sup> )
Flood Storage Area	A natural or man made depression or dam (e.g. retarding basin) which allows surface runoff to be stored for a period of time for gradual dissipation of outflow.
Hectare (ha)	10,000 square metres
Hydrograph	Graph of Time (seconds, x axis) versus surface runoff (y axis, m <sup>3</sup> /s) for a particular rainfall event
Kilometre (km)	1000 metres
m <sup>3</sup> /s - cubic metre/second	Unit of discharge usually referring to a design flood flow along a stormwater conveyance system
MRL	Melbourne Regional Landfill
Retarding basin	A man made depression or dam which allows surface runoff to be stored for a period of time for gradual dissipation of outflow to protect downstream properties from flood impact.
RORB	Hydrologic computer program used to calculate the design flood flow (in m <sup>3</sup> /s) along a stormwater conveyance system (e.g. waterway or drain)
SWS	Stormy Water Solutions
Total Catchment Management	A best practice catchment management convention which recognises that waterways and catchments do not stop at site boundaries and decisions relating to surface water management should consider the catchment as a whole
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total suspended solids
WAA	Works approval application
WSUD	<i>Water Sensitive Urban Design</i> The use of naturalistic drainage features to meet stormwater pollutant removal, ecological, social landscape and drainage objectives.

## Appendix A - MWC DSS Plan

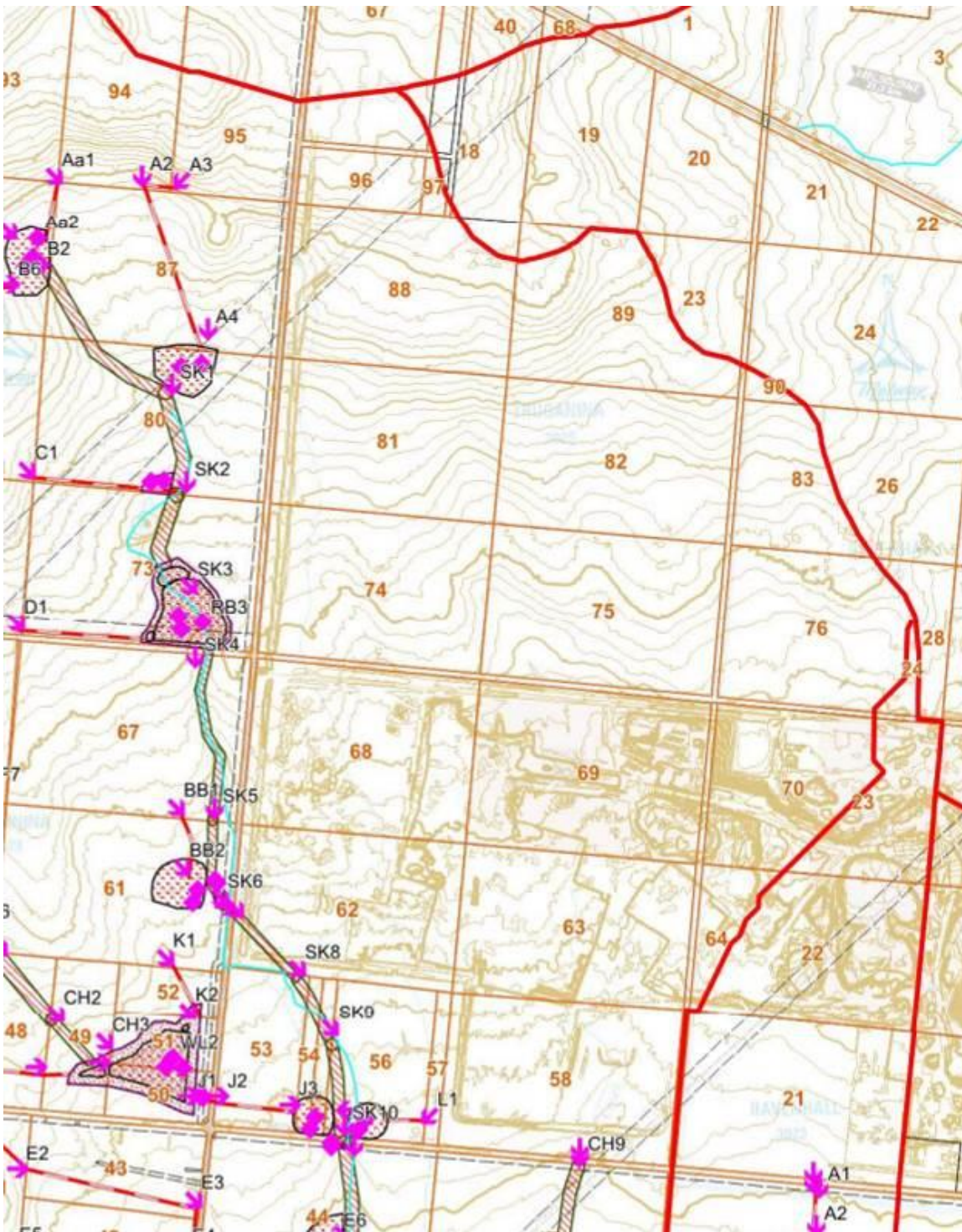


Figure A.1 Melbourne Water Corporation Development Services Scheme (DSS)  
(Source MWC web site)

## Appendix B - Planning Scheme Overlay



Figure B.1 Planning Scheme Overlay Plan  
(Source DEWLP web site)

## **APPENDIX G      INDEPENDENT LANDFILL EXPERT ADVISORY PANEL REVIEW**

- G.1 Brief
- G.2 Panel Report



# Independent Landfill Expert Advisory Panel for EPA – Confidential Brief



## PURPOSE

The Independent Landfill Expert Advisory Panel process enables expert peer review advice to EPA to assist it in making decisions on complex landfill applications. The purpose of this **Briefing Form** is to provide the Panel with a summary of the proposal being referred, EPA's preliminary assessment and reasoning for this assessment and clear direction on the questions being asked of the Panel. This Briefing Form provides the basis for the Panel's review.

### SUMMARY OF PANEL ITEM

<b>Project title</b>	Extension to the Melbourne Regional Landfill (MRL)
<b>Reference</b>	IBIS Service Order Number 1002191
<b>Proposal type</b>	2
<b>Reason for referral</b>	<p>The primary reasons for referral to the Independent Landfill Expert Advisory Panel are 3, 4 &amp; 5 from the Panel's Terms of Reference, i.e.</p> <ol style="list-style-type: none"> <li>3. The proposal will involve alternative measures (or variations) to the suggested measures in the BPEM</li> <li>4. The proposal has attracted (or is likely to attract) significant community concern</li> <li>5. The proposal is (or is likely to be) of state significance for its management of waste</li> </ol> <p>whilst also noting that EPA considers the proposal to be complex in nature</p>
<b>Executive summary</b>	<p>EPA received a Works Approval Application ('WAA' - WA1002191) from Landfill Operations Pty Ltd (Cleanaway) for the MRL, Ravenhall on 13 May 2016. Cleanaway is seeking to extend the existing landfill by utilising the void resulting from ongoing Boral quarrying operations.</p> <p>Landfilling of putrescible and solid inert waste has occurred at the MRL since 1999 as part of the rehabilitation of basalt quarrying operations. The quarrying operations first started in 1968 by Boral Resources and its predecessor Albion Reid Pty Ltd. In March 2015, Cleanaway acquired the site and the EPA licence to operate the existing landfill.</p> <p>The waste types the existing landfill receives includes municipal solid waste, low level 'Category C' contaminated soil and solid inert waste. The fill is placed in the quarry void resulting from current Boral quarrying operations.</p> <p>The existing landfill site allowed under WA31723 and WA53962 and planning permit P2091/97 covers an area of 165 hectares, filled in six stages. The current approved facility has 7-10 years of capacity remaining under its current approvals and EPA Licence No. 12160.</p> <p>The extension being applied for is proposed to commence landfilling in approximately ten years (2025) and to operate for a 30 year period to 2055. The proposed extension would receive the same waste types as the existing landfill, namely:</p> <ul style="list-style-type: none"> <li>• Putrescible waste;</li> <li>• Non-putrescible waste (Solid and Inert Waste);</li> <li>• Tyres shredded into pieces less than 250mm; and</li> <li>• Category C (low level) contaminated soil.</li> </ul> <p>It is proposed that the extension to the MRL would, like the current licence held by Landfill Operations Pty Ltd, not accept asbestos. It is noted that historically asbestos was permitted to be disposed of at the existing landfill when it was owned and operated by Boral Recycling Pty Ltd.</p> <p>The proposed extension would comprise of 16 landfill cells spread across an area that is divided into two portions by Riding Boundary Rd. The sequence plans submitted as part of the works approval application show the proposed timing of cell construction, waste filling, capping and closure over the 30 years of operation. Tipping of waste would only occur in a cell that is listed in the licence as an 'active cell'.</p> <p>The WAA for the proposed landfill would cover a total area of 210 hectares, located in a larger site area of 347 hectares that would also hold associated landfill infrastructure such as surface water runoff ponds,</p>

