Report and recommendations of the Environmental Protection Authority

Resource Recovery Facility, Red Hill

Eastern Metropolitan Regional Council

Report 1487

July 2013

Public Environmental Review
Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
21/12/10	Level of assessment set	
24/10/11	Final ESD approved	44
23/07/12	Environmental Review Document (ERD) released for public review	39
17/09/12	Public review period for ERD closed	8
18/12/12	Final Proponent response to ERD issues raised	13
4/04/13	EPA released s16e strategic advice on waste-to-energy technologies	14
26/06/13	Final information required for assessment received from Proponent	12
17/07/13	Transmittal of EPA report to the Minister for Environment	3
22/07/13	Publication of EPA report	5 days
05/08/13	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority met its timeline objective in the completion of the assessment and provision of a report to the Minister.

Dr Paul Vogel
Chairman

17 July 2013

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by the Eastern Metropolitan Regional Council (EMRC), to develop a Resource Recovery Facility (RRF) at the existing Red Hill Waste Management Facility (WMF) in the Perth metropolitan area.

The proposed facility would be used to process kerbside municipal solid waste. The EMRC are proposing to use one of two technology options for processing waste:

- anaerobic digestion; or
- gasification.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides the EPA's conclusions, and Section 6 presents the EPA's recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

Red Hill Waste Management Facility

The existing Red Hill WMF began operation as a landfill in 1981 and has expanded to be one of Perth's largest landfills. It receives Class III and Class IV waste, with dedicated cells for putrescible waste and contaminated soil, a greenwaste processing area for producing mulch and compost, and a transfer station for recyclable material.

The establishment of the RRF would assist the EMRC in diverting waste from landfill and increase the life expectancy of the Red Hill WMF.

Strategic advice on Waste-to-Energy technologies

The EPA and the Waste Authority have recently undertaken and released their strategic review on 'Environmental and Health Performance of Waste to Energy Technologies' (EPA, 2013) under section 16(e) of the *Environmental Protection Act 1986* (EP Act). This strategic review is available on the EPA's website as EPA Report 1468.

The strategic review concluded that it has been demonstrated internationally that modern Waste-to-Energy plants can operate within strict emission standards with acceptable environmental and health impacts to the community when a plant is well designed and operated using best practice technologies and processes.

The EPA supports the establishment of Waste-to-Energy plants in Western Australia, subject to a number of principles which are outlined in the EPA's section 16(e) advice.

2. The proposal

The EMRC are proposing to develop a RRF to process kerbside municipal solid waste within the existing Red Hill WMF (Figure 1).

The EMRC is proposing to use one of two technology options which are:

- anaerobic digestion, with a maximum capacity of 150,000 tonnes per annum (tpa); or
- waste-to-energy using a gasification process, with a maximum capacity of 200,000 tpa.

The proponent intends to make a final decision on the technology to be used following the environmental impact assessment process. If approved, the detailed design would be undertaken through the Engineering, Procurement and Construction phase.

Anaerobic digestion

Three anaerobic digestion technologies, Kompogas, Bekon and Amec Minproc, were considered by the EMRC. The technologies proposed were used as a basis for predicting environmental impacts.

Anaerobic digestion technology processes the organic fraction of municipal solid waste. Organic waste is fed into a fermenter, where microorganisms process the waste to produce biogas and compost. The biogas is then burnt in gas engines to produce energy.

Residual digestate is produced by the anaerobic digestion process and is separated from the residual liquid through a filter press or centrifuge and matured through aerobic composting. Surplus liquid residue from the process would be utilised as liquid fertiliser, discharged to the Red Hill landfill leachate management system or treated in a waste water treatment plant.

Gasification

The Energos technology has been used to model the environmental impacts for gasification technology. The gasification facility would consist of a number of components including the following:

- fuel bunker and transport system;
- thermal conversion unit, consisting of a primary gasification chamber for converting waste to syngas and a secondary chamber for syngas combustion;
- heat recovery steam generator;
- power generation system; and
- flue-gas cleaning system.

The first Energos facility was commissioned in 1997, and Energos technology has been used for processing residual municipal solid waste and commercial waste. The most recently established plant is the Sarpsborg II plant in Norway, which was commissioned in 2010.

The gasification technology facility would process the non-recyclable fraction of municipal solid waste. The facility would consist of four modules of 50,000 tpa each to give a total capacity of 200,000 tpa. The proposed capacity is greater than for anaerobic digestion since it would process both the organic fraction plus non-recyclable material that has calorific value.

To be considered a Waste-to-Energy plant, a facility needs to have reasonable efficiency. The proponent has advised that the Energos plant is expected to have an efficiency of approximately 0.59. Increasing the efficiency to the European Union Waste Incineration Directive (WID) (EU, 2000) standard of 0.65 would require higher steam pressure which the proponent considers unfeasible for Western Australian conditions, and the EPA accepts this, in this circumstance.

The gasification process would produce residual bottom ash and fly ash. This would be disposed of in the appropriate class of landfill located at the Red Hill WMF.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 4 of the PER (EMRC, 2012a) and in the section 43A application (EMRC, 2012b).

Table 1: Summary of key proposal characteristics

Summary of the Proposal	
Proposal Title	Resource Recovery Facility
Proponent Name	Eastern Metropolitan Regional Council
Short Description	The proponent proposes to construct and operate a resource recovery facility for the processing of waste to produce energy at Red Hill. The waste management facility would use one of the following technologies: • anaerobic digestion; or • gasification.

Table 1 (continued)

Anaerobic Digestion		
Element	**Location**	**Proposed Extent Authorised**
Resource Recovery Facility and associated infrastructure	Site E, Red Hill (Figure 1).	Clearing of up to 0.85 ha of remnant vegetation.
Waste types accepted for processing:		The organic fraction of municipal solid waste from either a source separated collection system or from the rubbish bin using the mechanical separation designed into the facility.
Excluded wastes: • wastes with heavy metal concentrations greater than the requirements for Class III landfill; • 'Scheduled' wastes such as polychlorinated biphenyls and organochlorines; • Asbestos; • highly corrosive or toxic liquids or gases such as strong acids or chlorine or fluorine; • radioactive waste; • explosives; and • materials already deposited in the onsite landfill.		Not to be processed.
Quantity of waste to be processed:		Up to 150,000 tpa.
Odour concentration emitted from biofilter:		Less than 500 odour units.
Building under negative pressure:		Waste may only be accepted while the building is being maintained under negative pressure.
Fast Acting Doors:		Waste may only be accepted while the Fast Acting Doors are fully operational.

Table 1 (continued)

Gasification		
Element	**Location**	**Proposed Extent Authorised**
Resource Recovery Facility and associated infrastructure	Site E, Red Hill (Figure 1).	Clearing of up to 0.85 ha of remnant vegetation.
Waste types accepted for processing:		Municipal solid waste from the rubbish or residual bins of a two bin or three bin collection system.
Excluded wastes: • wastes with heavy metal concentrations greater than the requirements for Class III landfill; • 'Scheduled' wastes such as polychlorinated biphenyls and organochlorines; • Asbestos; • highly corrosive or toxic liquids or gases such as strong acids or chlorine or fluorine; • radioactive waste; • explosives; and • materials already deposited in the onsite landfill		Not to be processed.
Quantity of waste to be processed:		Up to 200,000 tpa.