# Independent Landfill Expert Advisory Panel for EPA – Confidential Brief



leachate ponds, landfill gas collection equipment, plus bunds and other land that will not be used for waste disposal. The extension area is divided by Riding Boundary Road into north and south portions:

- The South Portion will comprise of 7 landfill cells (cell nos. 1-7) of between 7 and 19.9 hectares each with 96 hectares in total.
- The North Portion will comprise of 9 landfill cells (cell nos. 8-16) of between 9.6 and 22.1 hectares each with a total of 113 hectares.

The total volume of airspace to be filled by the proposed extension is approximately 53 million cubic metres over the 30 year period.

After completion of landfilling on the site, the land would be rehabilitated and ready for its proposed after use. In this case, the proposed uses are public open space including recreation and community gathering.

The existing MRL site has been and continues to be a significant focus area for EPA given the large number of odour, litter escapes and mud being trafficked on local road complaints. The EPA has conducted its own surveillance works. Various enforcement activities have and continue to be instigated at the existing landfill.

Key issues for EPA in its determination of the WAA, and which make the proposal complex include amongst others:

- Relevant Policy and Guidance;
- Modern Landfill Design & Operation;
- Siting;
- Buffer Requirements for Landfills;
  - Odour Impacts & Odour Buffers [a key issue is that based on analysis of odour complaints and investigations by EPA, the EPA considers that the buffers for the extension should be increased to 1 and 1.5km i.e. further than our guidance];
  - Recommended Sensitive Use Buffer for Odour and Amenity [there is an adjacent Planning Scheme Amendment on land at Mt Atkinson and Tarneit Plains being proposed by the Victorian Planning Authority (which was subject to a separate Planning Panel Hearing). An issue at that Hearing was what are sensitive uses];
  - Landfill Gas Migration, Gas Risk Assessment, the Timing of New Development (Buildings and Structures) within the Landfill Gas Migration Buffer (i.e. on land covered by the Mt Atkinson and Tarneit Plains Planning Scheme Amendment) and recommended Landfill Gas Migration Buffer. Key issues at both Hearings was whether the 500m landfill gas buffer should be internal or external to the land controlled by Landfill Ops, presently the Southern Portion has the buffer extended externally which could sterilise land earmarked for future development within the Mt Atkinson land. No detailed plans exist either for those landfill cells or the land to be developed in the future – how can a landfill gas risk assessment and s 53V audit be undertaken at this time? (EPA is not seeking the panel's advice on the aspects of landfill gas risk assessment and s53V audit);
- Leachate & Groundwater, in particular compliance with Clause 16(2) of the WMP – there is some debate amongst the hydrogeologists about what is the long term undisturbed groundwater table with the EPA being of the opinion that several of the proposed cells do not have a 2m separation such that additional design and management measures are required. Some additional design and management measures has been provided to demonstrate compliance with WMP in response to a formal request for further information made under section 22 of the EP Act (see Appendix 6 of the additional information provided on 9 December 2016). This will require particular attention within the review;
- Health; and
- Compliance against BPEM.

Extensive consultation has occurred and is being undertaken, including an extended joint consultation with DELWP in June and July 2016, a Joint Information Session (drop-in held over two days in June 2016), an 18 day Planning Panel Hearing (administered by Planning Panels Victoria on behalf of the Minister for Planning) which also constituted the EPA's s 20B conference. Referral responses have also been sought (and continue to be sought) from external referral bodies.

Panel members are requested and reminded to keep all matters regarding this request confidential.

# Independent Landfill Expert Advisory Panel for EPA – Confidential Brief



<p><b>Review scope</b></p>	<p>EPA requests the Panel to provide advice on questions 1 to 4 below to inform EPA’s assessment and for the Panel to peer review EPA’s assessment for 5 to 8 below:</p> <p>For advice immediately:</p> <ol style="list-style-type: none"> <li>1. Does the Panel consider the length of WA sought appropriate with regards the State-wide Resource Recovery Implementation Plan and Metropolitan Waste and Resource Recovery Implementation Plan and have any concerns over the proposed duration of the WA?</li> <li>2. Does the Panel consider the lead in time prior to the proposed commencement of works appropriate and have any concerns with potentially granting a WA 7-10 years prior to commencement?</li> <li>3. How should the community be involved in the subsequent WA and licensing of the MRL extension given the proposed duration of the WA?</li> <li>4. In this case, does the Panel consider that Landfill Gas Buffers should be internal or external to the WA boundary? Please explain why the Panel has reached its decision? Are there any additional design or engineering solutions that the Panel recommends should be implemented to reduce potential off-site landfill gas migration.</li> </ol> <p>(Note: EPA requests that the panel consider these questions in a broad context and not just in relation to the MRL extension)</p> <p>For peer review of EPA’s assessment:</p> <ol style="list-style-type: none"> <li>5. Does the Panel agree with EPA’s assessment of how the applicant would address the geotechnical stability of the landfill where the cells are not buttressed against the quarry wall? If the Panel thinks that there are any inadequacies that need to be addressed by the applicant prior to the detail design stage, please identify them.</li> <li>6. Does the Panel agree with the EPA’s discussion that the groundwater levels considered in the application cannot be considered as long term undisturbed groundwater levels in determining the 2m separation between waste and groundwater for the purpose of compliance of clause 16(2) of the WMP? Please provide comments.</li> <li>7. Does the Panel agree with EPA’s assessment that the additional design and management measures provided by the applicant to show compliance of clause 16(2)(a) of the WMP are appropriate? Please provide comments.</li> <li>8. Does the Panel agree with EPA’s assessment that groundwater in the area is not in Segment A? Therefore, the compliance of clause 13(3) is not applicable for the proposed landfill development.</li> </ol>
<p><b>Key dates relating to the matter</b></p>	<p>Landfill Operations WAA to be made available w/c 12 Dec 2016 to allow panel members to become familiar with the application materials.</p> <p>EPA requests advice on questions 1-4 by end of January 2017.</p> <p>EPA Assessment Text to be peer reviewed (questions 5 to 8) will be circulated to the Panel on Tuesday 7 February 2017.</p>
<p><b>Implications for EPA</b></p>	<p>This is a high profile WAA that has generated considerable interest (just under 4,000 submissions – almost exclusively objections have been received).</p> <p>A joint process is being run, and the Planning Permit Application has been called in by the Minister for Planning. Accordingly a Planning Hearing (incorporating a section 20B Conference) was held over 18 days in September and October by Planning Panels Victoria.</p> <p>It is quite likely that any decision EPA makes will be challenged at VCAT.</p>
<p><b>Consistency</b></p>	<p>No relevant past decisions identified at this time. This will be confirmed prior to 30 January 2017.</p>
<p><b>Resources provided</b></p>	<p>The Landfill Operations WAA comprises the following all of which are available for viewing and downloading from the EPA website. Particular attention is drawn to those documents identified in blue italics. Key sections that are considered particular relevant to the peer review and review scope are listed in blue:</p> <ul style="list-style-type: none"> <li>• <i>Works Approval Application</i> <ul style="list-style-type: none"> <li>○ Landfill Operations’ WAA form</li> </ul> </li> </ul>

# Independent Landfill Expert Advisory Panel for EPA – Confidential Brief



- *Information to support WAA*
- *WAA Appendices*
  - *Appendix A - Needs assessment*
  - *Appendix B - Figures*
  - *Appendix C - Financial assurance - 'commercial-in-confidence' not provided*
  - *Appendix D - Hydrogeological assessment*
  - *Appendix E - Ecological assessment*
  - *Appendix F - Greenhouse gas estimate*
  - *Appendix G - Leachate management plan*
  - *Appendix H - Landfill gas management plan*
  - *Appendix I - Traffic impact assessment*
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  - *Appendix M - Landscape and visual impact assessment, including Annex A: Parameters of human vision*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP01*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP02*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP05*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP07*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP10*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP13*
  - *Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP16*
  - *Appendix M - Landscape and visual impact assessment Annex C: Rehabilitation Plan*
  - *Appendix N - Monitoring program*
  - *Appendix O - Aftercare management plan*
- *Supplementary technical information to support WAA (PDF 930KB)*
- *Further information received in response to the Section 22 notice*
  - *information provided on 23 September 2016, comprising -*
    - *a cover letter*
    - *a tabulated response*
    - *extracts from Cleanaway's Landfill standards operations manual on vermin and bird control*
  - *information provided on 9 December 2016, comprising:*
    - *a cover letter*
    - *Appendix 1: 'Response to hydrogeological Issues Raised by EPA Section 22 Notice of 21st October 2016 in relation to Melbourne Regional Landfill'*
    - *Appendix 2: 'Letter to EPA - Section 22 Notice Additional Information - Groundwater Levels'*
    - *Appendix 3: 'Section 7 only of the DRAFT Environmental Audit of Landfill Operations (s. 53V) ('*
    - *Appendix 4: 'Email to Cardno - Draft Audit Report - Melbourne Regional Landfill'*
    - *Appendix 5: 'MRL S22 Response letter - Geotechnical Stability of Sidewall batter and liner system'*
    - *Appendix 6: 'Memorandum - Further information re Section 22 Notice Additional Information, 1528407-057-M-Rev0'*



# Independent Landfill Expert Advisory Panel for EPA – Confidential Brief



Environment Protection Authority Victoria

	<ul style="list-style-type: none"> <li>• <i>Landfill Operations response to the written submissions</i> <ul style="list-style-type: none"> <li>○ <i>Landfill Operations response to submissions</i></li> <li>○ <i>Table of Landfill Operations response to submissions</i></li> <li>○ <i>Expert witness statement of Andrew Green (landfill)</i></li> <li>○ <i>Expert witness statement of Tony Kortegast (needs assessment)</i></li> <li>○ <i>Expert witness statement of Tony Kortegast (buffers and landfill gas)</i></li> <li>○ <i>Expert witness statement of Alex Todoroski (odour)</i></li> <li>○ <i>Expert witness statement of David Ife (hydrogeological assessment)</i></li> <li>○ <i>Expert witness statement of Christopher Delaire (acoustics)</i></li> <li>○ Expert witness statement of Michael Barlow (planning)</li> <li>○ Expert witness statement of Stephen Hunt (traffic and transport assessment)</li> <li>○ Expert witness statement of Allan Wyatt (landscape and visual assessment)</li> </ul> </li> </ul>
<b>Due date for Panel's response</b>	EPA will require the Panel to submit their final report by Monday 13 Feb 2017.
<b>EPA contact</b>	For further information contact Richard Hook, Senior Project Manager, DAU Tel 0396952794, Mob 0475974791 Email <a href="mailto:richard.hook@epa.vic.gov.au">richard.hook@epa.vic.gov.au</a>

APPROVAL			
<b>Client</b>	Richard Hook, Development Assessment Unit		
<b>Referral endorsement (Client Unit Manager)</b>	Name: Tim Faragher	Signature:	Date: 10/2/17
<b>Approval (ESU Manager)</b>	Name:	Signature:	Date: 10/2/17

ESTIMATION OF EFFORT <i>(to be completed by Panel Secretariat after discussion with Panel Chair)</i>		
Sitting purpose	Attendees	Estimated time required (hours)



# Independent Landfill Expert Advisory Panel for EPA – Report



Environment  
Protection  
Authority Victoria

<b>Project title</b>	Extension to the Melbourne Regional Landfill		
<b>Reference</b>	IBIS Service Order Number 1002191		
<b>Proposal type</b>	2		
<b>Requested by</b>	Richard Hook		
<b>Prepared by</b>	Ian Rossiter		Date 16/2/17
<b>Contributors</b>	Roger Parker		Date 16/2/17
	Malek Bouazza		Date 16/2/17

## Executive Summary

EPA received a Works Approval Application ('WAA' - WA1002191) from Landfill Operations Pty Ltd (Cleanaway) for the MRL, Ravenhall on 13 May 2016. Cleanaway is seeking to extend the existing landfill by utilising the void resulting from ongoing Boral quarrying operations.

The primary reasons for referral to the Independent Landfill Expert Advisory Panel are 3, 4 & 5 from the Panel's Terms of Reference, i.e.

3. The proposal will involve alternative measures (or variations) to the suggested measures in the BPEM
4. The proposal has attracted (or is likely to attract) significant community concern
5. The proposal is (or is likely to be) of state significance for its management of waste whilst also noting that EPA considers the proposal to be complex in nature

The Panel convened on Wednesday 25 January 2017 and Wednesday 8 February and considered the following questions:

1. *Does the Panel consider the length of WA sought appropriate with regards the State-wide Waste and Resource Recovery Infrastructure Plan and Metropolitan Waste and Resource Recovery Implementation Plan and have any concerns over the proposed duration of the WA?*
2. *Does the Panel consider the lead in time prior to the proposed commencement of works appropriate and have any concerns with potentially granting a WA 7-10 years prior to commencement?*
3. *How should the community be involved in the subsequent WA and licensing of the MRL extension given the proposed duration of the WA?*
4. *In this case, does the Panel consider that Landfill Gas Buffers should be internal or external to the WA boundary Please explain why the Panel has reached its decision. Are there any additional design or engineering solutions that the Panel recommends should be implemented to reduce off-site landfill gas migration?*
5. *Does the Panel agree with EPA's assessment of how the applicant would address the geotechnical stability of the landfill where the cells are not buttressed against the quarry wall?*
6. *Does the Panel agree with the EPA's discussion that the groundwater levels considered in the application cannot be considered as long term undisturbed groundwater levels in determining the 2m separation between waste and groundwater for the purpose of compliance with clause 16(2) of the WMP? Please provide comments.*
7. *Does the Panel agree with EPA's assessment that the additional design and management measures provided by the applicant to show compliance of Clause 16(2)(a) of the WMP are appropriate? Please provide comments.*
8. *Does the Panel agree with EPA's assessment that groundwater in the area is not in Segment A? Therefore the compliance of clause 13(3) is not applicable for the proposed landfill development.*

## Conclusions and Recommendations

1. The Panel finds that the WAA sought exceeds the period considered under the Statewide Waste and Resource Recovery Infrastructure Plan and suggests that the WA be only approved for the extent of proposed cells 1 to 7 and associated site works, provided adequate planning controls are in place to ensure that buffers can be maintained for the full site, should cells 8 to 16 be required.
2. The Panel considers the lead in time excessive. The Panel considers a lead in time period allowing for any planning or WA appeals of around 5 years would be appropriate.
3. The Panel considers the need for an independent stakeholder liaison body to be convened and resourced to allow all major stakeholders to be informed on project progress,

complaints and subsequent investigations, compliance with Licence conditions and auditor's reports. The panel recommends that the independent stakeholder liaison body be a stakeholder for the purposes of scoping any Section 53V operational environmental audits and that the independent stakeholder liaison body have appropriate technical resources to assist them in interpreting and commenting on the scopes for the operational environmental audits.