During the assessment the EMRC moved the proposed location to the western portion of the Red Hill WMF (Site B2 to E, Figure 1).

The EPA agreed that the change in location to Site E reduced the overall predicted environmental impacts compared to Site B2 and approved the change under section 43A of the EP Act. Table 1, *Summary of key proposal characteristics* includes relevant changes to the proposal made under section 43A of the EP Act.

The potential impacts of the proposal initially predicted by the proponent in the PER document (EMRC, 2012a) for Site B2 and their proposed management are summarised in Table ES2 of the proponent's document. The potential impacts predicted by the proponent for Site E are detailed in the section 43A application (EMRC, 2012b).

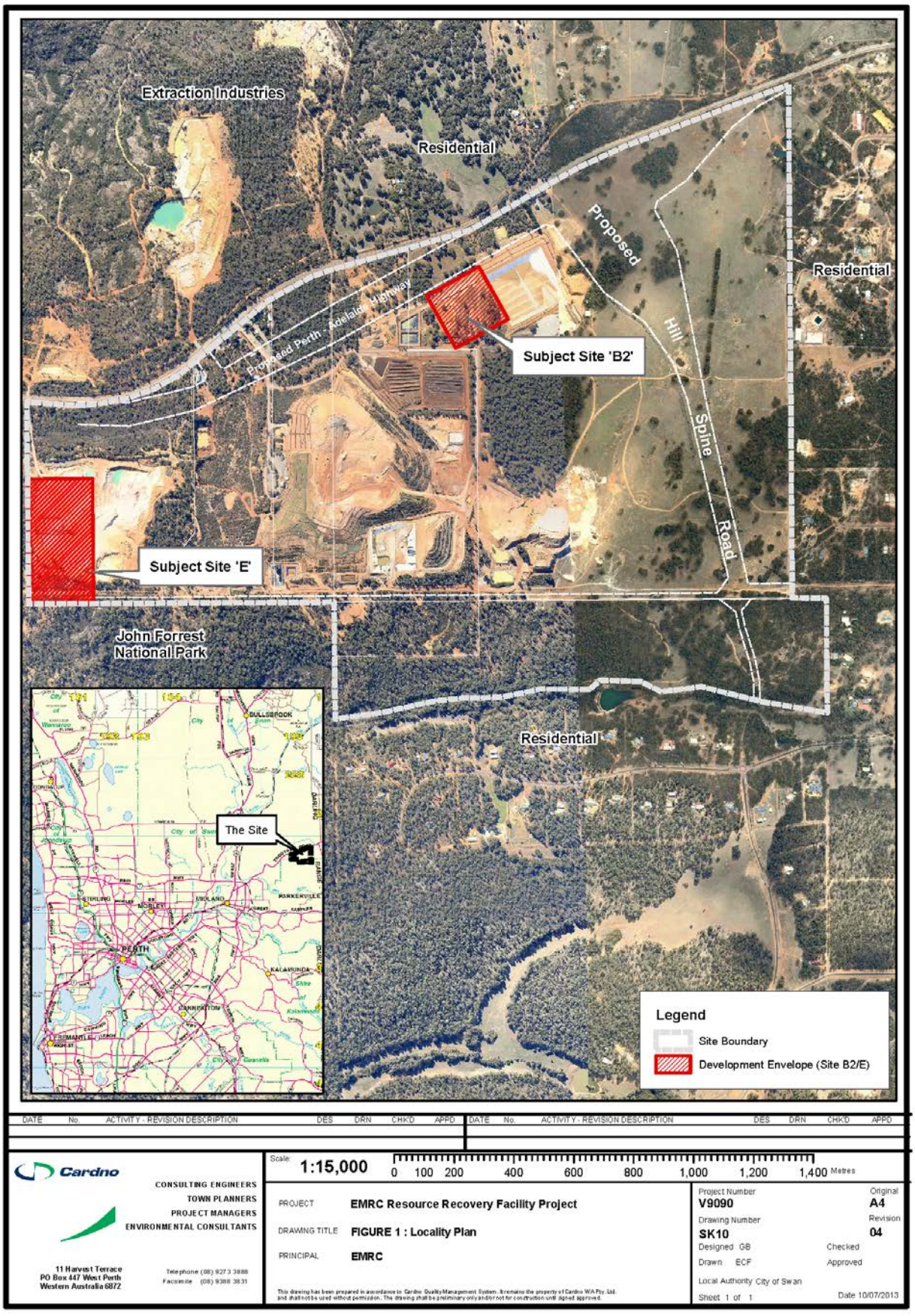

Figure 1:Development envelope including regional context

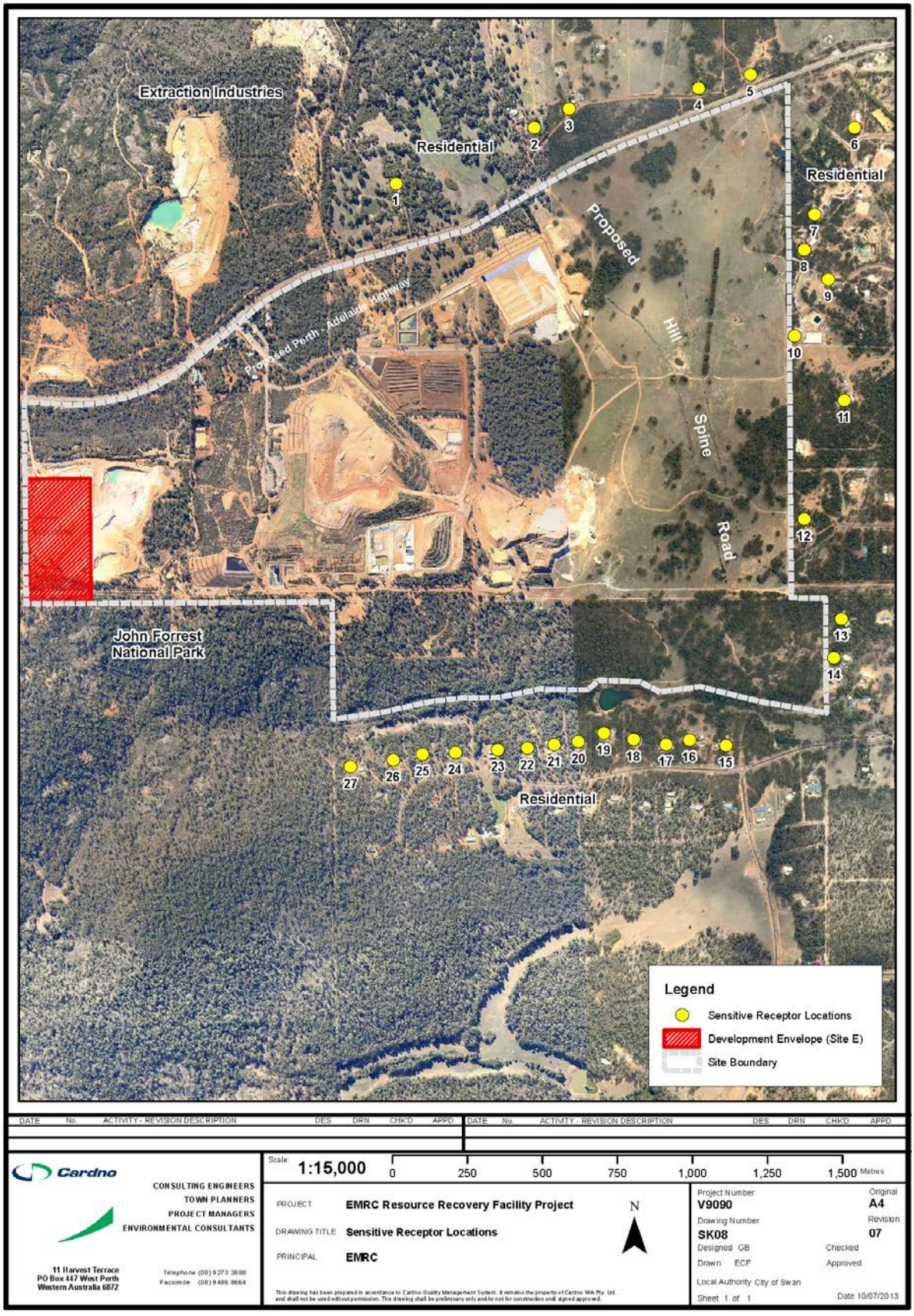

Figure 2: Locations of sensitive receptors surrounding the Red Hill Waste Management Facility

3. Key environmental factors and principles

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

For this assessment, the EPA is assessing each of the proposed technologies (anaerobic digestion and gasification) on their individual merits to determine whether the EPA's objectives can be met. The assessment should not be seen as a comparison of the technologies.

The identification process for the key environmental factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as inland waters environmental quality and amenity (noise), are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation, for both anaerobic digestion and gasification technology, in this report:

(a) Air quality; and

(b) Amenity (odour).

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document, the section 43a application, and the submissions received, in conjunction with the proposal characteristics set out in Table 1.

Details on the key environmental factors for anaerobic digestion and their assessment are contained in Sections 3.1.1 – 3.1.2. Details on the key environmental factors for gasification and their assessment are contained in Sections 3.2.1 – 3.2.2. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal, taking into consideration environmental impact management by the proponent. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

(a) the precautionary principle;

(b) the principle of intergenerational equity;

(c) the principle of the conservation of biological diversity and ecological integrity;

(d) principles relating to improved valuation, pricing and incentive mechanisms; and

(e) the principle of waste minimisation.

3.1 Anaerobic digestion

3.1.1 Air quality

Description

The proposal is located to the west of the existing Red Hill WMF, and the nearest residence is approximately one kilometre to the south-east. Predominant winds have been recorded north to north-easterly during the morning and west to south-westerly during the afternoon. During operation of the anaerobic digestion facility, air emissions would be produced from the exhausts of the gas engines, the biogas burner and the flare. These emissions include oxides of nitrogen and sulphur (NO_X and SO_2), carbon monoxide, Non-Methane Volatile Organic Compounds (NMVOC), and formaldehyde.

A baseline air quality monitoring study was conducted between April and July 2011 to characterise the existing background levels of pollutants. This study included the continuous measurement of the oxides of nitrogen and sulphur (NO_X and SO_2), carbon monoxide, and particulate matter (PM_{10} and $PM_{2.5}$). Discrete campaign-based monitoring was also conducted for polycyclic aromatic hydrocarbons, total suspended particles, particulate matter (PM_{10}), metals, hydrochloric and hydrofluoric acids, hydrogen sulphide, volatile organic compounds and carbonyls.

Air dispersion modelling was undertaken based on the data from Amec Minproc and Bekon anaerobic digestion technologies to assess potential impacts on air quality. Both direct and cumulative impacts were considered. Initial modelling was undertaken using an eight metre exhaust stack and exceedances of air quality standards were predicted. Emissions were remodelled with a 25 metre stack, which resulted in the predicted Ground Level Concentrations (GLC) complying with air quality standards.