4. The Panel is of the view that for any new site, sufficient internal landfill gas buffer should be maintained to allow the landfill operator to effectively monitor and manage LFG migration risks for the life of landfill operations and throughout the aftercare period. For modern landfills, the internal landfill gas buffer could be substantially less than 500 m, provided;
  - The proposed liner system is BPEM compliant and installation is managed under an appropriate CQA programme;
  - There is landfill gas extraction during filling of cells, as currently proposed;
  - A well-engineered landfill gas extraction system is progressively installed as soon as filling is completed in any part of the site;
  - There is a well-designed, BPEM compliant, landfill gas monitoring system installed at the site. Monitoring wells should be located both close to the landfill cells and at the boundary of the site; and
  - Regular monitoring during operation and aftercare is undertaken in the landfill gas wells.
5. The Panel considers the landfill geotechnical stability assessment by EPA as it relates to cells not buttressed against quarry walls to be incomplete. However, the panel agrees with the EPA that stability assessment should be conducted in the detailed design process. The Panel recommends the Works Approval conditions require detailed design and supporting evidence of geotechnical stability before approval of all cell lining and capping designs. The panel recommends that material site specific testing for stability assessment be conducted as part of the detailed design and this should be a condition of the Works Approval.
6. The Panel has reviewed EPA's conclusions relating to groundwater levels on MRL and the Works Approval Application supporting documents and agrees with EPA's conclusion that the groundwater levels presented in the WAA cannot be considered as long term undisturbed groundwater levels. The Panel notes that determination of long term undisturbed groundwater levels in a disturbed environment without long term pre-disturbance groundwater level records is difficult. Modelling methods may provide some understanding of the long term undisturbed groundwater levels but even this would only be an estimate rather than a definitive determination of long term undisturbed groundwater levels.
7. (a) The Panel accepts EPA's assessment that the use of a blanket drainage layer 2 m below the base of waste provides for additionality in compliance with Clause 16(2)(a) of the WMP. However, the Panel recommends:
  - i. Where required, the drainage blanket be located 2 m below the lowest leachate (also a waste) level (i.e. top of liner in the sump) rather than as illustrated in Plate 5 of Appendix 6 of the documents supporting the WAA. EPA has advised environmental auditors that leachate is a waste and therefore needs to be considered in compliance with the separation distance required by Clause 16(2)(a) of the WMP;
  - ii. Unless the drainage blanket is placed beneath all cells, the proponent should agree

a methodology with EPA for determining groundwater levels at the site to provide a basis for establishing the 2 m separation distance;

- iii. The proponent should provide to EPA's satisfaction a plan which demonstrates that water drained from the under-drains can be managed appropriately for the life of the landfill operations and throughout the aftercare period.

(b) The Panel notes that the WAA did not offer the proposed liner design as an alternative design to meet the requirements for additional design measures to satisfy Clause 16(2)(a) of the WMP. The panel assumes that EPA has considered the use of GCL as additional to the compacted clay liner (0.5 m thick) as potential addition to the design. If this is the case, then the two following issues need to be addressed before considering additionality:

- i. There is a need to demonstrate that the alternative liner is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point.
  - ii. There is a need to assess the water retention properties (i.e. unsaturated properties) of the CCL carefully to ensure that enough water will be available for the GCL to hydrate to the target water content set by the design.
8. The Panel agrees with the EPA's assessment that groundwater in the area is not in Segment A. Examination of the Melbourne Regional Landfill Hydrological Assessment (AECOM 2016) and Department of Environment, Land, Water and Planning's Online Ground Water Resource Report for the locality provides confidence that ground water sampling over a period of time has identified the groundwater's characteristics as being within Segments B and C. The application is therefore considered compliant with requirements of clause 13(3) of the Waste Management Policy (Siting, Design and Management of Landfills 2004).

## Background

The existing landfill site allowed under WA31723 and WA53962 and planning permit P2091/97 covers an area of 165 hectares, filled in six stages. The current approved facility has 7-10 years of capacity remaining under its current approvals and EPA Licence No. 12160.

The extension being applied for is proposed to commence landfilling in approximately ten years (2025) and to operate for a 30 year period to 2055. The proposed extension would receive the same waste types as the existing landfill, namely:

- Putrescible waste;
- Non-putrescible waste (Solid and Inert Waste);
- Tyres shredded into pieces less than 250mm; and
- Category C (low level) contaminated soil.

The proposed extension would comprise of 16 landfill cells spread across an area that is divided into two portions by Riding Boundary Rd. The sequence plans submitted as part of the works approval application show the proposed timing of cell construction, waste filling, capping and closure over the 30 years of operation.

After completion of landfilling on the site, the land would be rehabilitated and ready for its proposed after use. In this case, the proposed use is public open space including recreation and community gathering.

The existing MRL site has been and continues to be a significant focus area for EPA given the large number of odour, litter escapes and mud being trafficked on local road complaints. The EPA has conducted its own surveillance works. Various enforcement activities have and continue to be instigated at the existing landfill.

Key issues for EPA in its determination of the WAA, and which make the proposal complex include amongst others:

- Relevant Policy and Guidance;
- Modern Landfill Design & Operation;
- Siting;
- Buffer Requirements for Landfills;
- Leachate & Groundwater, in particular compliance with Clause 16(2) of the WMP Health; and
- Compliance against BPEM.

The primary reasons for referral to the Independent Landfill Expert Advisory Panel are 3, 4 & 5 from the Panel's Terms of Reference, i.e.

3. The proposal will involve alternative measures (or variations) to the suggested measures in the BPEM
4. The proposal has attracted (or is likely to attract) significant community concern
5. The proposal is (or is likely to be) of state significance for its management of waste whilst also noting that EPA considers the proposal to be complex in nature

The Panel received a Draft Confidential Brief in late December 2016 and have prior to convening examined the following documents:

- Works Approval Application
  - Landfill Operations' WAA form
  - Information to support WAA
- WAA Appendices
  - Appendix A - Needs assessment
  - Appendix B - Figures
  - Appendix C - Financial assurance - 'commercial-in-confidence' not provided
  - Appendix D - Hydrogeological assessment
  - Appendix E - Ecological assessment
  - Appendix F - Greenhouse gas estimate
  - Appendix G - Leachate management plan
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  - Appendix M - Landscape and visual impact assessment, including Annex A: Parameters of human vision



- Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP01
- Appendix M - Landscape and visual impact assessment Annex B: Photomontage VP02
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- Appendix M - Landscape and visual impact assessment Annex C: Rehabilitation Plan
- Appendix N - Monitoring program
- Appendix O - Aftercare management plan
- Supplementary technical information to support WAA (PDF 930KB)
- Further information received in response to the Section 22 notice
  - information provided on 23 September 2016, comprising -
    - a cover letter
    - a tabulated response
    - extracts from Cleanaway's Landfill standards operations manual on vermin and bird control
  - information provided on 9 December 2016, comprising:
    - a cover letter
    - Appendix 1: 'Response to hydrogeological Issues Raised by EPA Section 22 Notice of 21st October 2016 in relation to Melbourne Regional Landfill'
    - Appendix 2: 'Letter to EPA - Section 22 Notice Additional Information -Groundwater Levels'
    - Appendix 3: 'Section 7 only of the DRAFT Environmental Audit of Landfill Operations (s. 53V)'
    - Appendix 4: 'Email to Cardno - Draft Audit Report - Melbourne Regional Landfill'
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  - Landfill Operations response to submissions
  - Table of Landfill Operations response to submissions
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  - Expert witness statement of Tony Kortegast (needs assessment)
  - Expert witness statement of Tony Kortegast (buffers and landfill gas)
  - Expert witness statement of Alex Todoroski (odour)
  - Expert witness statement of David Ife (hydrogeological assessment)
  - Expert witness statement of Christopher Delaire (acoustics)
  - Expert witness statement of Michael Barlow (planning)
  - Expert witness statement of Stephen Hunt (traffic and transport assessment)
  - Expert witness statement of Allan Wyatt (landscape and visual assessment)

## Approach

The Panel convened on two occasions, Wednesday 25 January and Wednesday 9 February 2017 at the EPA's 200 Victoria Street offices in Melbourne. The Panel considered the questions posed in the draft Panel brief issued on 29/12/16, updated drafts received on 25 January and 7 February and sought clarification from Richard Hook (Project Manager) and Kapila Bogoda (EPA Senior Applied Scientist) to ensure common understanding of the scope and meaning of the questions in the Panel's brief. Further clarification was sought in relation to Question 5 and confirmed via an exchange of email and confirming phone call between Ian Rossiter and Richard Hook on 8/2/17. The final brief was received on 13/2/17 with the following questions required to be answered by the Panel:

1. *Does the Panel consider the length of WA sought appropriate with regards the State-wide Waste and Resource Recovery Infrastructure Plan and Metropolitan Waste and Resource Recovery Implementation Plan and have any concerns over the proposed duration of the WA?*
2. *Does the Panel consider the lead in time prior to the proposed commencement of works appropriate and have any concerns with potentially granting a WA 7-10 years prior to commencement?*

3. *How should the community be involved in the subsequent WA and licensing of the MRL extension given the proposed duration of the WA?*
4. *Does the Panel consider that there are design and engineering solutions available to enable the risk from landfill gas migration to be adequately managed without significant impact on neighbouring properties, such that external landfill gas buffers are not required? If yes, what are the design and engineering solutions?*
5. *Does the Panel agree with EPA's assessment of how the applicant would address the geotechnical stability of the landfill where the cells are not buttressed against the quarry wall? If the Panel thinks that there are any inadequacies that need to be addressed by the applicant prior to the detail design stage, please identify them.*
6. *Does the Panel agree with the EPA's discussion that the groundwater levels considered in the application cannot be considered as long term undisturbed groundwater levels in determining the 2m separation between waste and groundwater for the purpose of compliance with clause 16(2) of the WMP? Please provide comments.*
7. *Does the Panel agree with EPA's assessment that the additional design and management measures provided by the applicant to show compliance of Clause 16(2)(a) of the WMP are appropriate? Please provide comments.*
8. *Does the Panel agree with EPA's assessment that groundwater in the area is not in Segment A? Therefore the compliance of clause 13(3) is not applicable for the proposed landfill development.*

The Panel referred to the following documents to assist in responding to the questions raised:

- Statewide Waste and Resource Recovery Infrastructure Plan
- Metropolitan Waste and Resource Recovery Implementation Plan
- EPA's Waste Management Policy
- EPA Publication 866 BPEM Landfill Siting, Design, Operation and Rehabilitation
- EPA's Draft Works Approval Assessment Report for MRL (extracts provided 9/2/17 and document received electronically 13/2/17)
- Memorandum from Philip Mulvey and John Nolan dated 5/10/16 to Planning Panels Victoria entitled "Conclave Meeting of Groundwater Experts in relation to the proposed Melbourne Regional Experts"

## Discussion

**Question 1: Does the Panel consider the length of WA sought appropriate with regards the State-wide Waste and Resource Recovery Implementation Plan and Metropolitan Waste and Resource Recovery Implementation Plan and have any concerns over the proposed duration of the WA?**

### Assessment

As the Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) has a planning horizon of 30 years, and the MRL Works Approval Application includes a period of 7-10 years for planning and filling existing approved landfill areas, the application effectively seeks approval well beyond the period applicable for the SWRRIP. The current SWRRIP projects to 2044, and the application seeks approval for operating the enlarged landfill to potentially 2047 or beyond.

The need for the extension of the MRL for 30 years is well established within the context of the SWRRIP, however the SWRRIP will be subject to review in coming years in light of updated projections on waste to landfill affected by population growth, operation and closure of other regional landfills, legislative changes, impacts of extreme weather events and changes to the waste hierarchy associated with technological and behaviour changes. The

Melbourne Metropolitan Waste and Resource Recovery Implementation Plan (MMWRRIP) has a planning horizon of 10 years and demonstrates the need for continued operation of the MRL beyond its potential current airspace capacity expected to be reached in 7-10 years. The MMWRRIP will be reviewed in 5 years and will most likely include MRL within its Category 2 Landfill Schedules.

The Panel therefore recommends:

- As the period of the WA sought exceeds the period considered under the SWRRIP, that the WAA be only approved for the extent of proposed cells 1 to 7 and associated site works, provided adequate planning controls are in place to ensure that buffers can be maintained for the full site, should cells 8 to 16 be required;
- That the EPA limits the WA to no more than 30 years total planning and filling. This might be achieved by approving only Stage 1 which under the application information provides airspace up to 2040 (23 years); and
- It is however important to preserve buffers for longer term use of the greater MRL site in the event that the landfill extends beyond 2040. Therefore, the footprint of both northern and southern stages of the proposed future landfill expansion should be noted in all relevant land use planning decisions with reference to buffer zones and neighbourhood amenity to ensure that surrounding land uses do not change to the extent that necessary buffer zones for the establishment and operation of the future MRL stages are maintained. If preservation of buffers cannot be ensured under the current planning laws, then it would be preferable to approve Stage 2 to ensure that the ability to use the site as a landfill is preserved.

## Justification

- The EPA's Works Approval Assessment Considerations include the proposal's compliance with Clause 11(1) of the Waste Management Policy, which requires compliance with provisions of relevant regional waste management plans and any Solid Industrial Waste Management Plan. These policy documents have been superseded by the SWRRIP and the MMWRRIP. Given the intergenerational impacts that could occur by approving significant waste placement well beyond the horizon of the current SWRRIP(2044), The Panel considers the proposed cell development beyond 2044 may not be in conformance with Clause 11(1)of the WMP.
- While the SWRRIP only lists landfills required for the period to 2044, the document indicates there will be few current landfills still operating by that time and that buffers need to be maintained for essential waste management infrastructure sites to ensure viable operation to cater with the waste and resource recovery activity sites for future generations. If the current planning laws do not allow preservation of buffers for potential development of Stage 2 of MRL, then consideration should be given to approving Stage 2 with Stage 1 to ensure that buffers can be maintained.

**Question 2. Does the Panel consider the lead in time prior to the proposed commencement of works appropriate and have concerns with potentially granting a WA 7-10 years prior to commencement?**

## Assessment

The Panel considers the timing of the MRL Works Approval Application, when there is currently 7-10 years projected airspace, to be somewhat ahead of the required time. Allowing for delays associated with planning approval, EPA Works Approval, VCAT hearings and undertaking construction, the Panel considers a period of around 5 years would be more appropriate. The Panel has no specific concerns regarding the granting of Works Approval with the 7 to 10 year lead time as the filling rates of the MRL currently approved airspace is likely to be significantly influenced by closures of other landfills, impacts of extreme weather events and demand for quarry products creating airspace. The broader concern, as raised in Question 1, is the potential for the lead period plus a 30 year works approval potentially pushing out beyond 2050 if filling rates are less than identified in the application's supporting information.

# Independent Landfill Expert Advisory Panel Report – MRL Extension

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## Justification

From the perspective of planning, community consultation, undertaking quarrying ahead of landfill construction and the timeframes required for approval for cell and leachate dam construction, 5 years should suffice.

EPA's Publication 1560 Approval Proposal Pathway, Publication 1307.10 Works Approval Application, Publication 1323.2 Landfill Licencing Guidelines identify timeframes for development of proposals, stakeholder engagement, lodgement and consideration of applications and appeal processes that lead us to this conclusion.

**Question 3: How should the community be involved in the subsequent WA and licensing of the MRL extension given the proposed duration of the WA?**

## Assessment

There has been considerable response from a range of stakeholders in relation to the MRL extension proposal. Given the long lead time to commencement of works and operation of the extended landfill, The Panel considers there may need to be a formalised structure for engaging the MRL's many stakeholders. If the community stays interested, The Panel recommends the formation of an independently chaired MRL stakeholder representative group. This could include, nominated community representatives, Local Government Authority representatives, Department of Justice, Land Developers, Melbourne Metro Waste and Resource Recovery Group, EPA, Urban Landcare/ Friends groups, and an MRL operator's senior representative.

The Stakeholder Representative Group would ideally:

- Meet quarterly (or as needed where there are specific matters to be considered)
- Be involved in scoping of operational audits.
- Should examine the complaints register.
- Should receive reports from Cleanaway and EPA including results of APS, any PANs, development plans and proposals, and progress on implementation of auditor recommendations.
- Have a resource who can interpret audits and technical matters and assist in the Groups input to audit scopes.
- Provide a vehicle for proactive community feedback e.g. market research panels of random stakeholders and surveys.
- Ensure all monitoring data is posted on a publicly accessible database.

## Justification

- The EPA's Landfill BPEM draws reference to varying levels of communication according to the goals, time frames, resources, skills, and levels of concern and interest by communities (Section 3). Given the timeframe, existing concern and resources associated with management, it is likely that as a minimum there should be involvement and preferably collaboration, requiring a stakeholder liaison committee.
- The BPEM draws reference under Section 5 Siting Considerations to community needs (5.1.1).
- Section 53V audit requirements include stakeholder input in the development of scope of audits. The Stakeholder Representative Group should be seen as a stakeholder, along with EPA and Landfill Ops, as a relevant stakeholder in the preparation of audit scopes. Specifically, section 13 of EPA publication 952.5 states:

*Stakeholders with a potential interest in the environmental audit may include neighbouring landholders, resource managers, the auditee's customers, local government, the Authority and other statutory authorities.*

*In consultation with the auditee and the client, the environmental auditor should determine the appropriate level of involvement, if any, of the stakeholders.*

*Where community interest is high, or the environmental audit is being conducted as part of an EIP, the environmental auditor should consider inviting the community to have input into the audit scope and/or to observe site inspections.*

*Where required, the nature and extent of community involvement should be determined at the start of the audit program and outlined in the audit report.*

- The Stakeholder Reference Group should have access to appropriate technical resources to assist in the interpretation of Environmental Audit reports and in providing input to operation audit scopes.

**Question 4: In this case, does the Panel consider that Landfill Gas Buffers should be internal or external to the WA boundary. Please explain why the Panel has reached its decision. Are there any additional design or engineering solutions that the Panel recommends should be implemented to reduce off-site landfill gas migration?**

## Assessment

The Panel is of the view that for any new site, sufficient internal landfill gas buffer should be maintained to allow the landfill operator to effectively monitor and manage LFG migration risks for the life of landfill operations and throughout the aftercare period. For modern landfills, the internal landfill gas buffer could be substantially less than 500 m, provided;

- The proposed liner system is BPEM compliant and installation is managed under an appropriate CQA programme;
- There is landfill gas extraction during filling of cells, as currently proposed;
- A well-engineered landfill gas extraction system is progressively installed as soon as filling is completed in any part of the site;
- There is a well-designed, BPEM compliant, landfill gas monitoring system installed at the site. Monitoring wells should be located both close to the landfill cells and at the boundary of the site; and
- Regular monitoring during operation and aftercare is undertaken in the landfill gas wells.

The internal LFG monitoring and management buffer should be determined on site specific factors such as geology, topography and hydrogeology. For MRL, an internal LFG buffer of around 100 m between edge of cell and Works Approval boundary may be appropriate if the above conditions are fulfilled.

## Justification

Section 8.2 of the BPEM in relation to aftercare management notes that buffers are to be in accordance with Table 8.2 or where these are unavailable demonstrate that risks are mitigated to the same standard. The Required Outcome in the BPEM is that for a Type 2 landfill the landfill gas buffer distance is 500 m. The Panel interpret this guidance to generally relate to older landfills where landfill gas management has not been integral in the design of the landfill.

While the EPA's question refers to the provision of LFG buffers internal or external to the WA boundary, the Panel has focussed on the need for reservation of sufficient land within the WA boundary to effectively monitor and manage LFG migration. These comments are independent from the need to maintain buffers between landfill cells and sensitive receptors which could negatively impacted during upset conditions within the landfill.

Modern landfills with lining system (with low permeability mineral liner and geomembrane), active landfill gas extraction and well-designed landfill gas monitoring programmes present a relatively low risk to the environment with respect to landfill gas migration. Landfill gas migration through the subsurface can create hazardous conditions if accumulation occurs around buildings, confined spaces and in surface utilities. The BPEM outlines assessment measures required for development within 500 m of a landfill. While landfill gas migration can occur to distances beyond 500 m, instances of this are rare and due to specific geological and operational conditions. EPA's adopted 500 m landfill gas buffer is a reasonable distance to adopt as an indicator of the need for further assessment. However, for modern well-operated and well-regulated landfills, buffer distances of less than 500 m could be maintained, provided:

- Landfill cells are constructed and operated to be BPEM compliant, including installation of active landfill gas extraction;
- There is high quality and robust landfill gas monitoring;
- An internal LFG monitoring and management zone is established; and



- There is a robust contingency plan in the event that landfill gas is observed beyond the perimeter of the landfill cells during the operation of the landfill and aftercare period.

**Question 5. Does the Panel agree with EPA's assessment of how the applicant would address the geotechnical stability of the landfill where the cells are not buttressed against the quarry wall? If the Panel thinks that there are any inadequacies that need to be addressed by the applicant prior to the detail design stage, please identify them.**

## Assessment

The Panel has reviewed EPA's assessment relating to the landfill geotechnical stability as reported in section 22 (response to notice to supply further information by Golder Associates) with focus on the cells not buttressed against the quarry wall as requested by EPA. The panel has found the EPA's assessment to be incomplete. However, the panel agrees with the EPA that the stability assessment should be conducted in the detailed design process and this should be a condition of the Works Approval.

## Justification

The stability assessment was performed using material properties from unknown sources and with no justification given for their selection. As no tests were carried out to obtain the material properties used in the analysis, it is important to clarify their source, how they relate to the case in hand and justify their selection since they have implications on the stability analysis. Commonly, when it is necessary to use published data from literature, databases, etc., for preliminary studies a lower bound strength from the available published data is employed in the analysis. It seems that this approach was not followed in the present case as the stability assessment was performed for peak interface strengths only.