All criteria pollutants were predicted to be compliant with the National Environment Protection Measure (NEPM) air quality standards at discrete receptors. The maximum predicted GLC for the two anaerobic digestion technologies for NO_X and SO_2 for example, was found to be less than 18 per cent and 0.4 per cent respectively at discrete receptors (see Figure 2) for maximum one hour average concentrations. Cumulative impacts of these pollutants at discrete receptors were found to be 30 per cent and 3.6 per cent of the respective assessment criteria. Other pollutants including NMVOCs and formaldehyde were found to meet relevant air quality standards and guidelines.

The proponent intends to use best practice and a stack of appropriate height and design to ensure compliance with air quality standards. The stack design would be finalised during the detailed design stage. Monitoring of air emissions would be conducted for the life of the project and would be detailed in a publicly available emissions management and monitoring plan, to be developed as part of the Works Approval required under Part V of the EP Act. The details of the plan would be dependent on the final design of the facility and would include development of standard operating procedures to deliver low emission outcomes, regular maintenance of all equipment to ensure compliance with standards, a contingency plan, and regular review of the management plan.

Submissions

Key matters raised in submissions focused on:

- shortcomings in the air quality modelling;
- the effect of an inconsistent waste mix on the outcomes of the model;
- cumulative impacts from air emissions from additional industrial facilities in the area; and
- the baseline monitoring data for air emissions not covering a full year.

Assessment

The EPA's environmental objective for this factor *is to maintain air quality for the protection of the environment and human health and amenity*.

The EPA notes that the results of the air dispersion modelling predict compliance with the NEPM standards for criteria pollutants, and that other emissions also meet relevant criteria.

Following the EMRC's final tender process the supplier of the anaerobic digestion technology would be chosen. Since the air emissions data is based on example emission data, the EPA has recommended condition 8, which requires that emissions from the chosen anaerobic digestion facility be benchmarked against best practice. Condition 8 also requires the preparation of an Air Quality Report that sets out emission rates and addresses normal operations, start up, shut down, and equipment failure conditions. The Air Quality Report also requires revised air quality modelling.

The main source of emissions is from the gas engine exhausts, and the EPA considers that these point sources are most appropriately managed via the Works Approval and Licence required under Part V of the EP Act. The Air Quality Report required by condition 8 would form part of the Works Approval application.

Summary

Having particular regard to the:

(a) air dispersion modelling results predicting compliance with the NEPM;

(b) provisions of Part V of the EP Act; and

(c) recommended condition 8,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for air quality provided the recommended condition is imposed.

3.1.2 Amenity (odour)

Description

The organic waste to be processed is inherently odorous and the facility has the potential to emit odours. To minimise odour potential the facility would be maintained under negative pressure, with all odorous exhaust air treated through a biofilter. The facility would also be fitted with fast acting doors to minimise the escape of odours. There is potential for odorous emissions during operational hours when the roller doors are open to allow waste trucks to enter and exit.

Site specific odour monitoring was undertaken in January 2011 to determine odour emission rates for all odorous sources at the existing WMF. Monitoring outcomes concluded that major sources of odour are the greenwaste windrows and the landfill gas engine exhausts.

Of the three anaerobic digestion technologies, Amec Minproc had the highest odour emission rate from the biofilter and therefore the Amec Minproc technology rate has been used to predict odour impacts. Dispersion modelling using site specific meteorological data was used to predict cumulative impacts from the existing operation and the anaerobic digestion facility. Results predict one exceedance of the odour criteria under current WMF operations at one sensitive receptor (Receptor 12, Figure 2).

The exceedance at Receptor 12 is mainly due to the existing greenwaste windrows, which contributes up to 78 per cent of maximum odour concentrations at this location. The predicted cumulative odour impacts are dominated by the existing operations at Red Hill and the proposed anaerobic digestion facility would not significantly increase odour impacts. The proponent is considering managing the exceedance at Receptor 12 through the relocation of the greenwaste windrows to a suitable location that would be identified through dispersion modelling.

Submissions

Key matters raised in submissions focused on:

- whether the use of a biofilter to manage odours is appropriate in Perth's hot and dry climate;

- odour complaints being prevalent for the existing Red Hill WMF; and
- management actions to reduce existing odour emissions.

Assessment

The EPA's environmental objective for this factor *is to ensure that impacts to amenity are reduced as low as reasonably practicable*.

The Department of Environment Regulation (DER, formerly the Department of Environment and Conservation) has advised that it does not consider the proponent's odour modelling to be conservative due to the odour monitoring techniques used to gather input data, and the historic odour complaint data for the WMF. However, the DER recognises that the anaerobic digestion facility as modelled would not significantly increase the odour impact.

The DER has also recommended the relocation of the greenwaste windrows as a means to minimise cumulative odour impact. Given the existing complaints and the DER's advice, the EPA considers that in order for the cumulative odour impacts to be considered acceptable, the proponent would need to reduce existing odour emissions. The EPA has recommended a condition to achieve this.

Condition 6 requires the preparation and implementation of a Cumulative Odour Reduction Report, which would involve the investigation of management measures to reduce the existing impact. Condition 6 also requires that a re-run of the odour emission modelling be undertaken to demonstrate an overall reduction in the predicted cumulative odour impacts.

The DER also advised that a suitably sealed building can be achieved and that biofilters are capable of controlling odour adequately from anaerobic digestion type facilities. However, the DER noted that the ongoing operational management of the biofilter is crucial to good performance in Perth's hot and dry climate.

The EPA notes that the biofilter is responsible for approximately 94 per cent of the emissions and fugitive emissions through the fast acting doors responsible for the remaining 6 per cent. The EPA has recommended condition 7 to ensure that the odour emissions from the anaerobic digestion facility are minimised and appropriately managed. Condition 7 requires an independent peer review of the detailed design of the odour control system, which specifically addresses such things as:

- building orientation and sealing;
- performance and specification of the air extraction system to maintain the building under negative pressure;
- biofilter design, size and loading;
- degree of automation of the monitoring and control system for critical parameters;
- redundancy incorporated into the design;

- robustness of the facility and design, and operational protocols;
- monitoring required to demonstrate odour performance; and
- technology suppliers warranty with respect to odour performance,

with particular emphasis on the design process control, management and maintenance of the biofilter.

The EPA notes that the detailed design of the odour control system would form part of the Works Approval application under Part V of the EP Act, and the DER would further assess the odour prevention and minimisation measures at this time.

Summary

Having particular regard to the:

(a) anaerobic digestion facility being a minor contributor to the cumulative odour impact from the WMF;

(b) recommended condition 6 requiring cumulative odour impact to be reduced; and

(c) recommended condition 7 requiring peer review of the odour control system;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for amenity provided the recommended conditions are imposed.

3.2 Gasification

3.2.1 Air quality

Description

Gasification technology uses a thermal conversion unit to convert waste into a fuel gas. This fuel gas is then burnt to raise steam and produce electricity. The exhaust emissions from the steam boiler are vented through a stack and have the potential to impact air quality.

As discussed in Section 3.1.1, baseline monitoring was conducted for the project area to characterise existing GLCs of pollutants.

Air dispersion modelling using Energos technology data was undertaken to predict GLCs of pollutants. The modelling results predict that the criteria pollutants comply with the NEPM standard. The highest GLC predicted was the one-hour average nitrogen oxide (NO_X) emissions at 7.8 per cent of the assessment standard for discrete receptors. Other pollutants including dioxins and mercury were predicted to meet relevant air quality standards and guidelines. Results from the cumulative assessment also predict compliance with assessment criteria for all parameters.

To illustrate a worst case, modelling was also undertaken using the emission limits from the WID. Results from this worst case predict that the GLCs would still comply with the relevant standards.

The proponent intends to monitor air emissions. This would be done for the life of the project and would be detailed in a publicly available emissions management and monitoring plan, to be developed as part of a Works Approval application. The details of the plan would be dependent on the final design of the facility and would include development of standard operating procedures to deliver low emission outcomes, regular maintenance of all equipment to ensure compliance with standards, a contingency plan, and regular review of the management plan.

Submissions

Key matters raised in submissions focused on:

- shortcomings in the air quality modelling;
- effect of an inconsistent waste mix on the outcome of the model;
- cumulative emissions from additional industrial facilities in the area;
- Energos type facilities have been experiencing emission problems; and
- stack emissions increasing from inefficiency of filters.

Assessment

The EPA's environmental objective for this factor is *to maintain air quality for the protection of the environment and human health and amenity*.

Emission standards

The EPA and the Waste Authority's strategic review of the Environmental and Health Performance of Waste-to-Energy Technologies (EPA, 2013) identifies the European Union WID as the appropriate standard for Waste-to-Energy facilities in Western Australia.

The EPA notes that the proposed continuous monitoring of the main stack emissions is appropriate. However, for those emissions that are not continuously monitored (e.g. heavy metals, dioxins and furans), the EPA considers that during the initial operation of the plant (minimum of two years following receipt of Certificate of Practical Completion) that more frequent testing should be required.

The EPA notes that under Part V of the EP Act, the DER can specify in the Works Approval that the plant must be constructed to meet the requirements of the WID. The DER can also specify stack emission limits as it deems appropriate in the operating Licence.

The EPA also notes that gasification technology (as opposed to combustion) offers the potential for emissions at much lower concentrations than the limits in the WID, and considers that for these emissions it is appropriate for the DER to set targets lower than those in the WID.

The EPA considers that the Works Approval and Licensing processes under Part V of the EP Act are the appropriate regulatory mechanisms to specify the emission limits and monitoring criteria.

Following the EMRC's final tender process there is the possibility of an alternative gasification technology being chosen. The EPA considers that an alternative equivalent technology could be implemented provided that it meets the technology considerations in the EPA and Waste Authority's strategic advice for Waste-to-Energy plants (EPA, 2013). The EPA has recommended condition 9 to allow for this.

Condition 9 requires the preparation of documentation to demonstrate that the chosen gasification technology has been operated reliably elsewhere, can operate within the WID limits, has a successful track record in treating the waste streams proposed, has operated at a similar scale to the proposal, and has a configuration of components that has been demonstrated elsewhere.

Summary

Having particular regard to the:

(a) air dispersion modelling results predicting compliance with the NEPM;

(b) provisions of Part V of the EP Act;

(c) monitoring and management measures proposed; and

(d) recommended condition 9,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for air quality provided the recommended condition is imposed.

3.2.2 Amenity (odour)

Description

The main source of odour for the gasification technology would be through the truck entry and exit doors of the facility. The building is maintained under negative pressure and the extracted air is passed into the combustion chamber. As such, the gasification technology does not need biofilters to control odours.