It is expected that material site specific testing will be conducted as part of the detailed design and this should be a condition of the Works Approval.

**Question 6 - Does the Panel agree with the EPA's conclusion that the groundwater levels considered in the application cannot be considered as long term undisturbed groundwater levels in determining the 2m separation between waste and groundwater for the purpose of compliance with clause 16(2) of the WMP? Please provide comments.**

## Assessment

The Panel has reviewed EPA's conclusions relating to groundwater levels at MRL and the WAA supporting documents and agrees with EPA's conclusion that the groundwater levels presented in application cannot be considered as long term undisturbed groundwater levels. The Panel notes that determination of long term undisturbed groundwater levels in a disturbed environment without long term pre-disturbance groundwater level records is difficult. Modelling methods may provide some understanding of the long term undisturbed groundwater levels but even this would only be an estimate rather than a definitive determination of long term undisturbed groundwater levels.

## Justification

Appendix D of the Golder report supporting the Works Approval Application is a Hydrogeological Assessment prepared by AECOM. In section 5.3.3 of this document it is stated:

*Groundwater flow contours have been constructed on the basis of the readings from bores taken between April and May 2014. The contours, which are plotted as groundwater elevations in Figure 5-5, show that groundwater flow is directed from the north to the southeast.*

It is further stated in Section 5.3.3 of the AECOM document:

*For design of the proposed landfill cells, BPEM requires a minimum separation of 2m between the waste and the watertable. Table 5-2 shows the estimated watertable elevation at the proposed landfill cells based on the groundwater contours inferred from April and May 2014 gauging data. Visual illustration of estimated separation distance is presented in Figure 5-6.*

Figure 5-6 is titled “Estimated Groundwater Depth below Existing Ground Surface” and it is not clear to The Panel how this represents separation distance from the landfill base. While statement about BPEM requirements is correct, the WMP requires waste to be not less than 2 m above the long term undisturbed groundwater levels.

In answering a request in the Section 22 Notice to provide information to demonstrate that the groundwater contours shown in Figure 5-5 are undisturbed groundwater levels, Cleanaway responded:

*The groundwater levels over the area proposed for the new MRL cells are based on the readings taken in April – May 2014, because this represented the most complete data set at the time of writing the Hydrogeological Assessment (Hydrogeological Assessment) which accompanied the Works Approval Application (WAA). These data were the basis for the water table estimates provided in Table 5-2 of the Hydrogeological Assessment. To assess the validity of these estimates, AECOM have compared the data from four more monitoring events carried out since – on 4th Aug 2015, 20th Nov 2015, 22nd Mar 2016 and 16th May 2016. Comparison of the maximum recorded levels during these events in the bores located in the vicinity of the footprint of the new MRL cells (presented in the table below) indicates that the groundwater levels used for the contours in Figure 5-5 of the Hydrogeological Assessment are a reasonable representation of elevated groundwater conditions and the basis for Table 5-2 remains valid.*

This information suggests that the groundwater levels presented by AECOM are maximum known groundwater levels rather than the long term undisturbed groundwater levels.

Based on the information presented, it is The Panel’s opinion that the groundwater contours presented in the AECOM report do not represent the long term undisturbed groundwater levels. Further the response in to the Section 22 Notice did not address the request to provide information to demonstrate that the groundwater contours shown in Figure 5-5 are undisturbed groundwater levels.

The Panel also notes the Memorandum to Planning Panels Victoria dated 5 October 2016 and signed by Messrs Iffe, Nolan and Mulvey that includes the following statement:

*Following discussion on the final recovered phreatic surface, all parties agreed that the long term undisturbed groundwater level may cause a rise of between 1.4 and 2.5 m in the phreatic surface as represented in Figure 5-6 to account for.....*

In relation to the WMP requirement for waste to be deposited at least 2 m above the long term undisturbed groundwater level The Panel offers the following additional comments:

- The Panel acknowledges the importance of ensuring waste within a landfill is always above the level of groundwater.
- Given that all the landfills around Melbourne, now and for at least the next 30 years, are located within worked-out quarries, The Panel considers that the need to determine the long term undisturbed groundwater level (in a disturbed environment) presents a significant problem for landfill operators and proponents.
- The Panel recommends:
  - The WMP be modified to provide a more practicable requirement for separation distance between waste and groundwater; or
  - The EPA provides a methodology for determination of the long term undisturbed groundwater level that can be used by landfill operators and proponents.

**Question 7. Does the Panel agree with EPA's assessment that the additional design and management measures provided by the applicant to show compliance of Clause 16(2)(a) of the WMP are appropriate? Please provide comments.**

## Assessment

- a) The Panel accepts EPA's assessment that the use of a blanket drainage layer 2 m below the base of waste provides for additionality in compliance with Clause 16(2)(a) of the WMP. However, the Panel recommends:
- Where required, the drainage blanket be located 2 m below the lowest leachate (also a waste) level (i.e. top of liner in the sump) rather than as illustrated in Plate 5 of Appendix 6 of the documents supporting the Works Approval Application. EPA has advised Environmental Auditors that leachate is a waste and therefore needs to be considered in compliance with the separation distance required by Clause 16(2)(a) of the WMP;
  - Unless the drainage blanket is placed beneath all cells, the proponent should agree a methodology with EPA for determining groundwater levels at the site to provide a basis for establishing the 2 m separation distance;
  - The proponent should provide to EPA's satisfaction a plan which demonstrates that water drained from the underdrains can be managed appropriately for the life of the landfill operations and throughout the aftercare period.
- b) The Panel's notes that the Applicant did not offer the proposed liner design as an alternative design to meet the requirements for additional design measures in compliance with clause 16(2)(a) of the WMP. The panel assumes that EPA has considered the use of GCL as additional to the compacted clay liner (0.5 m thick) as potential addition to the design. If this is the case, then the two following issues need to be addressed before considering additionality:
- There is a need to demonstrate that the alternative liner is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point; and
  - There is a need to assess the water retention properties (i.e. unsaturated properties) of the CCL carefully to ensure that enough water will be available for the GCL to hydrate.

## Justification

- a) The use of a drainage blanket as proposed in Appendix 6 of the document supporting the WAA is a way of maintaining groundwater levels at a nominated elevation, subject to appropriate design of the system. As outlined in Question 6, The Panel considers there is no practical way of determining the long term undisturbed groundwater level and the proponent should either construct underdrains under all of the landfill cells or agree on a methodology with EPA for determining the "design groundwater level" for the purpose of establishing sump and cell base levels. The documentation provided with the WAA does not discuss how the drainage water will be managed and for how long. This information should be provided during detail cell design and be subject to Environmental Auditor review during as normally occurs with each cell design.
- b) If the GCL layer is to be used as an additional design measure, then the two following issues will need to be addressed before considering additionality:
- There is a need to demonstrate that the alternative liner (GCL+0.5m CCL) is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point; and

- GCLs are engineered hydraulic barriers made of a thin layer of bentonite (5-10mm) encased between two geotextiles. Their main function is to prevent or slow the flow of fluids from a pollution source, being well suited for this owing to the low hydraulic conductivity of hydrated bentonite, a condition achieved when placed on site where it takes up water from the underlying soil. Very often it is implicitly assumed that GCLs will be fully hydrated and fully functional as a fluid barrier once installed on a given underlying soil. Unfortunately, achieving a specific target *water content* in field-deployed GCLs to minimise any possible chemical incompatibility has a number of uncertainties. The initial *water content* of the bentonite within the GCL is very low (~10%), and when a GCL is covered by a geomembrane immediately after field installation to form a composite liner, its hydration can only occur through water absorption from the underlying soil (CCL in this case). However, this process is governed by the ability of the underlying soil (CCL) to release enough water for the GCL to hydrate. Therefore, one needs to assess the water retention properties (i.e. unsaturated properties) of the CCL carefully to ensure that enough water will be available for the GCL to hydrate. Failure to do so may render the hydration process incomplete or inhomogeneous, and may compromise the sealing function of the GCL.

**Question 8 - Does the Panel agree with EPA's assessment that groundwater in the area is not in Segment A? Therefore the compliance of clause 13(3) is not applicable for the proposed landfill development.**

## **Assessment**

The Panel agrees with the EPA's assessment that groundwater in the area is not in Segment A. Examination of the Melbourne Regional Landfill Hydrological Assessment (AECOM 2016) and Department of Environment, Land, Water and Planning's Online Ground Water Resource Report for the locality provides confidence that ground water sampling over a period of time has identified the groundwater's characteristics as being within Segments B and C. The WAA is therefore considered compliant with clause 13(3) of the Waste Management Policy (Siting, Design and Management of Landfills 2004).

## **Justification**

The MRL Hydrological Assessment (AECOM 2016) shows plots of groundwater samples collected from monitoring sites within the site between December 1998 until May 2015 in figure 6-7 which clearly shows that during this period only one sample returned a result which was representative of Segment A groundwater. The one sample (collected in August 2012) had a total dissolved solids (TDS) reading of 980mg/L which approached the upper limit of Segment A groundwater (1,000mg/L). By comparison, all other readings displayed for this sampling site and all other sampling sites exceed the Segment A upper threshold TDS limit. The average TDS across all recorded samples for the period is reported by AECOM to be 6,342 mg/L.

Examination of the site on the Department of Environment, Land, Water and Planning's website with online groundwater resource reports (<http://www.depi.vic.gov.au/water/groundwater/groundwater-resource-reports>) indicated modelled groundwater TDS to be in the range 3,501 to 13,000 mg/L meaning it would typically be classified as Segment C Groundwater.

## Findings and Recommendations

1. The Panel finds that the WAA sought exceeds the period considered under the Statewide Waste and Resource Recovery Infrastructure Plan and suggests that the WA be only approved for the extent of proposed cells 1 to 7 and associated site works, provided adequate planning controls are in place to ensure that buffers can be maintained for the full site, should cells 8 to 16 be required.
2. The Panel considers the lead in time excessive. The Panel considers a lead in time period allowing for any planning or WA appeals of around 5 years would be appropriate.
3. The Panel considers the need for an independent stakeholder liaison body to be convened and resourced to allow all major stakeholders to be informed on project progress, complaints and subsequent investigations, compliance with Licence conditions and auditor's reports. The panel recommends that the independent stakeholder liaison body be a stakeholder for the purposes of scoping any Section 53V operational environmental audits and that the independent stakeholder liaison body have appropriate technical resources to assist them in interpreting and commenting on the scopes for the operational environmental audits.
4. The Panel is of the view that for any new site, sufficient internal landfill gas buffer should be maintained to allow the landfill operator to effectively monitor and manage LFG migration risks for the life of landfill operations and throughout the aftercare period. For modern landfills, the internal landfill gas buffer could be substantially less than 500 m, provided;
  - The proposed liner system is BPEM compliant and installation is managed under an appropriate CQA programme;
  - There is landfill gas extraction during filling of cells, as currently proposed;
  - A well-engineered landfill gas extraction system is progressively installed as soon as filling is completed in any part of the site;
  - There is a well-designed, BPEM compliant, landfill gas monitoring system installed at the site. Monitoring wells should be located both close to the landfill cells and at the boundary of the site; and
  - Regular monitoring during operation and aftercare is undertaken in the landfill gas wells.
5. The Panel considers the landfill geotechnical stability assessment by EPA as it relates to cells not buttressed against quarry walls to be incomplete. However, the panel agrees with the EPA that stability assessment should be conducted in the detailed design process. The Panel recommends the Works Approval conditions require detailed design and supporting evidence of geotechnical stability before approval of all cell lining and capping designs. The panel recommends that material site specific testing for stability assessment be conducted as part of the detailed design and this should be a condition of the Works Approval.
6. The Panel has reviewed EPA's conclusions relating to groundwater levels on MRL and the Works Approval Application supporting documents and agrees with EPA's conclusion that the groundwater levels presented in the WAA cannot be considered as long term undisturbed groundwater levels. The Panel notes that determination of long term undisturbed groundwater levels in a disturbed environment without long term pre-disturbance groundwater level records is difficult. Modelling methods may provide some understanding of the long term undisturbed groundwater levels but even this would only be an estimate rather than a definitive determination of long term undisturbed groundwater levels.
7. (a) The Panel accepts EPA's assessment that the use of a blanket drainage layer 2 m below the base of waste provides for additionality in compliance with Clause 16(2)(a) of the WMP. However, the Panel recommends:



- i. Where required, the drainage blanket be located 2 m below the lowest leachate (also a waste) level (i.e. top of liner in the sump) rather than as illustrated in Plate 5 of Appendix 6 of the documents supporting the WAA. EPA has advised environmental auditors that leachate is a waste and therefore needs to be considered in compliance with the separation distance required by Clause 16(2)(a) of the WMP;
- ii. Unless the drainage blanket is placed beneath all cells, the proponent should agree a methodology with EPA for determining groundwater levels at the site to provide a basis for establishing the 2 m separation distance;
- iii. The proponent should provide to EPA's satisfaction a plan which demonstrates that water drained from the under-drains can be managed appropriately for the life of the landfill operations and throughout the aftercare period.

(b) The Panel notes that the WAA did not offer the proposed liner design as an alternative design to meet the requirements for additional design measures to satisfy Clause 16(2)(a) of the WMP. The panel assumes that EPA has considered the use of GCL as additional to the compacted clay liner (0.5 m thick) as potential addition to the design. If this is the case, then the two following issues need to be addressed before considering additionality:

- i. There is a need to demonstrate that the alternative liner is equivalent to the BPEM standard liner configuration from both advective and diffusive flow view point.
- ii. There is a need to assess the water retention properties (i.e. unsaturated properties) of the CCL carefully to ensure that enough water will be available for the GCL to hydrate to the target water content set by the design.

8. The Panel agrees with the EPA's assessment that groundwater in the area is not in Segment A. Examination of the Melbourne Regional Landfill Hydrological Assessment (AECOM 2016) and Department of Environment, Land, Water and Planning's Online Ground Water Resource Report for the locality provides confidence that ground water sampling over a period of time has identified the groundwater's characteristics as being within Segments B and C. The application is therefore considered compliant with requirements of clause 13(3) of the Waste Management Policy (Siting, Design and Management of Landfills 2004).

8.

## References

- *Environment Protection Act 1970, Waste Management Policy (Siting, Design and management of Landfills)(2004)*
- *EPA (2015) Publication 1560 Approval Proposal Pathway*
- *EPA (2015) Publication 1307.10 Works Approval Application*
- *EPA (2011) Publication 1323.2 Landfill Licencing Guidelines*
- *EPA (2015) Publication 788.3 Siting, Design, Operation and Rehabilitation of Landfills BPEM (2015)*
- *EPA (2017) Draft Works Approval Assessment Report for MRL Extension*
- *Metropolitan Waste and Resource Recovery Group (2016) Metropolitan Waste and Resource Recovery Implementation Plan*
- Memorandum from Philip Mulvey and John Nolan dated 5/10/16 to Planning Panels Victoria entitled "Conclave Meeting of Groundwater Experts in relation to the proposed Melbourne Regional Experts
- *Sustainability Victoria (2014) Statewide Waste and Resource Recovery Infrastructure Plan*

## **Any additional Panel notes**

1. The Panel was able to reach its findings and recommendations through consensus.
2. The Panel did not require or receive input from other parties.