As discussed in Section 3.1.2, odour monitoring was conducted at the Red Hill WMF to characterise existing odour sources and emission rates. Odour modelling of the existing WMF predicted one exceedance at Receptor 12

(Figure 2). Cumulative odour modelling was undertaken to predict odour impacts for Energos technology and results showed that there would be no additional exceedances of the odour criteria with the addition of a gasification facility.

Submissions

Key matters raised in submissions focused on:

- odour complaints generated from the existing WMF;
- that further investigations should be made to reduce odour emissions from the greenwaste windrows; and
- concern regarding odour impacts at nearby residents.

Assessment

The EPA's environmental objective for this factor is *to ensure that impacts to amenity are reduced as low as reasonably practicable*.

As discussed in Section 3.1.2, the EPA considers that in order for the cumulative odour impacts to be considered acceptable, the proponent would need to reduce existing odour emissions from the WMF. The EPA has recommended a condition that would achieve this.

Condition 6 requires the preparation and implementation of a Cumulative Odour Reduction Report, which would involve the investigation of management measures to reduce the existing impact. Condition 6 also requires that a rerun of the odour emissions modelling be undertaken to demonstrate an overall reduction in the predicted cumulative odour impacts.

The EPA notes that the detailed design of the odour control system would form part of the Works Approval application under Part V of the EP Act and that the DER would further assess the odour prevention and minimisation measures at this time.

Summary

Having particular regard to the:

(a) gasification facility being a minor contribution to the cumulative odour impact; and

(b) recommended condition 6 requiring cumulative odour impact to be reduced,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for amenity, provided the recommended condition is imposed.

3.3 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

4.1 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the EMRC to develop and operate a RRF, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) minimising the cumulative odour emissions;

(b) ensuring a robust odour control system design, should anaerobic digestion be the chosen technology; and

(c) ensuring that, should gasification be the chosen technology, it is consistent with the EPA and the Waste Authority's strategic advice.

It should be noted that other regulatory mechanisms relevant to the proposal are the Works Approval and License required under Part V of the EP Act.

4.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the DER in respect of matters of fact and matters of technical or implementation significance. Minor changes, which did not change the intent or scope, were made to some conditions to improve clarity. Condition 8 was amended to improve consistency with EPA Guidance Statement 55 *Implementing best practice in proposals submitted to the environmental impact assessment process*, and Schedule 1 Table 2 was amended to make the authorised extent more practical.

5. Conclusion

The EPA has considered the proposal by the EMRC to develop a RRF to process kerbside municipal solid waste within the Red Hill WMF using either anaerobic digestion or gasification technology.

The EPA recognises the potential for waste facilities to diminish amenity via odour, and has paid particular attention to ensuring that odour is minimised and managed to prevent unacceptable impacts. Given the historical odour complaints from the Red Hill WMF, and the potential for increased cumulative odour impact with the addition of a RRF, the EPA has recommended a condition to reduce cumulative odour emissions.

For anaerobic digestion, the EPA has also recommended a condition requiring peer review of the detailed design of the total odour control system for anaerobic digestion to ensure it is well designed and appropriately managed so that odour emissions are acceptable.

The EPA and the Waste Authority recently released the section 16(e) strategic advice for Waste-to-Energy plants. This advice noted that the WID is the appropriate standard for Waste-to-Energy technologies. The EPA notes that the Energos gasification technology meets the WID emission limits however, following the EMRC's final tender process, there is the possibility of an alternative gasification technology being chosen. The EPA considers that an alternative equivalent technology could be implemented provided that it meets the technology considerations in the EPA and the Waste Authority's section 16(e) strategic advice. The EPA has recommended condition 9 to allow flexibility for this possibility.

The EPA considers that the Works Approval and Licensing process under Part V of the EP Act managed by the DER will be critical to ensure that the RRF is appropriately managed.

The EPA has therefore concluded that the proposal can be managed to meet the EPA's objectives provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4.

6. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for the development of a RRF using either anaerobic digestion or gasification technology at the Red Hill WMF in Perth;
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is likely that the EPA's environmental objectives would be achieved provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:
Alliance for a Clean Environment Inc.
City of Belmont
Department of Indigenous Affairs
Department of Water
Department of Health
Department of Environment and Conservation
Environment House
Gidgengannup Progress Association
Jewel Nominees
Mount Helena Residents and Ratepayers Progress Association
Save Perth Hills
Stoneville and Parkerville Progress Association
Transition Town Guildford

Individuals:
7 individual submissions

Appendix 2

References

EMRC (2012a) Public Environmental Review: *EMRC Resource Recovery Facility*, prepared by Cardno (WA) Pty Ltd for EMRC, July 2012.

EMRC (2012b) *EMRC Resource Recovery Facility Section 43A Application: Relocation of RRF*, prepared by Cardno (WA) Pty Ltd for EMRC, October 2012.

EPA (2003) *Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process.* Environmental Protection Authority Guidance Statement No. 55, December 2003.

EPA (2013) *Environmental and Health Performance of Waste to Energy Technologies*. Report No. 1468. Environmental Protection Authority, Government of Western Australia, April 2013.

EU (2000) European Parliament and Council of the European Union (2000) Waste Incineration Directive (WID). *Directive 2000/76/EC of the European Parliament and of the Council on the Incineration of Waste.* Official Journal of the European Communities. L332/91.

EU (2005) European Union *Best Available Technology, Energy Efficiency Regulation* required under EUD-COM (2005), 667 final.

Appendix 3

Summary of identification of key environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
LAND			
Flora and Vegetation	Clearing of 0.85 hectares remnant vegetation. Site location historically cleared for quarry operations.	No submissions received on this factor.	**Not considered to be a key environmental factor.**
Terrestrial Fauna	Clearing of 0.85 hectares remnant vegetation. There are three Threatened Species likely to utilise the project area.	No submissions received on this factor.	Majority of the site has been cleared and is unlikely to have significant impact on fauna habitat. **Not considered to be a key environmental factor.**
WATER			
Inland Waters Environmental Quality	The closest surface water body to the site is a small creek located 300 metres north of the site, and flowing in a westerly direction. There are also two prevalent water tables beneath the site. A breach of the facility, flooding or regular housekeeping activities could lead to contamination of the environment and result in decreased water quality.	**Department of Environment Regulation:** • Combustion of waste materials will produce large amounts of bottom ash and fly ash that are likely to contain potentially leachable material. Appropriate leaching tests should be undertaken to demonstrate the suitability of bottom and fly ash materials for use or disposal outside of a lined landfill cell. **Public submissions:** • Concern that the close proximity of the Helena and Mundaring reservoirs to the project site may potentially impact drinking water catchments and sources. • The gasification plant may result in large amounts of toxic material (ash) being placed in the Red Hill landfill, which may potentially contaminate land and water.	The nearest surface water body is located upstream from the proposed facility and is unlikely to be impacted from potential spills and leakages. The Red Hill site is an operating waste facility and has lined cells that can accept up to class IV waste. Under Part V of the EP Act, the DER can regulate the ongoing management and monitoring of contaminated discharge during the Works Approval stage and implement relevant conditions for the licence to manage environmental impacts. **Not considered to be a key environmental factor.**
AIR			
Air Quality	The proposal would produce air emissions, including NO_X, SO_X and other pollutants from the	**Department of Environment Regulation:** • The DER recommends that the air quality modelling be revisited to reflect worst case emissions, and that any	**Considered to be a key environmental factor and discussed in Sections 3.1.1 and 3.2.1 Air Quality under the relevant**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	anaerobic digestion and gasification technologies	shortcomings be identified and addressed. • Potential failure modes can cause increased air emissions and measures should be identified to correct this. **Department of Health:** • The DOH is satisfied with the level of conservatism used for the modelled substances and that the proposed technologies are unlikely to cause health effects, provided emissions remain consistently below the recommended air quality health based references for the life of the facility. **Public submissions:** • Concerns that an inconsistent waste mix could change the modelled outcome, which may cause health impacts during operations. • Existing SO_X, NO_X and particulate levels are already poor in the area and no information on cumulative impacts from emissions has been provided. • Air monitoring was done during winter months and no monitoring was undertaken during summer months, which raises concern that monitoring locations were selectively located to avoid prevailing dry easterly winds. • Strong easterly winds during the morning and westerly winds during the evening would cause harmful emissions to be transported back and forth through dense populations.	**technology heading.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
PEOPLE			
Human Health	Establishment of the project can affect human health from exposure to air pollution, contamination of the food chain, water contamination, noise and increased risks of injury.	**Department of Health:** • Statements and comments related to impact on public health are recommended, particularly in relation to odour control and the reuse of treated solid (compost) and liquid wastes. • The PER should include disaster preparedness, health, social and mental wellbeing of the workforce and visitors. **Public submissions:** • Consideration should be given to indirect exposure pathways to human health such as from drinking water and food. • Anaerobic digestion technology is preferable to gasification technology as there is less risk to human health. • Standards for compounds including dioxins, nanoparticles and some heavy metals are not available and, in the absence of standards, may result in human health impacts.	Potential impacts from emissions on human health are considered through other factors including air quality, amenity (odour), and inland waters environmental quality. **Not considered to be a key environmental factor.**
Heritage	The DIA Register of Aboriginal Sites indicates the closed boundary of one Heritage Place overlaps Lots 8, 9 and 10.	**Department of Indigenous Affairs:** • There is potential for cultural material to be revealed in the relatively undisturbed sections of the land, and should cultural or skeletal material be discovered during the project, work should cease immediately and be reported to the DIA. • All relevant documents on heritage surveys undertaken should be provided to the DIA. • The proponent is obligated to abide by the requirements of the *Aboriginal Heritage Act 1972*.	No Aboriginal heritage sites were recorded within the project area. Surveys also did not identify any new heritage sites. Heritage would be managed under the *Aboriginal Heritage Act 1972*. The proposed RRF would not impact any registered sites. **Not considered to be a key environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
Amenity (noise)	Construction and operation of the facility would increase noise impacts to nearby receptors. The facility would be operating 24 hours a day.	**Department of Environment Regulation:** • Existing noise emissions already exceed the assigned levels by up to 9 dB at one of the nearby residences. The proponent should develop a Noise Management Plan to ensure overall noise emissions from all operations comply with the noise regulations. • Reversing beepers on heavy machinery have been identified by the local community to be a source of noise impact and less intrusive mobile equipment reversing safety systems should be used to minimise impacts. **Public submissions:** • Concerns that noise emissions from the facility would impact nearby residents.	Noise modelling was undertaken for the anaerobic digestion and gasification technologies to predict noise levels generated from the facility. The worst case predicted noise level to surrounding residences is 26 dB from anaerobic digestion and 25 dB from gasification technology. This represents a noise level at least 9 dB below the assigned noise level at receptors and at least 4 dB below the adjusted assigned noise level, which takes into account contributing industry noise. Results show that noise compliance can be achieved at all times. Action has been undertaken to control existing noise exceedances generated by the Landfill Gas Power Station, and noise monitoring will be undertaken to ensure compliance. Noise can be managed under the *Environmental Protection (Noise) Regulations 1997*. **Not considered to be a key environmental factor.**
Amenity (odour)	Odour would be generated from the facility due to the nature of the waste used for processing.	**Department of Environment Regulation:** • The DER recommends that the chosen technology for odour prevention represent best practice, and that odour will be controlled under worst case odour loading. • The use of a biofilter for managing odour at an anaerobic digestion facility is a high risk strategy due to Perth's hot and dry climate. • The existing waste disposal facility has generated a	**Considered to be a key environmental factor and discussed in Sections 3.1.2 and 3.2.2 Amenity (odour) under the relevant technology heading.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		number of odour complaints during warmer months, and the challenge of reducing the impact has not been met by the proponent. **Department of Health:** • DOH supports further investigation to reduce emissions from the greenwaste windrows to ensure ambient odour concentration criteria is met. **Public submissions:** • Odour emissions from the facility are concerning for nearby residents.	

Abbreviations:
DER – Department of Environment Regulation (formerly the Department of Environment and Conservation)
DIA – Department of Indigenous Affairs
DOH – Department of Health
RRF – Resource Recovery Facility
dB - decibels

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*		
	Yes	Specialist surveys and assessment have been undertaken to inform the environmental assessment process. A risk assessment of possible environmental impacts has been conducted and environmental management measures have been proposed to minimise the risk to the environment.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*		
	Yes	The project would contribute to current and future waste management outcomes and provide benefits for future generations without negatively impacting on health, diversity and productivity of the environment.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*		
	Yes	Site specific studies have been undertaken to determine the presence of significant flora, fauna and ecological communities.
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.*		
	Yes	Environmental management costs would be incorporated into planning of the project.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.*		
	Yes	Best practice emission controls would be used to minimise the discharge of air emissions into the environment. The proposal would reduce the amount of waste to landfill and increase the recovery of resources.

Appendix 4

Identified Decision-making Authorities
and
Recommended Environmental Conditions

Identified Decision-making Authorities

Section 44(2) of the EP Act specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Department of Environment Regulation	Works Approval and Licence
2. City of Swan	Building and Planning Approvals

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

RESOURCE RECOVERY FACILITY, RED HILL

Proposal: Resource Recovery Facility at Red Hill.

Proponent: EASTERN METROPOLITAN REGIONAL COUNCIL
Australian Company Number 89 631 866 056

Proponent Address: 1st Floor Ascot Place, 226 Great Eastern Highway
BELMONT WA 6984

Assessment Number: 1844

Report of the Environmental Protection Authority Number: 1487

The proponent may implement the Proposal subject to the implementation conditions and procedures set out below in this Statement.

Note: Schedule 3 provides definitions of terms and phrases used in this statement.

1 Proposal Implementation

1-1 The proponent shall use either anaerobic digestion technology or gasification digestion technology, but not both.

1-2 If anaerobic digestion technology is used when implementing the Proposal, the proponent shall not exceed the authorised extent of physical and operational elements provided for in Table 2 in Schedule 1 of this Statement and shall also ensure the requirements of conditions 2, 3, 4, 5, 6, 7 and 8 of this Statement are met, unless amendments to the Proposal and the authorised extent of the Proposal has been approved under the EP Act.

1-3 If gasification waste digestion technology is used when implementing the Proposal, the proponent shall not exceed the authorised extent of physical and operational elements provided for in Table 2 in Schedule 2 of this Statement and shall also ensure the requirements of conditions 2, 3, 4, 5, 6 and 9 of this Statement are met, unless amendments to the Proposal and the authorised extent of the Proposal has been approved under the EP Act.

2 Contact Details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within 28 days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Time Limit for Proposal Implementation

3-1 The proponent shall not commence implementation of the proposal after the expiration of 5 years from the date of this statement, and any commencement, within this 5 year period, must be substantial.

3-2 Any commencement of implementation of the proposal, within 5 years from the date of this statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of 5 years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.

4-2 The proponent shall submit to the CEO the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance assessment report required by condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

(1) the frequency of compliance reporting;

(2) the approach and timing of compliance assessments;

(3) the retention of compliance assessments;

(4) the method of reporting of potential non-compliances and corrective actions taken;

(5) the table of contents of compliance assessment reports; and

(6) public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.

4-6 The proponent shall submit to the CEO the first compliance assessment report 15 months from the date of issue of this Statement addressing the 12 month period from the date of issue of this

Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

(1) be endorsed by the proponent's Managing Director / General Manager / Chief Executive Officer or a person delegated to sign on the Managing Director's / General Manager's / Chief Executive Officer's behalf;

(2) include a statement as to whether the proponent has complied with the conditions;

(3) identify all potential non-compliances and describe corrective and preventative actions taken;

(4) be made publicly available in accordance with the approved compliance assessment plan; and

(5) indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Public Availability of Data

5-1 Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this statement and for the remainder of the life of the proposal the proponent shall make publically available, in a manner approved by the CEO, all validated environmental data (including sample design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in condition 5-1 contains particulars of:

(1) a secret formula or process; or

(2) confidential commercially sensitive information.

the proponent may submit a request for approval from the CEO to not make this data publically available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publically available.

6 Odour – Existing Operations

6-1 The proponent shall reduce the cumulative odour levels prior to operation of the anaerobic digestion or gasification facility to as low as reasonably practicable.

6-2 The proponent shall prepare a Cumulative Odour Reduction Report.

6-3 The Cumulative Odour Reduction Report required pursuant to condition 6-2 shall:

(1) investigate options and propose measures to reduce the cumulative odour impact from the Red Hill Waste Management Facility by management measures such as relocating the greenwaste windrows; and

(2) provide a re-run of the model (SLR Consulting Australia 2012 '*Resource Recovery Facility: Odour Impact Assessment for Lot 8 (Site E) Toodyay Road*' Report) to demonstrate that the chosen measures from 6-3(1) provides an overall improvement in predicted cumulative odour impacts,

to the satisfaction of the CEO on advice of the DER.

6-4 Prior to operation of the anaerobic digestion or gasification facility the proponent shall implement management measures approved by the CEO to meet condition 6-1.

Should the option be anaerobic digestion, then condition 7 and 8 applies.

7 Odour Control System

7-1 The proponent shall ensure that maximum odour emissions from the anaerobic digestion facility are less than those listed in Column 3 of Table 2 in Schedule 1.

7-2 The proponent shall commission an independent peer review of the detailed design of the total odour control system, prior to submission of a Works Approval, that addresses:

(1) building orientation (shielding of openings from prevailing winds);

(2) sealing of the building to minimise fugitive emissions;

(3) location of extraction points, ducting and fans, and performance specification of the air collection network within the building;

(4) humidification system in the building and at the air inlet of the biofilter;

(5) biofilter surface irrigation system;

(6) degree of automation of the monitoring/control system for critical parameters such as temperature, relative humidity, volumetric flow of the air at the inlet of the biofilter as well as the back-pressure, and the temperature and moisture content of the biofilter media;

(7) biofilter type (open, covered or enclosed) and design (suitability for Western Australia's hot and dry climate);

(8) biofilter size and loading, number of building air changes per hour;

(9) type of biofilter media used;

(10) redundancy incorporated in the design;

(11) the robustness of the facility design and operational protocols to achieve (or better) the authorised extent in Schedule 1;

(12) the verification / monitoring required to demonstrate compliance with the authorised extent in Schedule 1; and

(13) the technology suppliers warranty with respect to achieving the authorised extent in Schedule 1,

to the requirements of the CEO.

The peer review should have particular emphasis on the design, process control, management, and maintenance of the biofilter.

7-3 The proponent shall submit a copy of the peer review report required by condition 7-2 to the DER with the application for the Works Approval.

8 Air Quality

8-1 The proponent shall ensure that emissions from the anaerobic digestion facility are as low as reasonably practicable.

8-2 The proponent shall prepare an Air Quality Report.

8-3 The Air Quality Report required pursuant to condition 8-2 shall:

(1) benchmark the emissions for all criteria pollutants from the chosen anaerobic digestion technology against best practice;

(2) set out emission rates for all the sources;

(3) address normal operations, start up, shut down, and equipment failure; and

(4) provide a rerun of the model (Synergetics 2012 *'Air Quality dispersion modelling of the proposed Resource Recovery Facility (RRF) at Red Hill Waste Management Facility – Location RRF on Lot 8, Toodyay Road – for Eastern Metropolitan Regional Council'* Report),

to the satisfaction of the CEO on advice of the DER.

8-4 The proponent shall submit the Air Quality Report required by condition 8-2 to the DER with the application for the Works Approval.

<u>Should the option be gasification, then condition 9 applies.</u>

9 Gasification Technology

9-1 The proponent shall ensure that the gasification technology to be implemented is consistent with the EPA and the Waste Authority's strategic advice ('*Environmental and Health Performance of Waste to Energy Technologies*: Report No. 1468' under section 16(e) of the *Environmental Protection Act 1986*).

9-2 The proponent shall prepare and submit documentation that demonstrates the chosen gasification technology:

(1) uses only components that have operated reliably elsewhere;

(2) can operate well within emission standards equal to the 'Directive 2000/76/EC of the European Parliament and of the Council (4 December 2000)';

(3) uses only components that have a successful track record in treating the waste streams proposed;

(4) has operated at a similar scale to that proposed; and

(5) has a configuration of components that has been demonstrated elsewhere,

to the satisfaction of the CEO on advice of the DER.

9-3 The proponent shall commission an independent peer review, to provide comment on the validity of the documentation prepared for condition 9-2 to demonstrate the chosen gasification technology meets points (1), (2), (3), (4), and (5) of condition 9-2 to the satisfaction of the CEO on advice of the DER.

9-4 The proponent shall submit a copy of the documentation required by condition 9-2 and the peer review required by 9-3 to the DER with the application for the Works Approval.

Notes

The following notes are provided for information and do not form a part of the implementation conditions of the Statement:

- The proponent for the time being nominated by the Minister for Environment under section 38(6) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal unless and until that nomination has been revoked and another person is nominated.

- If the person nominated by the Minister, ceases to have responsibility for the proposal, that person is required to provide written notice to the Environmental Protection Authority of its intention to relinquish responsibility for the proposal and the name of the person to whom responsibility for the proposal will pass or has passed. The Minister for Environment may revoke a nomination made under section 38(6) of the *Environmental Protection Act 1986* and nominate another person.

- To initiate a change of proponent, the nominated proponent and proposed proponent are required to complete and submit *Post Assessment Form 1 – Application to Change Nominated Proponent.*

- The General Manager of the Office of the Environmental Protection Authority was the Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986* at the time the Statement was signed by the Minister for Environment.

ANAEROBIC DIGESTION OPTION

Schedule 1

Table 1: Summary of the Proposal

Proposal Title	EMRC Resource Recovery Facility
Short Description	The proponent proposes to construct and operate a resource recovery facility for the processing of waste to produce compost and biogas using anaerobic digestion technology. The biogas would be burnt in gas engines to produce electricity.

Table 2: Location and authorised extent of physical and operational elements

Element	Location	Authorised Extent
Resource Recovery Facility and associated infrastructure	Site E, Red Hill (Figure 1)	Clearing of up to 0.85 ha of remnant vegetation.
Waste types accepted for processing:		The organic fraction of municipal solid waste from either a source separated collection system or from the rubbish bin using the mechanical separation designed into the facility.
Excluded wastes: • Wastes with heavy metal concentrations greater than the requirements for Class III landfill • 'Scheduled' wastes such as polychlorinated biphenyls and organochlorines • Asbestos • Highly corrosive or toxic liquids or gases such as strong acids or chlorine or fluorine • Radioactive waste • Explosives • Materials already deposited in the onsite landfill		Not to be processed.
Quantity of waste to be processed:		Up to 150,000 tpa.
Odour concentration emitted from biofilter:		Less than 500 odour units.
Building under negative pressure:		Waste may only be accepted while the building is being maintained under negative pressure.
Fast Acting Doors:		Waste may only be accepted while the Fast Acting Doors are fully operational.

Figures

Figure 1 Development envelope and locations of sensitive receptors surrounding the Red Hill Waste Management Facility

GASIFICATION OPTION

Schedule 2

Table 1: Summary of the Proposal

Proposal Title	EMRC Resource Recovery Facility
Short Description	The proponent proposes to construct and operate a resource recovery facility for the processing of waste to produce steam using gasification technology. The steam would be used in a steam turbine to produce electricity.

Table 2: Location and authorised extent of physical and operational elements

Element	Location	Authorised Extent
Resource Recovery Facility and associated infrastructure	Site E, Red Hill (Figure 1)	Clearing of up to 0.85 ha of remnant vegetation.
Waste types accepted for processing:		Municipal solid waste from the rubbish or residual bins of a two bin or three bin collection system.
Excluded wastes: • Wastes with heavy metal concentrations greater than the requirements for Class III landfill • 'Scheduled' wastes such as polychlorinated biphenyls and organochlorines • Asbestos • Highly corrosive or toxic liquids or gases such as strong acids or chlorine or fluorine • Radioactive waste • Explosives • Materials already deposited in the onsite landfill		Not to be processed.
Quantity of waste to be processed:		Up to 200,000 tpa.

Figures

Figure 1 Development envelope and locations of sensitive receptors surrounding the Red Hill Waste Management Facility

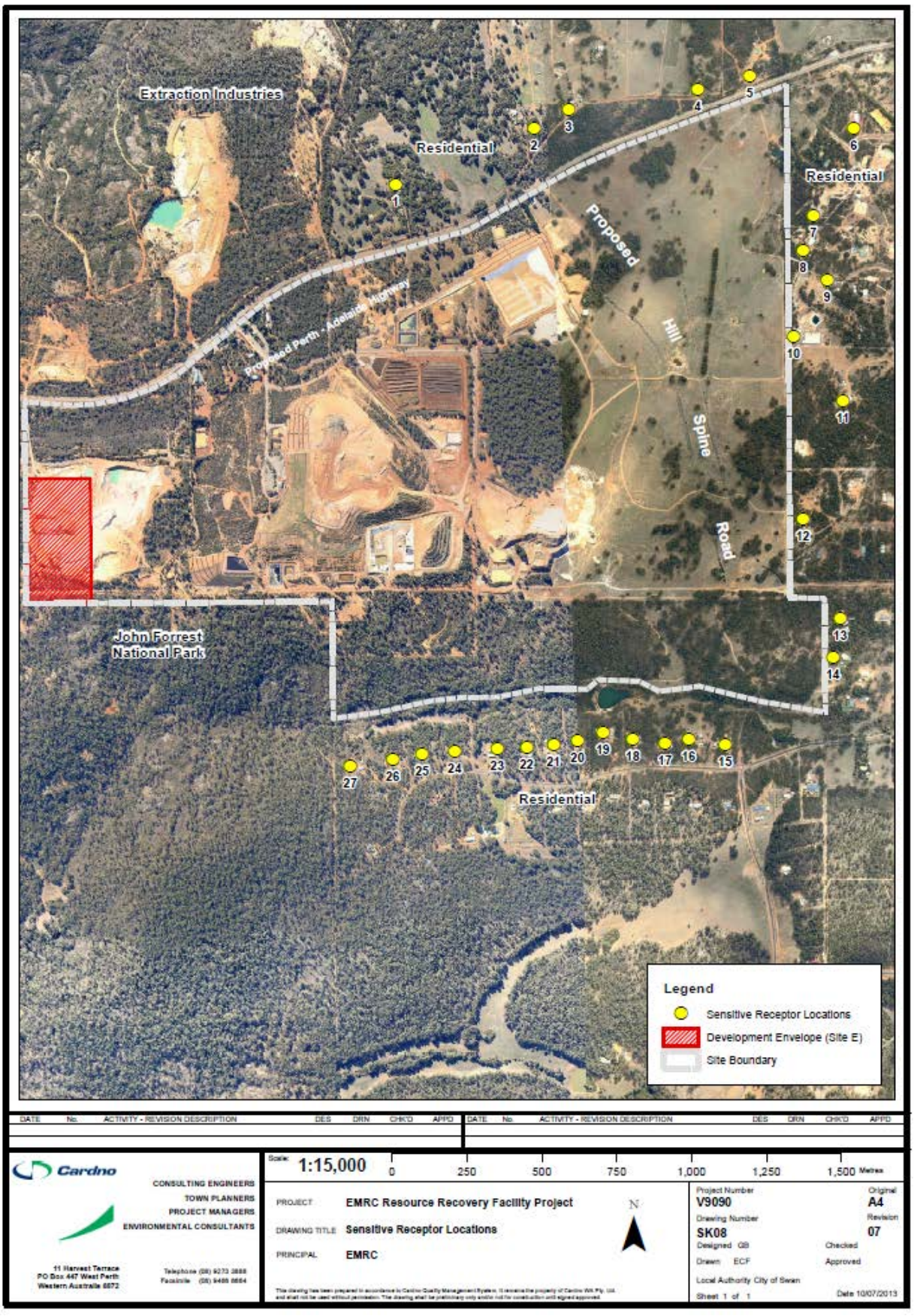

Figure 1: Development envelope and locations of sensitive receptors surrounding the Red Hill Waste Management Facility

Schedule 3

Term or Phrase	Definition
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or their delegate.
Criteria pollutants	Key air pollutants set by the National Environment Protection Measure for Ambient Air Quality, which includes carbon monoxide, ozone, sulphur dioxide, nitrogen dioxide, lead and particles (PM_{10}).
DER	Department of Environment Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
ha	hectare
Odour unit	The concentration of odorant(s) at standard conditions that elicits a physiological response from a panel (detection threshold) equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
tpa	Tonnes per annum

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions