APPENDICES

Executive Summary, Geotechnical Factual Report

Prepared by Jacobs

Geotechnical Factual Report

JACOBS

Executive Summary

Jacobs has been engaged by Australian Paper to undertake a geotechnical investigation and provide a geotechnical factual report for the Maryvale Paper Energy from Waste Feasibility Project.

The Maryvale Paper Mill is one of Victoria's largest natural gas users and has a high reliance on purchased electricity. In the backdrop of dynamic energy and waste markets, Australian Paper has hastened the need for the development of a firm business case for the project through undertaking a robust and 'bankable' feasibility assessment.

The objective of this geotechnical factual report, which includes a site investigation and laboratory testing programme, is to confirm and characterise the subsurface ground conditions of the feasibility project option three site.

Seven borehole including two groundwater monitoring well were drilled across the site.

The subsurface layers observed across the site generally consist of;

- Topsoil and fill material generally comprising silty clay low to high plasticity, a thickness of 0.1 to 0.3 m and a depth of 0.0 to 0.3 m bgl; overlying
- Fine grained soils consisting of silty clay, sandy clay and gravelly clay of low to high plasticity, a thickness 0.3 to 5.7 m and a depth of 0.1 to 16.2 m; interbedded with
- Sands consisting of fine to coarse grained clayey and silty sand, clean sand and gravelly sand 0.3 to 16.7 m thickness and a depth of 0.2 to 25.2 m bgl; interbedded with
- Gravels consisting of fine to medium grained sandy gravel and clean gravel of 0.3 to 3.0 m thickness and a depth of 7.1 to 16.0 m bgl.

Two groundwater monitoring wells were installed in boreholes BH05 and BH08 to 20.0 m bgl. The groundwater level in borehole BH05 was measured at 19.35 m bgl (32.23 m Mill Datum) on 20 December 2017. The groundwater well installed in borehole BH08 was recorded as dry on 20 December 2017 (i.e. deeper than 36 m Mill Datum).

Executive Summary, Waste Composition and Tonnage

Modelling Evaluation – April 2018, prepared by Jacobs

Executive Summary

This report is intended to provide an initial estimation of the likely tonnage, composition and Net Calorific Value (NCV) of waste arriving at the proposed Maryvale Energy from Waste (EfW) facility over a period of time (to 2032). It is based on information that was immediately available to the project team in terms of information supplied by Australian Paper (AP), publically available information, and information requested during the early stages of the development of the Feasibility Study (FS).

Regions for Waste

Waste feedstock for the project will be derived from a number of councils sources, which at the time of modelling this report is unknown as Councils will be entering a procurement process estimated to start mid-2018. In order to model representative councils, a selection was made based on locality to potential transfer / bulking stations for onward transport to Maryvale. The proposed Council areas of origin of the waste feedstock are shown in Table 1 below. Note that these are the initial Council areas selected based on locality, with no consideration given to availability of waste.

Table 1 : List of Initial Councils Selected

Region	Councils initially selected	
Gippsland	• Bass • Baw Baw • East Gippsland	• Latrobe • South Gippsland • Wellington
Metropolitan Melbourne (the South East Melbourne Councils)	• Bayside • Boroondara • Cardinia • Casey • Frankston • Glen Eira • Greater Dandenong	• Kingston • Knox • Manningham • Maroondah • Monash • Stonnington • Whitehorse
Dynon Road	• Hobsons Bay • Maribyrnong • Melbourne	• Moonee • Port Phillip • Yarra

Note that no engagement has been undertaken with these councils as part of this assessment, and it is intended to be indicative only of the availability of the tonnage and the likely composition of the waste from these regions. It is not expected that all of these councils will participate in the joint procurement processes, nor potentially that all waste generated by each council would be available to the EfW plant. However, they do provide an assessment of tonnage availability and, where data allowed, likely composition.

Current Waste Tonnages and Composition

Table 2 provides Kerbside Municipal Solid Waste (MSW) waste tonnages for each of the above regions for 2015/16 (data derived from the Sustainability Victoria Waste Data Portal) and estimated Kerbside MSW data based on current growth projections for 2020/21 using the Victorian Local Government Annual Waste Services Report (VLGAWSR) data. These tonnages were compiled to achieve an appropriate level of feedstock at year of plant opening (when combined with Commercial and Industrial (C&I) waste.

Waste Composition and Tonnage - Modelling Evaluation

Table 2 : Waste Tonnages for Kerbside MSW for Gippsland, South East Melbourne and Dynon Road (selected Councils only)

Council area	Kerbside MSW (tonnes)	
	2015/16	2020/21
South East Melbourne	380,023	416,485
Gippsland	50,867	55,317
Dynon Road	119,860	138,231
Totals	**550,930**	**610,034**

The future waste tonnages and compositions were modelled using the naus waste modelling platform – an online waste modelling tool. For modelling purposes, two scenarios were developed with 10 options for each scenario. The two scenarios are shown in Table 3 below. The two scenarios are termed B1 and B2 and relate to the tonnage sourced from the three different regions. Scenario B1 is based on 70% Kerbside MSW and 30% C&I split of the total tonnage available from the selected councils.

Scenario B2 is based on 80% Kerbside MSW and 20% C&I split of waste, and was developed based on:

- Capturing all tonnage available in Gippsland;
- Targeting 70ktpa Kerbside MSW from Dynon Road; and
- Making up the remainder needed (for 80% MSW split) from SE Melbourne.

Table 3 : Scenarios B1 and B2 - Kerbside MSW Tonnages and Percentages from Targeted Areas

Area	Scenario B1 Details Kerbside MSW	Scenario B2 Details for Kerbside MSW
Gippsland	6 LGAs 100% Kerbside MSW Target of 55,000 tonnes	6 LGAs 100% Kerbside MSW Target of 55,000 tonnes
South East Melbourne	14 LGAs 91% of Kerbside MSW Target of 400,000	14 LGAs 90% Kerbside MSW Target of 395,000 tonnes
Dynon Road	No waste targeted	6 LGAs 51% Kerbside MSW Target of 70,000 tonnes

For naus modelling of the Commercial and Industrial (C&I) waste, only the largest five waste producing target sectors were included for the C&I sector. These were:

- Manufacturing;
- Retail Trade;
- Wholesale Trade;

- Education and Training; and
- Healthcare and Social Assistance.

These sectors produce an estimated 55% of the C&I waste across the Council areas selected. Shown in Table 4 below are the estimated tonnages available for C&I waste for the selected Council areas.

Table 4 : Waste Tonnages for C&I, Gippsland and South East Melbourne and Dynon Road (selected Councils only)

Council area	2015/16 Estimated Target C&I (tonnes)	2020/21 Estimated Target C&I (tonnes)
South East Melbourne	280,649	297,861
Gippsland	26,989	28,644
Dynon Road	124,503	132,138
Totals	**432,142**	**458,644**

Jacobs used the compositional data from the HRL report, the Statewide Garbage Bin Audit and various council compositional audits to create a composition table for the Gippsland, South East Melbourne and Dynon Road Councils for Kerbside MSW to use as an input for the naus model. Composition of C&I waste varies depending on the economic activities that are present in each local government area. The analysis of the C&I sector the following information was used:

- www.economicprofile.com.au;
- http://economy.id.com.au/;
- Waste flows in the Victorian commercial sector: Final report, Sustainability Victoria (Sustainable Resource Use), 2013;
- C&I South East Melbourne Disposal Market Analysis, A Submission to Australian Paper, MRA, 18 August 2017.

The composition values for C&I waste differ slightly for each Council and region due to the difference in commercial and industrial activities present in each.

Waste Modelling - Options

In order to forecast the change in composition and volume (tonnage) of waste over time; 20 models were run based on the different options for Scenarios B1 and B2. These options are listed in Table 5 and are based on assumptions of possible changes in waste stream tonnages, characteristics or population growth changes (higher or lower than predicted) as a result of a range of system and policy changes.

Table 5 : Options for Modelling of Scenarios B1 and B2

Option	Description
Baseline	Baseline tonnages at 2021

Waste Composition and Tonnage - Modelling Evaluation

Option	Description
Waste Stream W1	Widespread introduction of kerbside organics collections (including food and garden organics). Increase in organics processing capacity at public drop off facilities.
Waste Stream W2	Ban on E-waste to landfill
Waste Stream W3	New infrastructure built to increase capacity for recycling more materials prior to going to landfill.
Waste Stream W4	Introduction of container deposit scheme and improved systems/increase capacity for plastic recycling
Waste Stream W5	Combination of Options W1, W2 and W3 all occurring
Sensitivity Option G6	Growth projection 2% above baseline in 2018/19
Sensitivity Option G7	Growth projection 2% below baseline in 2018/19
Sensitivity Option G8	Growth projection 1% above baseline in 2018/19
Sensitivity Option G9	Growth projection 1% below baseline in 2018/19

Waste Tonnage Modelling Outcomes-

From the 20 modelled scenarios and options there are scenarios and options that have a larger impact than others. Table 6 below provides a list of the scenarios and options and a summary of their impact on tonnage at years 2020/21 and 2025/26. Also listed is the waste tonnage at year 2032/33 (the last year modelled) with the options ranked according to the tonnage at year 2032/33 (1 being lowest the lowest tonnage). Note that Option G6 and G7 are not included in this table, as the outputs from modelling of the tonnages showed that a 2% increase or decrease in population growth is unrealistic.

Waste Composition and Tonnage - Modelling Evaluation

Table 6 : Summary of Waste Tonnage Modelling Scenarios and Options

Option	Scenario	Impact on Kerbside MSW tonnage at 2020/21	Impact on C&I tonnage at 2025/26	Tonnage at 2032/33	Influence rank for Scenarios and Options
Baseline	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 1 Introduction of increase Organic collection	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 2 Ban on E-Waste	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 3 New infrastructure for Recycling	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 4 - CDS Scheme	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 5 - Combination of Options 1, 2 and 3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 8 - Option 5 with growth 1% above predicted	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 9 - Option 5 with growth 1% below predicted	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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- If Option 5 does occur, a source of additional waste tonnage will need to be considered;
- There is the possibility to consider options to increase waste from the C&I waste sector of South East Melbourne;
- There may also be the ability to increase the amount for MSW and C&I waste from the Dynon Road area; and
- Evaluate the options in detail during the procurement phase.

Waste Fuel Quality Parameter Results

Waste Net Calorific Value Forecast

[redacted]

Moisture

The modelling results show that the average waste moisture content for the two scenarios B1 and B2 and various options is estimated to vary between 41-45% moisture content which is not considered a major change from a waste combustion perspective, and so does not pose a challenge or risk to the plant design. The changes in moisture content on a scenario and option breakdown basis are essentially the inverse impact as those observed for NCV, which is to be expected, as when moisture content increases, NCV will decrease, and vice versa.

Ash

The range of ash contents that are predicted are between 14.4% and 17.0% of the incoming waste volume, whereas in Europe figures of the order of 20-30% are not uncommon. In terms of an annual volume of ash generated (summing annual IBA and APC residues), for 650,000 tons of waste processed, the residues may vary between 93,000-110,000 tons per annum, excluding moisture and spent residues introduced in the flue gas cleaning process.

The increase in ash levels observed under the various future scenarios and options is not considered a significant impact to the plant design as the EPC contract specifies that the plant shall be capable of handling inert levels up to 32 %. A more significant impact will be the disposal costs of the additional BA and APC residues.

Chlorine

The modelled range of total chlorine level is from 0.35-0.40% are considered low when compared with other western countries municipal waste feedstocks which are typically 0.6-1.0% total chlorine.

In the scenarios and options where organics were reduced (Scenario B1 and B2 Option 1), the chlorine content is increased, as the organics have lower levels of chlorine. For the other scenarios and options involving reduction in e-waste, plastics and papers (Scenarios B1 and B2 options 2, 3, 4), these all result in a decrease in chlorine content, as they are components with above the chlorine levels of the average mixed waste. Option 5 in Scenarios B1 and B2 includes a combination of organics removal and increased recycling, (Options 1, 2 and 3), and it is evident that the removal of recyclables outweighs the effect of organic removal, such that a net chlorine content reduction is observed.

Waste Data Quality

The waste composition data available to inform the feasibility study is generally of poor quality, a fact acknowledged by the Melbourne Waste and Resource Recovery Group (MWRRG), prompting it to commission its own study in advance of its procurement of waste disposal services. In addition, NCVs for individual waste components representative of Victorian waste are not available and have been inferred from other regions.

As such AP has commissioned HRL to gather and present better waste compositional data, including analysis of NCV, from multiple locations in Victoria over multiple seasons. This data will be used when available to provide potential technology providers with a more accurate projection of the NCV of the waste feedstock (likely in Q2 2018, and then as seasonal studies are completed).

As a measure to provide additional confidence over the potential impacts of waste compositional, volume and fuel quality parameter changes of the waste, Jacobs would recommend that selected scenarios and options from the above analyses are input as sensitivity cases into the project financial model, to estimate the NPV/IRR impact on the project. In particular, Options 1, 3, 4 and 5 are expected to have the most significant economic impact on the project (for both Scenarios B1 and B2). Changes in waste growth rate expectations should also be modelled in the financial model (Options 6 to 9), but these do not have an impact on the waste composition

Appendix 3

Executive Summary, Traffic Impact Assessment

Prepared by Jacobs

JACOBS

Executive Summary

Paper Australia Pty Ltd (Australian Paper or AP) is conducting a Feasibility Study to determine the viability of constructing and operating an Energy from Waste (EfW) plant. The EfW will be located within AP's existing Maryvale Pulp and Paper Mill site (Mill), approximately seven kilometres north of Morwell in the Latrobe Valley. Part of the Feasibility Study includes preparing assessments and documentation for applications to government agencies for requisite statutory approvals. Jacobs Group (Australia) Pty Ltd (Jacobs) has been engaged by AP to undertake a Traffic Impact Assessment (TIA) report as part of the Planning Permit application for the EfW plant.

During the course of the Feasibility Study and approvals applications, AP has conducted extensive consultation with a wide range of stakeholders, including the community groups and government agencies/departments. Consultation with VicRoads and Latrobe City Council led to the scoping of this Traffic Impact Assessment (TIA) which forms part of the Planning Permit application for the project. Prior to conducting the TIA, the scope was agreed with VicRoads and council to ensure that the relevant issues were analysed and assessed.

This TIA details the current traffic conditions and the expected traffic generation and distribution during the peak construction phase and the operational phase of the proposed project, as well as the potential traffic impacts when the site is fully operational ten years post construction of the EfW development at the nominated key intersections. The TIA assessed the potential impacts of the traffic for the project using SIDRA software to analyse traffic generation/congestion. Additionally the TIA assessed the 'swept paths' of the proposed A-Double trucks, where the envelope 'swept' out by the truck body was reviewed to determine if the truck can be accommodated within the constraints of the existing road network.

Of particular interest regarding the Planning Permit application is the road network from the Princes Freeway to/from the proposed EfW plant at the AP Mill. The road network consists of the route from Princes Freeway, Tramway Road, Princes Drive, Alexanders Road, Old Melbourne Road, Maryvale Road, Traralgon West Road and two private AP roads.

The traffic generation/congestion analysis using the SIDRA software analysed traffic operational performance at midblock sections and intersections, comparing the existing scenario of current usage (background traffic including existing AP Mill traffic) with the proposed scenario of the EfW plant's construction and operation. The TIA also summarises the swept path analysis undertaken at key intersections along the proposed access routes for the largest vehicle planned to be used for deliveries to the proposed facility – this is proposed to be an A-Double truck and two possible configurations ("Truck A" and "Truck B") have been assessed.

The "Truck A" configuration (29.8m long at 75.5 tonne Gross Vehicle Mass (GVM)) is currently approved for this route. The Truck B configuration (30.9m long at 85.5t GVM) has also been assessed for this route as it provides additional payload capacity enabling a reduction in average A-Double truck volumes from 32 per day to 26 per day. This is consistent with the development of the Higher Productivity Freight Vehicle (HPFV) network outlined in the Victorian freight plan "Delivering the Goods"[1]. Truck B is designed to meet the parameters for the Victorian HPFV A-Double network Reference Vehicle 1 and will benefit from the bridge strengthening program along the Princess Freeway to Morwell, which is currently in progress.[2]

The findings of the TIA indicate that the potential impacts of the proposed project in terms of traffic volumes and swept paths is minimal and that the project will not lead to significant impacts on the road network.

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[1] https://transport.vic.gov.au/Ports-and-freight/Freight-Victoria

[2] https://www.vicroads.vic.gov.au/newsmedia/2018/bridge-strengthening-works-happening-along-the-princes-highway

Ministerial reasons for decision under Environment Effects Act 1978

REFERRAL NUMBER 2018R01

Attachment 2

For Public Notice via Internet

REASONS FOR DECISION UNDER *ENVIRONMENT EFFECTS ACT 1978*

Project name: **Australian Paper Energy from Waste**

Proponent: **Australian Paper Pty. Ltd.**

Description of Project:

Australian Paper Pty Ltd (the proponent) proposes to install an 'Energy from Waste' Plant at the existing Australian Paper Maryvale Pulp and Paper Mill Site located in the Latrobe Valley. The project will alter the baseload power source from a reliance on natural gas and grid-bought electricity and change to the predominant baseload power to be generated from Moving Grate 'Energy from Waste' model (EfW). This type of incineration is undertaken by the movement of waste via a moving grate for incineration. Municipal Solid Waste and Commercial and Industrial waste will be used as fuel, which will be incinerated to create electricity and steam. The project infrastructure includes:

- Site roads and weighbridges
- Waste reception, tipping hall and bunker where waste is delivered stored and mixed respectively
- Furnaces for combustion of residual waste
- Energy recovery boiler/steam generators
- Continuous emissions monitoring system
- Condensing extraction steam turbo-generator of circa 70 MWe maximum generation capacity without steam extraction
- EfW plant buildings and structures
- Laydown and minor access roads on the existing AP Maryvale Site
- A black start emergency diesel generator of capacity approximately 6 MWe
- An emergency shutdown diesel generator of capacity circa 200 kWe

Decision:

The Minister for Planning has decided that an Environment Effects Statement (EES) is not required for the Australian Paper Energy from Waste Project, as described in the referral accepted on 22 March 2018.

Reasons for Decision:

- The project has potential for effects particularly in relation to air emissions, greenhouse gas emissions and waste, although these are unlikely to be significant. Existing statutory processes, in particular the Works Approval process under the *Environment Protect Act 1970*, will readily enable appropriate examination of both these effects and necessary mitigation measures.
- The proponent will be required to demonstrate that they have identified best practice in relation to energy use and greenhouse gas (GHG) emissions associated with the proposal as part of the EPA Works Approval process. A GHG Action Plan will need to be implemented in accordance with EPA's 'Protocol for Environmental Management: GHG and Energy Efficiency in Industry'.
- Residual effects on amenity (such as noise and odour) and cultural heritage are also unlikely to be significant and can be readily addressed via existing statutory requirements.
- The effects on native vegetation and other biodiversity values are minor due to the siting of the project on developed land with very limited ecological values.

Date of Decision: **2 May 2018**

Appendix 5

EPA Works Approval Summary

Australian Paper waste to energy works approval decision

Environment Protection Authority Victoria

Publication 1717 November 2018

Summary report

Paper Australia Pty Ltd (trading as Australian Paper) has proposed construction of a 'moving grate' waste to energy facility at its Maryvale site, in Victoria's Latrobe Valley (Figure 1). The facility will process residual municipal solid waste, and industrial and commercial waste.

The proposed facility requires a works approval from the Environment Protection Authority Victoria (EPA) under the *Environment Protection Act 1970* (the Act). A works approval is required for industrial and waste management activities that have the potential for significant environmental impact. The approval permits the construction of a plant, the installation of equipment or the modification of processes.

On 24 April 2018, EPA received an application for works approval from Australian Paper. EPA requested additional information before accepting the application as complete. On 25 May 2018, EPA received the updated application and commenced its assessment. On the statutory decision due date of 28 November 2018, EPA approved the works proposal, subject to conditions.

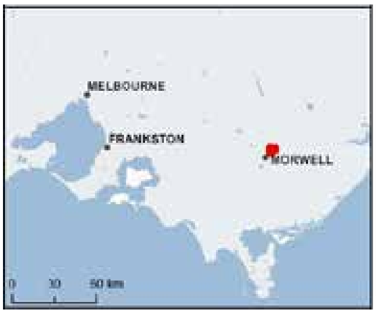

Figure 1: Map showing the location of the Australian paper facility (source – Australian Paper Works Approval Application, Jacobs 2018).

This publication summarises the key aspects of EPA's assessment and the decision-making process for the works approval application. The full works approval application assessment report is available via EPA's website.

EPA decision on the works approval application

On 28 November 2018, EPA approved the works approval application, subject to conditions.

What was proposed in the works approval application?

Australian Paper proposed building and operating a waste to energy facility adjacent to the pulp and paper mill on its Maryvale site. The proposed facility will be capable of producing steam for the operation of the mill, and electricity for the mill or for export to the grid. The facility will thermally treat approximately 650,000 tonnes (+/- 10%) per year of residual municipal solid waste and industrial and commercial waste.

Activities to follow works approval

Activities that Australian Paper will need to undertake following works approval include:

- obtaining other permits (for example, a planning permit)
- completion of final detailed designs
- securing waste contracts consistent with the works approval conditions
- a construction phase (approximately 2 years)
- a commissioning phase
- obtaining an EPA operating licence

The facility has an expected operational lifetime of 25-years.

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VICTORIA State Government
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Australian Paper waste to energy works approval decision

Works approval application process

The diagram below shows some of the key steps in the works approval application and assessment process.

Background: waste to energy

There are over 1,600 operational waste to energy facilities globally. Modern, well-run facilities are commonly found throughout countries of Europe (Sweden, France, United Kingdom) and East Asia (Japan, South Korea).

The technology generates energy as heat from the combustion of waste materials that would otherwise go to landfill. Heat is converted to steam, which can be used to generate electricity and/or in operational processes.

Victoria has a number of EPA-approved and licensed waste to energy facilities. However, these operate at a smaller scale and use different waste feedstocks from those proposed by Australian Paper.

Works approval application details

Australian Paper's Maryvale paper and pulp mill requires a significant amount of operational steam and energy. In 2016, the mill used 30 MW of electricity and approximately 6.7 PJ (6.7 million GJ) of natural gas (which represents approximately 5 per cent of Victoria's total annual gas consumption). The proposed waste to energy facility would reduce the mill's gas consumption to approximately 2 PJ per year, and generate almost all its electricity needs.

Australian Paper has conducted an international search and shortlisted three contractors with a strong track record of designing, building and commissioning waste to energy facilities which are capable of meeting the European Union's Industrial Emissions Directive and Best Available Techniques requirements.

The proposed design is based on eight equivalent operational facilities in the United Kingdom.

The facility will have capacity to treat a total annual residual waste volume of approximately 650,000 tonnes (+/- 10%), coming from Melbourne and Gippsland. The facility will not treat waste which is prescribed industrial waste, hazardous waste or pre-sorted recycling waste.

Construction is set to commence in November 2019, commissioning to commence in 2022 and project completion expected in 2023.

Proposed key design controls

The proposed key design controls include:

- continuous emission monitoring of pollutants
- continuous monitoring of crucial operating parameters (for example temperature, pollutants in flue gas) to enable optimisation of plant operation (for example waste combustion, energy generation and flue gas treatment efficiency)
- flue gas treatment system optimised to remove acidic gases, heavy metals and complex halogenated compounds (e.g. dioxins and furans)
- hazardous waste and waste that does not comply with waste acceptance criteria to be segregated and rejected

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Australian Paper waste to energy works approval decision

- moving grate combustion process with sufficient temperature, residence time and turbulence to destroy harmful pollutants
- waste bunker and tipping hall operated under negative pressure to capture and prevent escape of odorous gases from waste
- storage of chemicals (such as water treatment chemicals and pollution control chemicals) in an area with containing walls and impervious floor to reduce potential for chemicals to escape into soil, groundwater and surface waters.

EPA assessment process

Relevant legislation and policies

A works approval application is required to comply with the Act and subordinate legislation. Other legislation also needs to be considered, such as the *Climate Change Act 2017*.

The Act, regulations, and state environment protection policies (SEPPs) establish a framework to ensure that waste treatment infrastructure is appropriately located, designed, constructed, operated and managed to minimise risks to the environment and public health.

EPA considers that the following SEPPs and protocols for environmental management are particularly relevant for this proposal:

- SEPP (Waters of Victoria) now SEPP (Waters)
- SEPP (Groundwaters of Victoria) now SEPP (Waters)
- SEPP (Prevention and Management of Contamination of Land)
- SEPP (Air Quality Management)
- The Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry (Publication 824)

Departmental and agency consultation

In assessing the application, EPA consulted with several other departments and agencies including:

- Country Fire Authority
- Department of Environment, Land, Water and Planning
- Department of Health and Human Services
- Gippsland Waste and Resource Recovery Group
- Latrobe City Council
- Latrobe Health Advocate
- Metropolitan Waste and Resource Recovery Group
- Sustainability Victoria
- West Gippsland Catchment Management Authority
- WorkSafe Victoria.

Determination of best practice

The proposed development must meet international best practice. Integrated within the SEPPs is the requirement to meet best practice. This includes '*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*'. In determining best practice, EPA has considered the application against the following international standards:

- European Union – Industrial Emissions Directive
- Best available techniques reference document - incineration

In addition, members of EPA's assessment team inspected operational waste to energy facilities in the United Kingdom, France and across Scandinavia; and met with environmental regulators of these facilities and organisations associated with thermal treatment of municipal solid waste. The team reviewed European directives and member state legislation that govern the approval and oversight of waste to energy facilities.

Community engagement

Engagement by Australian Paper

Australian Paper engaged with stakeholders (including local community and business groups) prior to making its submission, including: focus group meetings held in Traralgon, Morwell and Moe; establishment of an information centre in Morwell; production of stakeholder newsletters; advertising in local newspapers; information booths in Traralgon, Morwell and Moe; and regular updates with the Maryvale Community Consultative Committee.

Australian Paper waste to energy works approval decision

Engagement by EPA

As required by the Act, the works approval application was advertised in newspapers, and communicated on a dedicated EPA webpage and the Engage Victoria website.

There was an extended period of public comment, from 30 May to 6 July 2018, with dedicated public information sessions held on 5, 6 and 19 June.

EPA received 115 submissions during the consultation period. Of the 109 submissions received though Engage Victoria, 84 supported the application, 8 supported it subject to conditions and 8 objected to it (9 submissions did not specify an opinion).

Following a review of these responses, EPA organised a community conference, held on 25 July 2018 in Traralgon. The conference, hosted by an independent chair, provided an additional opportunity for the community to raise concerns and, where possible, attempt to reach a just resolution of them, consistent with section 20B of the EP Act.

The chair subsequently published recommendations, which have been considered as part of EPA's determination.

EPA assessment

What did EPA assess?

This section summarises the findings relating to the most important issues as part of EPA's assessment. For more information on how EPA assessed all the key issues of concern, see Section 6 of the full report.

Regulatory compliance

EPA has determined that the proposal:

- is protective of human health and the environment
- is consistent with the SEPPs
- meets the Environment Protection Principles of the Act
- is consistent with the Statewide Waste and Resource Recovery Infrastructure Plan and two relevant regional plans
- will contribute to meeting waste disposal needs for Victoria, is compliant with the relevant resource recovery implementation, plans and does not undermine recycling
- has comprehensively considered potential climate change impacts in accordance with EPA's obligations
- Australian Paper meets the 'fit and proper person' requirement of the Act.

Key issues

Air emissions

Why is it a concern?

Combustion of waste generates emissions of a range of air pollutants. EPA received a number of submissions raising concerns specifically about the potential environmental and health impacts of emissions from the facility. Air quality modelling was performed according to the requirements of the SEPP.

Conclusions of the assessment

The application complied with the requirement to achieve best practice and continuous improvement for all relevant indicators and reductions to the 'maximum extent achievable' for hazardous air pollutants.

How will it be managed?

There will be a flue gas treatment system and best practice controls will achieve compliance with the SEPP.

There will be continuous monitoring of air pollutants, with the results governing treatment of the flue gas to achieve best practice emission control. EPA will require monitoring data to be made publicly available.

Best practice

Why is it a concern?

Best practice is a requirement of the SEPPs. New sources of emissions must apply best practice to manage those emissions. EPA considers best practice one of the most important requirements of the policy as changes over time will place stricter controls and requirements on new sources of emissions.

Conclusions of the assessment

Waste to energy is an established disposal method that is used globally, with international best practice standards available and used in this assessment. Accordingly, the potential environmental risks and impacts are well known, with evolving improvements in containment, control and monitoring technologies. The European Union's Industrial Emissions

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Australian Paper waste to energy works approval decision

Directive (IED 2010/75/ EU) and the Best Available Techniques reference document, are key compliance policy documents that the facility will need to meet. These directives and policies are regularly updated to reflect international best practice. The applicant has committed to comply with international best practice.

How will it be managed?

The requirements of EPA approval conditions will ensure the operation of the plant is managed in accordance with best practice.

Health impacts

Why is it a concern?

Protecting human health is integral to the intent of the Act, subordinate legislation and policies. The EPA assessment process specifically considers the potential impacts to human health and how these impacts are controlled.

To supplement its application Australian Paper submitted a health impact assessment.

In addition to an assessment of the works approval application, EPA commissioned an independent literature review of publicly available research on human health impacts from air emissions from modern waste to energy facilities. The objective was to determine the possible impacts on the health of residents living close to the facility and across the Latrobe Valley region.

Conclusions of the assessment

The EPA review of literature concluded that there was little potential for health impacts or risk from exposure to emissions from modern waste to energy facilities, noting the few studies available.

The contribution of emissions from the proposed activity were found to be very low and the technology of the facility design combined with conditions of operation, capable of ensuring protection of human health.

How will it be managed?

Management will largely be through the implementation of the key design controls and operation of the facility to meet Best Practice. Conditions of EPA approvals will require routine review of the operations and emissions to ensure the necessary protections of health.

Waste feedstock

Why is it a concern?

It is critically important to understand the waste that is targeted and received at the site to ensure that the facility has the capability of treating that waste. The composition of kerbside collected waste varies both over time and across councils. The design of the facility needs to be adjusted to account for this variation.

If waste at the site is detected via onsite operational controls (e.g. visual inspection) to contain material unsuitable for combustion, that waste will be quarantined and handled in accordance with Victorian waste regulations.

Conclusions of the assessment

Twelve months of Victorian waste composition data was compared to waste composition data from the operational facility in Suffolk (UK). It was demonstrated that the wastes are comparable.

Before the final detailed design are completed, further investigation and verification of targeted kerbside waste will be performed to ensure it is fully understood.

How will it be managed?

During the operation of the plant Australian Paper will be required to perform regular audits on the waste feedstock to ensure that the facility is operated in accordance with EPA approvals.

Waste hierarchy

Why is it a concern?

The waste hierarchy is one of the eleven principles of the Environment Protection Act. The EPA needs to give consideration of how an application and a decision aligns with these principles.

Conclusions of the assessment

The waste hierarchy preferences recovery of energy from waste after recycling as a method for managing waste over sending the waste to landfill. Landfilling is currently the dominant option available in Victoria for residual waste. This proposal targets only residual wastes and so does not undermine recycling options.

Australian Paper waste to energy works approval decision

At the time of approving this works approval, it is not considered feasible to viably recover material from the residual waste feedstock prior to burning the waste.

How will it be managed?

The EPA has required the facility maintains capacity to install a system capable of higher waste recovery and an investigation reviewing the feasibility of building such a pre-sort facility every 5 years.

Other issues assessed

Waste generated by the facility

Incineration creates three types of ash: incinerator bottom ash, boiler ash, and air pollution control residue (also known as fly ash). Incinerator bottom ash will be stored onsite pending reuse or disposal. Boiler and fly ash will be stored in a silo pending treatment prior to being disposed of in a suitable landfill. Any waste generated by the facility will need to be disposed of in accordance with the framework of the Act, including the Environment Protection (Industrial Waste Resource) Regulations 2009. Any reuse will require EPA approval.

Wastewater

EPA has investigated the capability of the site's existing system and has concluded that it can treat the additional wastewater generated by the new facility. The existing wastewater treatment system can accommodate the additional wastewater without exceeding the EPA licence discharge limits.

Energy use and greenhouse gas emissions

EPA has determined that the proposal will result in a net reduction in greenhouse gas emissions through its lifetime. This takes into consideration the offset of GHG emissions from the current energy use at the Australian Paper mill and through the diversion of waste from landfill.

Noise

Operational noise will meet the noise levels set in the Noise from industry in regional Victoria (publication 1411) guideline at all times. Measurements will be taken during the operation of the facility to confirm that the actual noise of operations reflects the application predictions.

Odour

Controls will be sufficient to reduce the risk of odour beyond the site boundary. The waste bunker will be constantly under negative pressure, with air injected to the combustion chamber to destroy odorous gases.

Land

To enable the construction of the facility, land will need to be cleared on the site. EPA does not regulate land clearing in Victoria. Australian Paper will perform a thorough assessment of potential existing contamination of that land and manage any contaminated material in accordance with Victorian waste regulations.

Groundwater

The facility will be built on concrete, which will minimise the risk of pollution to groundwater. The existing groundwater has been correctly assessed and described in the application, and the impact from the proposed facility is compliant with policy.

Conditions of approval

The works approval is subject to conditions. Some conditions must be met prior to commencement of construction; others relate to commissioning of the facility. In addition, operation of the facility will be regulated through an EPA-issued licence. The works approval conditions include:

- The final detailed design must be verified by an EPA-appointed industrial facilities auditor (or alternative expert approved by EPA).
- The facility is to be verified at commissioning stage by an EPA-appointed industrial facilities auditor prior to issue of an operating licence. The auditor will assess whether the facility has been constructed and is operating (in the commissioning stage) in accordance with the conditions of the approvals from EPA.
- Verification that the facility can treat the waste in a safe manner.
- Australian Paper must clearly describe the waste

Australian Paper waste to energy works approval decision

streams that will be accepted at the premises, including the waste categories, volume and sources.

- Australian Paper must develop a comprehensive commissioning programme that includes verification of stack emissions and ongoing monitoring.
- Australian Paper must make monitoring data publicly available at daily, monthly and quarterly intervals.
- An independent auditor appointed during the first three years of operation to verify that the material received onsite is compliant with the works approval and operating licence.
- Annual audits during the first three years of operation, with timing of subsequent audits determined by the auditor to verify operational performance.
- Provision for future incorporation of options to improve material recovery from the waste feedstock prior to incineration, if this becomes viable.

Appeal process

If you object to the issuing of the works approval or its conditions, you may have the decision reviewed by applying in writing within 21 days of the date of issue to:

Registrar, Planning and Environment Division
Victorian Civil and Administrative Tribunal (VCAT)
7th Floor, 55 King Street, Melbourne, 3000

An application fee may be applicable when lodging an appeal with VCAT. Contact VCAT on (03) 9628 9777 for further details on fees associated with an appeal. A copy of the appeal should also be forwarded, within seven days of lodgment, to:

Director, Development Assessments Unit
Environment Protection Authority Victoria
GPO Box 4395, Melbourne, 3001

If you would like further information, please contact us by emailing contact@epa.vic.gov.au or calling 1300 372 842 (1300 EPA VIC).

More information

Read EPA's full assessment report on Engage Vic.

Please contact EPA on 1300 372 842 (1300 EPA VIC) or via email on contact@epa.vic.gov.au

Figure 1. Typical Process overview of an EfW Plant

Conclusions, Economic Impacts of Proposed Energy from Waste Plant

Prepared by Western Research Institute

The combined EfW plant operations and construction are estimated to make significant contributions to both the Victorian and Latrobe Valley economies and help Australian Paper improve its social and economic contribution to its employees and the communities in which it operates.

In Victoria, the contribution is estimated to be:

- An average of \$161 million per annum for each of the 3 years of construction and \$198.7 million per annum added to GSP
- An average of \$76.1 million per annum for each of the 3 years of construction and \$76.1 million per annum in household income
- An average of 1,046 full-time equivalent jobs per annum for each of the 3 years of construction and 911 FTE jobs thereafter.

In the Latrobe Valley region, the combined contribution is estimated to be:

- An average of \$67.9 million per annum for each of the 3 years of construction and \$95.8 million per annum in GRP
- An average of \$29.6 million per annum for each of the 3 years of construction and \$20.2 million per annum in household income
- An average of 454 FTE jobs per annum for each of the 3 years of construction and 265 FTE jobs thereafter.

The proposed EfW Plant has the potential to provide other social, economic and environmental benefits alongside those discussed in this report, including wider benefits to the Australian economy.

It is recommended that a full business case be developed to gain greater insight into the full impact of the EfW Plant.

Executive Summary, Works Approval Application 20B Conference Report

Australian Paper Energy from Waste proposal

Executive summary and recommendations

Paper Australia Pty Ltd (trading as Australian Paper) (AP) submitted a works approval application (WAA) to the Environment Protection Authority (EPA) for an Energy-from-Waste (EfW) plant at its Maryvale paper mill site in the Latrobe Valley. EPA formally accepted the application on 25 May 2018.

Following a review of the 115 submissions received, EPA determined a Section 20B Conference would useful to further explore community views and concerns about the proposal.

The conference provided an opportunity for:

- AP to provide an overview of its EfW WAA
- EPA to provide an update on the WAA and assessment process
- Participants to hear about issues raised in submissions, ask questions of AP and EPA and express their views about the proposal.

The role of the Chair is to collate the information from the 20B Conference and provide a report. This report documents the perspectives and questions raised by conference participants. As Chair and author of this report I have included participant contributions in good faith without endorsement or judgment as to their accuracy or veracity.

The following recommendations are made in response to participant concerns as outlined at the conference and have their basis in participant comments made during the conference or in submissions. Additional detail is contained in Section 3 of this report in relation to the Chair's observations and how EPA might deliver the recommendations contained in Tables 1-1 to 1-4 below.

Table 1-1: The following general recommendations relate to actions prior to works approval application determination:

RECOMMENDATIONS
EPA to continue raising awareness about where Works Approval Applications sit in the overall approvals and licensing process, that it is concept approval vs detailed design approval the EfW plant (including approved design for construction and commissioning).
EPA to facilitate the provision of responses to the collated list of questions at Section 2.7 of this report.

Table 1-2: The following topic specific recommendations relate to actions prior to works approval application determination:

RECOMMENDATIONS
Re Topic 1 – Air emission monitoring & control technology to prevent health impacts: EPA approvals unit to seek advice from its Chief Scientist / Public Health Unit about: • AP's statement that "By complying with particular clauses in SEPPs (e.g. SEPP Air Quality Management – "SEPP AQM"), compliance with human health exposure is also achieved"
EPA approvals unit to seek advice from its Chief Scientist / Public Health Unit about: • when a Health Risk Assessment might be a relevant consideration in the works approval assessment process.

Appendix 7 *cont.*

RECOMMENDATIONS
Topic 2 – Best practice handling of waste and European Standards: EPA to consider: • Obtaining further information from AP about proposed pre-treatment options if in their detailed assessment of the proposal this is not sufficiently addressed.

Table 1-3: The following <u>topic specific</u> recommendations relate to future actions, <u>if a works approval is granted:</u>

RECOMMENDATIONS
Topic 1 – Air emission monitoring and control technology to prevent health impacts: EPA to consider: • supporting AP to undertake specific community consultation in relation to establishing an appropriate monitoring, evaluation and reporting regime as part of considering potential future licence conditions.
Topic 3 – Waste Hierarchy and waste composition EPA to consider: • outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects AP to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.
Topic 4 – Management of incoming waste and residual waste EPA to consider: • outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects AP to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.
Topic 5 – Greenhouse Gas Emissions and odour from the site EPA to consider: • the need for expert review of any emissions and odour modeling information relied upon in its detailed assessment.
Topic 6 Track record and public consultation EPA to consider: • the benefits and appropriateness of providing access to engagement advice (from EPA's Communications and Engagement Group) to AP to support their continued engagement approaches.
EPA to consider: • Encouraging AP to better engage with external stakeholders (agencies and community representatives) specifically around health impacts.

Table 1- 4: The following <u>general</u> recommendation relates to future action <u>regardless of whether an approval is granted:</u>

RECOMMENDATIONS
EPA to consider its role in: • improved external communications and access to information.

As stated above additional detail is contained in Section 3 of this report in relation to the Chair's observations and how EPA might deliver the recommendations in the tables above.

creating energy from waste

Appendix 8

Executive Summary: Maryvale Energy from Waste Plant: Health Impact Assessment

Prepared by EnRisks

EnRiskS

Executive Summary

Introduction

The project, proposed by Paper Australia Pty Ltd also known as Australian Paper (AP), involves the construction and operation of an energy from waste (EfW) plant on its existing pulp and paper mill site in Maryvale, located between Tanjil East and Traralgon West roads near the townships of Traralgon and Morwell, Victoria (the '**site**') (**Figure 1**).

The proposed facility will process an estimated 650,000 tonnes per annum of municipal solid waste and commercial and industrial waste sourced from the greater Melbourne Metropolitan area along with the local Gippsland region. Waste will be transported to the site via rail and road in sealed 40 foot containers, with waste from the Gippsland region delivered via refuse collection vehicles. The plant will provide both steam and power to the existing Maryvale Mill operations of the order of 30 Megawatts electricity (MWe) per annum and 130 tonnes per hour of high pressure steam. Any energy created in excess of these needs, will be placed into the national electricity market.

This Health Impact Assessment (HIA) has been developed for Australian Paper by identifying and estimating the health impacts of the proposed project on the health of the surrounding (local and regional) community.

Assessment Approach

The HIA assessment has been conducted as a desktop assessment in accordance with national guidelines available from the Centre for Health Equity Training, Research and Evaluation (CHETRE) (Harris 2007) and enHealth (enHealth 2001, 2012a). The HIA has been undertaken on the basis of the information provided in the *Maryvale Energy from Waste Plant – Works Approval Application, Jacobs -23 April 2018*.

The conduct of an HIA is intended to provide a structured, solution-focused and action-oriented approach to maximising the positive and minimising the negative health impacts of a proposed project. This HIA has therefore been conducted to identify and address potential social, economic and environmental impacts of the project on health and provide recommendations to enhance positive impacts and mitigate negative impacts.

Outcomes of the HIA

The HIA has considered the operation of the proposed project and potential impacts to the health of the off-site community. The assessment has considered a range of issues that have the potential to affect the health of the community (either positive or negative), which relate to changes to air quality, odour, noise, water, traffic, hazardous materials, economic and social environment.

Based on the assessment undertaken, the project is associated with some benefits to the community, particularly in relation to employment. Where negative impacts have been identified, these are considered to be negligible in terms of community health.

Table ES-1 presents a summary of the HIA undertaken.

EnRiskS

Table ES-1: Summary of HIA outcomes and enhancement/mitigation measures

Health Aspect/Issue	Reference in HIA	Potential Health Impacts Considered	Impact Identified (positive or negative and significance)	Types of measures that could be implemented to enhance positive impacts or mitigate negative impacts
Air quality – Inhalation exposures	Section 5.4	Range of health effects associated with exposure to pollutants released to air from the proposed facility	**All exposures: Negative but negligible** More specifically: ▪ No acute risk issues of concern ▪ No chronic risk issues of concern Particulate exposures are negligible and essentially representative of zero risk ▪ Incremental carcinogenic risks are negligible and essentially representative of zero risk	The proper operation and maintenance, and monitoring, of the pollution control/flue gas equipment.
Air quality – Multiple pathway exposures	Section 5.5	Range of health effects associated with exposure to pollutants released to air from the proposed facility, that may then deposit and accumulate in soil, homegrown fruit and vegetables and other farm produce (eggs, beef and milk)	**All exposures: Negative but negligible** More specifically: ▪ No chronic risk issues of concern for multiple pathway exposures ▪ All calculated risks for individual exposure pathways are negligible and essentially representative of zero risk ▪ All calculated risks for combined multiple pathway exposures are negligible and essentially representative of zero risk	The proper operation and maintenance, and monitoring, of the pollution control/flue gas equipment.
Odour	Section 5.6	Annoyance, stress, anxiety	**Not significant and negligible**	The proper operation of the tipping hall as proposed to ensure fugitive odour emissions are effectively managed.
Noise	Section 6	Sleep disturbance, annoyance, children's school performance and cardiovascular health	**Modelled noise impacts: negligible potential for health impacts**	Additional assessment of the project detailed design is required, and application of appropriate and reasonable mitigation measures is required so as not to increase noise levels at the nearest sensitive receivers from current levels.
Economic Environment	Section 7	Reduction in anxiety, stress and feelings of insecurity	**Positive improvements in health and wellbeing**	The identified positive outcomes in the local community can be enhanced by encouraging employment of people who live within the local community

Health Aspect/Issue	Reference in HIA	Potential Health Impacts Considered	Impact Identified (positive or negative and significance)	Types of measures that could be implemented to enhance positive impacts or mitigate negative impacts
Traffic and transport	Section 7	Injury or death, stress and anxiety.	**Negative but minimal**	Details to be determined at the detailed design phase of the project
Discovery and disposal of hazardous waste	Section 7	Possible injury if incorrectly disposed of	**Negative but minimal**	Further development of the feedstock delivery protocol into an operational management plan to address the discovery and proper disposal of this material
Community and social	Section 7	Wellbeing, changes in levels of stress and anxiety	**Positive outcomes** enhancing feelings of wellbeing for aspects such as sustainability **Negative outcomes** for potential changes to amenity and community feelings of control related to perceived risks rather than actual risks	These health impacts relate to community perceptions and trust. It is therefore important that the positive impacts associated with the project are enhanced within the local community and community consultation is continued and uses a range of techniques that are tailored to the various sub-populations that have particular areas of concern or particular characteristics that make normal methods of communication less effective. It is important that an effective communication/ community consultation program is maintained throughout the construction, commissioning and operational phases of the project.

Executive Summary – Air Quality Impact Assessment

Prepared by Jacobs

Executive Summary

Australian Paper (AP) is Victoria's largest generator of baseload renewable energy, the largest industrial user of natural gas in Victoria and a major user of coal-fired electricity. Australian Paper is facing increasing costs associated with surges in energy prices and uncertainty of supply. With support from the Australian and Victorian Governments, Australian Paper is undertaking a comprehensive Energy from Waste (EfW) feasibility study for a proposed new facility to be located at the Maryvale Pulp and Paper Mill site. Potentially the new EfW Plant could divert 650,000 tonnes (+/- 10%) of waste from Gippsland and Melbourne landfills annually (Australian Paper, 2018).

Australian Paper is proposing to construct an Energy from Waste (EfW Plant) at its existing Maryvale Mill site in the Latrobe Valley, Victoria. The EfW Plant is proposed to utilise Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste as feedstock for two EfW boilers. The facility will produce steam and electricity for use at the existing Mill, with any excess electricity generation potentially exported to the National Electricity Market (NEM).

AP Maryvale has a significant existing Amenity Rural Buffer around its site to reduce the potential impact of its operations on surrounding residents.

The proposed EfW Plant under normal operations would have all emissions to the air emitted via a single stack with two or three flues at a height of approximately 95 metres above ground level. The EfW Plant will have a nominal output of 70 megawatts (MW), with the combustion of waste via two moving-grate fired boilers, a 6MW 'black-start' diesel generator, and a 200 kiloWatt (kW) emergency shut-down generator.

The application of best practice was considered in the assessment (EPAV, 2017). The potential air emissions were analysed and estimated following the EPA's guidelines: *Energy from waste* (EPA, 2013a), and *Recommended separation distances for industrial residual air emissions* (EPA, 2013b). EPA's Energy from waste guidelines stipulate that EfW plants must comply with the European Union's *Industrial Emissions Directive 2010/75/EU* ("IED"), while it is also necessary to meet the requirements of *State Environment Protection Policy (Air Quality Management)* ("SEPP (AQM)")).

An air quality impact assessment was undertaken for AP's proposed EfW Plant in accordance with the SEPP(AQM) and EPA guidelines for the use of the regulatory model, AERMOD (EPAV, 2014a; EPAV, 2014b). Details of the assessment methods were discussed and agreed with the EPA prior to commencing the works.

Key components of the AERMOD modelling assessment methods were:

1) Use of AERMOD in accordance with EPA (2014b)
2) Creation of AERMOD meteorological data in accordance with EPA (2014a) including the use of a five-year, dataset of hourly meteorological parameters.

Computational modelling using AERMOD and the associated comparison with the SEPP (AQM) requirements is a complex and specialist field. In simple terms, the modelling and assessment process involved the following steps:

- Identification of relevant standards; for the EfW Project the standards are specified by:
  - IED limits for emissions discharged from an EfW plant stack
  - SEPP (AQM) limits for emissions discharged from an EfW plant stack
  - SEPP (AQM) 'design criteria' or ground level concentrations (GLCs) for sensitive receptors; i.e. maximum GLCs ('design criteria') for substances emitted by the EfW stack at residential (or other sensitive) locations.
- Development and compilation of air emissions modelling data, including regional meteorology, background air quality data, project infrastructure details (e.g. stack heights, building heights, etc), project emissions (e.g. discharges from the stack) and regional terrain/geographical data

- Conducting computational air emissions modelling using the EPA designated modelling software ("AERMOD") and including the required data inputs. The AERMOD modelling predicts the ground level concentrations of substances due to the behaviour of the emissions plume combined with the existing background ground level concentrations, local/regional meteorology and the geography of the Latrobe Valley
- Assessment of proposed emissions and air emissions modelling results with IED and SEPP (AQM) limits and design criteria.

A number of conservative assumptions were built in to the modelling data in order to provide suitable factors of safety to ensure that the proposed EfW Plant will meet the IED and SEPP (AQM) requirements. These assumptions include:

- Inclusion of already-closed industrial facilities into the background air quality data, such as Hazelwood Power Station, Morwell Power Station and the Energy Brix briquette factories
- Inclusion of the existing Australian Paper gas-fired boilers into the background air quality data – this is conservative because the purpose of the EfW Project is to reduce the use of these boilers
- Modelling the particulate matter 2.5 ($PM_{2.5}$) as 100% of the entire mass fraction of total particulate matter being emitted from the EfW Plant at the maximum IED limit of 30 mg/Nm^3. Modelling of $PM_{2.5}$ was also performed using a more realistic figure of 0.02 mg/Nm^3, which itself is still a conservative value given that the Ricardo-AEA report[1] states this figure (0.02 mg/Nm^3) is the average maximum emission from sampled UK EfW plants.

The assessment concludes that the emissions to air from the proposed EfW Plant are minimal, with no adverse air quality impacts anticipated. **Table E.1** shows the key emissions from the EfW Plant and the compliance with SEPP (AQM). Emissions from the EfW Plant will meet all IED and SEPP (AQM) emission limits.

The AERMOD results for the EfW Plant's operating scenario demonstrated there were no predicted exceedances of SEPP(AQM) Design Criteria for the 99.9th percentile, with the exception of $PM_{2.5}$ when combined with background concentrations. AERMOD results demonstrate that there are no exceedances of the SEPP(AQM) design criteria for any modelled substances at any of the discrete receptors.

The exceedances for $PM_{2.5}$ are due to the existing high background levels of $PM_{2.5}$. The peak $PM_{2.5}$ exceedances are highly likely to be associated with elevated smoke levels that may have originated from bushfires, landholder burning off, forest regeneration burns and planned burning. Smoke is often persistent in the Latrobe Valley in autumn due to the stable atmospheric conditions at that time of year as demonstrated in the time series plots. The time-series plots show that the contribution of the EfW Plant to $PM_{2.5}$ ground level concentrations is minimal in comparison to the periodic high $PM_{2.5}$ background levels.

The assessment showed that existing background $PM_{2.5}$ levels are above the design criterion for some periods as shown in a time-series plot analysis. AERMOD modelling was also conducted on a scenario where there were zero EfW Plant $PM_{2.5}$ emissions (i.e. only background) which showed exceedances of SEPP(AQM) Design Criteria. Additionally, AERMOD modelling was conducted using a high in-stack $PM_{2.5}$ emissions concentration (30 mg/m^3) and a low in-stack $PM_{2.5}$ emissions concentration (0.02 mg/m^3). The difference in resultant GLCs between the 30 mg/m^3 case, the 0.02 mg/m^3 case and the zero emissions case was negligible providing further confirmation that the $PM_{2.5}$ exceedances are due to the high background $PM_{2.5}$ levels.

It should also be noted that the assessment included an evaluation of total particulate emissions (PM_{total}) and these emissions from the EfW Plant, as measured at the stack, are compliant for the IED Limit of 30mg/Nm^3. The air quality assessment concludes that for steady state normal operating conditions, the worst case $PM_{2.5}$ contribution to the overall $PM_{2.5}$ levels beyond the Amenity Rural Buffer is below 0.1 µg/m^3 of the overall $PM_{2.5}$ levels (approximately 0.2% of the SEPP AQM Design Criterion). This is based on the 99.9 percentile 1 hour

[1] Ricardo-AEA Ltd (Buckland, Thomas), *Assessment of particulate emissions from energy-from-waste plant, National Atmospheric Emissions Inventory, Report for DEFRA, 14/10/2015. https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1511261133_AQ0726_PM_EfW_emissions_report_Issue1_Final_including_appendices.pdf , assessed*

Appendix 9 *cont.*

average – i.e. the 0.1 µg/m³ contribution to the overall worst case $PM_{2.5}$ levels would occur for only 9 hours in the given meteorological year. It is also based on a very conservative figure for the emissions rate.

The conclusion of the air quality modelling assessment is there is a low risk of air quality impact from the Project's EfW emissions. Although the Project has only a very small effect on the high $PM_{2.5}$ background levels, $PM_{2.5}$ should be monitored to confirm compliance of the Project's predicted very minor effect on $PM_{2.5}$ levels.

Emissions of air toxics such as IARC Group 1 carcinogens chromium VI (Cr(VI)), cadmium (Cd) and mercury (Hg) were investigated for this assessment. Model results for all of the carcinogens showed that the GLCs due to the EfW Plant are below the relevant SEPP(AQM) design criteria and most are 100 – 1,000 times below their Criterion. Monitoring of the elemental composition of the in-stack pollutant concentrations should be considered to confirm that the proposed EfW operation will not cause significant air quality impacts at any sensitive receptors.

Table E.1 : Statistical summary of AERMOD results for 99.9 percentile hourly averages, GLCs (µg/m³)

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Carbon monoxide: SEPP(AQM) CO Design Criterion – 29,000 µg/m³						
Summary of CO results – all GLCs substantially less than the SEPP(AQM) design criterion						
CO, 99.9% 1h; 9th-highest from 'Top 100 Table'	2,527	2,559	2,036	6,343	ND	ND
CO, 99.9% 1h; grid maximum	1,607	1,616	1,490	3,432	ND	ND
CO, 90th percentile grid result	1,489	1,490	1,264	3,432	ND	ND
CO, 99.9% 1h; discrete receptor maximum	1,488	1,497	1,268	3,432	ND	ND
Nitrogen dioxide: SEPP(AQM) NO_2 Design Criterion – 190 µg/m³						
Summary of NO_2 results – all GLCs substantially less than the SEPP(AQM) design criterion						
NO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	95.6	79.3	93.4	84.1	84.3	69.1
NO_2, 99.9% 1h; grid maximum	66.2	64.4	71.9	67.85	70.1	62.8
NO_2, 90th percentile grid result	50.8	50.8	55.6	50.76	54.5	49.0
NO_2, 99.9% 1h; discrete receptor maximum	50.8	51.2	56.4	50.8	54.5	49.3
Sulfur dioxide: SEPP(AQM) SO_2 Design Criterion – 450 µg/m³						
Summary of SO_2 results – all GLCs substantially less than the SEPP(AQM) design criterion						
SO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	167.0	169.7	155.7	122.4	192.5	230.5
SO_2, 99.9% 1h; grid maximum	72.5	81.1	96.4	92.9	76.0	64.4
SO_2, 90th percentile grid result	70.6	70.9	85.2	89.1	70.6	60.9
SO_2, 99.9% 1h; discrete receptor maximum	70.6	72.9	87.2	90.9	70.6	62.8
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 30 mg/m³(IED limit): SEPP(AQM) $PM_{2.5}$ Design Criterion –50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.2	ND	ND
Background contribution	59.9	59.9	155.6	84.0	ND	ND
EfW contribution	1.2	0.2	0.3	1.6	ND	ND

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.7	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 0.02 mg/m³, as per the average maximum in the Ricardo-AEA Report: SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.1	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), for background $PM_{2.5}$ (i.e. EfW Plant emission rate of zero mg/m³): SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	59.9	59.9	155.6	84.0	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Ammonia: SEPP(AQM) NH_3 Design Criterion – 600 µg/m³						
Summary of NH_3 results – all GLCs substantially less than the SEPP(AQM) design criterion						
NH_3, 99.9% 1h; 9th-highest from 'Top 100 Table'	26.6	15.7	15.6	15.5	15.6	14.9
NH_3, 99.9% 1h; grid maximum	10.0	14.4	13.8	13.7	14.0	13.2
NH_3, 90th percentile grid result	4.2	4.2	4.4	4.9	4.4	4.3
NH_3, 99.9% 1h; discrete receptor maximum	4.6	5.1	5.1	5.6	5.2	4.8
Dioxins and Furans: SEPP(AQM) DF Design Criterion – 3.7E-06 µg/m³						
Summary of DF results – all GLCs substantially less than the SEPP(AQM) design criterion						
DF, 99.9% 1h; 9th-highest from 'Top 100 Table'	8.9E-08	5.2E-08	5.2E-08	5.2E-08	5.2E-08	5.0E-08
DF, 99.9% 1h; grid maximum	3.3E-08	4.8E-08	4.6E-08	4.6E-08	4.7E-08	4.4E-08
DF, 90th percentile grid result	1.4E-08	1.4E-08	1.5E-08	1.6E-08	1.5E-08	1.4E-08
DF, 99.9% 1h; discrete receptor maximum	1.5E-08	1.7E-08	1.7E-08	1.9E-08	1.7E-08	1.6E-08
PAHs as B(a)P: SEPP(AQM) DF Design Criterion – 0.73 µg/m³						
Summary of B(a)P results – all GLCs substantially less than the SEPP(AQM) design criterion						
B(a)P, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.012	0.007	0.007	0.007	0.007	0.007
B(a)P, 99.9% 1h; grid maximum	0.004	0.006	0.006	0.006	0.006	0.006
B(a)P, 90th percentile grid result	0.002	0.002	0.002	0.002	0.002	0.002

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
B(a)P, 99.9% 1h; discrete receptor maximum	0.002	0.002	0.002	0.002	0.002	0.002
Hexavalent chromium (highest risk metal): SEPP(AQM) Cr(VI) Design Criterion – 0.17 µg/m³						
Summary of Cr(VI)results – all GLCs substantially less than the SEPP(AQM) design criterion						
Cr(VI), 99.9% 1h; 9th-highest from 'Top 100 Table'	0.136	0.080	0.080	0.079	0.080	0.076
Cr(VI), 99.9% 1h; grid maximum	0.051	0.073	0.070	0.070	0.071	0.067
Cr(VI), 90th percentile grid result	0.021	0.022	0.023	0.025	0.023	0.022
Cr(VI), 99.9% 1h; discrete receptor maximum	0.024	0.026	0.026	0.029	0.026	0.025
Cadmium (2nd-highest risk metal): SEPP(AQM) Cd Design Criterion – 0.033 µg/m³						
Summary of Cd results – all GLCs less than the SEPP(AQM) design criterion						
Cd, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.027	0.016	0.016	0.015	0.016	0.015
Cd, 99.9% 1h; grid maximum	0.010	0.014	0.014	0.014	0.014	0.013
Cd, 90th percentile grid result	0.004	0.004	0.004	0.005	0.004	0.004
Cd, 99.9% 1h; discrete receptor maximum	0.005	0.005	0.005	0.006	0.005	0.005
Mercury: SEPP(AQM) Cd Design Criterion – 0.33 µg/m³						
Summary of Hg results – all GLCs substantially less than the SEPP(AQM) design criterion						
Hg, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.044	0.026	0.026	0.026	0.026	0.025
Hg, 99.9% 1h; grid maximum	0.017	0.024	0.023	0.023	0.023	0.022
Hg, 90th percentile grid result	0.007	0.007	0.007	0.008	0.007	0.007
Hg, 99.9% 1h; discrete receptor maximum	0.008	0.009	0.008	0.009	0.009	0.008

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Appendix 10

Air Quality Modelling Results

Feasibility study outcomes This series of fact sheets provides an update on the initial findings from Australian Paper's Energy from Waste (EfW) feasibility study.

FACT SHEET 16

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Australian Paper Energy from Waste Feasibility Study - Air Quality Modelling Results

Air Quality Monitoring Results

This table details the results of the air quality impact assessment undertaken as part of the feasibility study into the adoption of Energy from Waste technology at Australian Paper's Maryvale Pulp and Paper Mill. A separate Air Quality fact sheet explaining key aspects of the assessment is also available.

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Carbon monoxide: SEPP(AQM) CO Design Criterion - 29,000 µg/m³						
Summary of CO results - all GLCs substantially less than the SEPP(AQM) design criterion						
CO, 99.9% 1h; 9th-highest from 'Top 100 Table'	2,527	2,559	2,036	6,343	ND	ND
CO, 99.9% 1h; grid maximum	1,607	1,616	1,490	3,432	ND	ND
CO, 90th percentile grid result	1,489	1,490	1,264	3,432	ND	ND
CO, 99.9% 1h; discrete receptor maximum	1,488	1,497	1,268	3,432	ND	ND
Nitrogen dioxide: SEPP(AQM) NO_2 Design Criterion - 190 µg/m³						
Summary of NO_2 results - all GLCs substantially less than the SEPP(AQM) design criterion						
NO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	95.6	79.3	93.4	84.1	84.3	69.1
NO_2, 99.9% 1h; grid maximum	66.2	64.4	71.9	67.85	70.1	62.8
NO_2, 90th percentile grid result	50.8	50.8	55.6	50.76	54.5	49.0
NO_2, 99.9% 1h; discrete receptor maximum	50.8	51.2	56.4	50.8	54.5	49.3
Sulfur dioxide: SEPP(AQM) SO_2 Design Criterion - 450 µg/m³						
Summary of SO_2 results - all GLCs substantially less than the SEPP(AQM) design criterion						
SO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	167.0	169.7	155.7	122.4	192.5	230.5
SO_2, 99.9% 1h; grid maximum	72.5	81.1	96.4	92.9	76.0	64.4
SO_2, 90th percentile grid result	70.6	70.9	85.2	89.1	70.6	60.9
SO_2, 99.9% 1h; discrete receptor maximum	70.6	72.9	87.2	90.9	70.6	62.8
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 30 mg/m³(IED limit): SEPP(AQM) $PM_{2.5}$ Design Criterion -50 µg/m³						
Summary of $PM_{2.5}$ results - 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.2	ND	ND
Background contribution	59.9	59.9	155.6	84.0	ND	ND
EfW contribution	1.2	0.2	0.3	1.6	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.7	40.3	ND	ND

Appendix 10

FACT SHEET 16

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 0.02 mg/m³, as per the average maximum in the Ricardo-AEA Report: SEPP(AQM) $PM_{2.5}$ Design Criterion - 50 µg/m³						
Summary of $PM_{2.5}$ results - 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.1	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), for background PM2.5 (emission rate of zero mg/m3): SEPP(AQM) $PM_{2.5}$ Design Criterion - 50 µg/m³						
Summary of $PM_{2.5}$ results - 9th highest GLCs above SEPP (AQM) design criterion						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	59.9	59.9	155.6	84.0	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Ammonia: SEPP(AQM) NH_3 Design Criterion - 600 µg/m³						
Summary of NH_3 results - all GLCs substantially less than the SEPP(AQM) design criterion						
NH_3, 99.9% 1h; 9th-highest from 'Top 100 Table'	26.6	15.7	15.6	15.5	15.6	14.9
NH_3, 99.9% 1h; grid maximum	10.0	14.4	13.8	13.7	14.0	13.2
NH_3, 90th percentile grid result	4.2	4.2	4.4	4.9	4.4	4.3
NH_3, 99.9% 1h; discrete receptor maximum	4.6	5.1	5.1	5.6	5.2	4.8
Dioxins and Furans: SEPP(AQM) B(a)P Design Criterion - 3.7E-06 µg/m³						
Summary of DF results - all GLCs substantially less than the SEPP(AQM) design criterion						
DF, 99.9% 1h; 9th-highest from 'Top 100 Table'	8.9E-08	5.2E-08	5.2E-08	5.2E-08	5.2E-08	5.0E-08
DF, 99.9% 1h; grid maximum	3.3E-08	4.8E-08	4.6E-08	4.6E-08	4.7E-08	4.4E-08
DF, 90th percentile grid result	1.4E-08	1.4E-08	1.5E-08	1.6E-08	1.5E-08	1.4E-08
DF, 99.9% 1h; discrete receptor maximum	1.5E-08	1.7E-08	1.7E-08	1.9E-08	1.7E-08	1.6E-08
PAHs as B(a)P: SEPP(AQM) B(a)P Design Criterion - 0.73 µg/m³						
Summary of B(a)P results - all GLCs substantially less than the SEPP(AQM) design criterion						
B(a)P, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.012	0.007	0.007	0.007	0.007	0.007
B(a)P, 99.9% 1h; grid maximum	0.004	0.006	0.006	0.006	0.006	0.006
B(a)P, 90th percentile grid result	0.002	0.002	0.002	0.002	0.002	0.002
B(a)P, 99.9% 1h; discrete receptor maximum	0.002	0.002	0.002	0.002	0.002	0.002
Hexavalent chromium (highest risk metal): SEPP(AQM) Cr(VI) Design Criterion - 0.17 µg/m³						
Summary of Cr(VI)results - all GLCs substantially less than the SEPP(AQM) design criterion						
Cr(VI), 99.9% 1h; 9th-highest from 'Top 100 Table'	0.136	0.080	0.080	0.079	0.080	0.076
Cr(VI), 99.9% 1h; grid maximum	0.051	0.073	0.070	0.070	0.071	0.067
Cr(VI), 90th percentile grid result	0.021	0.022	0.023	0.025	0.023	0.022
Cr(VI), 99.9% 1h; discrete receptor maximum	0.024	0.026	0.026	0.029	0.026	0.025
Cadmium (2nd-highest risk metal): SEPP(AQM) Cd Design Criterion - 0.033 µg/m³						
Summary of Cd results - all GLCs less than the SEPP(AQM) design criterion						
Cd, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.027	0.016	0.016	0.015	0.016	0.015
Cd, 99.9% 1h; grid maximum	0.010	0.014	0.014	0.014	0.014	0.013
Cd, 90th percentile grid result	0.004	0.004	0.004	0.005	0.004	0.004
Cd, 99.9% 1h; discrete receptor maximum	0.005	0.005	0.005	0.006	0.005	0.005
Mercury: SEPP(AQM) Hg Design Criterion - 0.33 µg/m³						
Summary of Hg results - all GLCs substantially less than the SEPP(AQM) design criterion						
Hg, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.044	0.026	0.026	0.026	0.026	0.025
Hg, 99.9% 1h; grid maximum	0.017	0.024	0.023	0.023	0.023	0.022
Hg, 90th percentile grid result	0.007	0.007	0.007	0.008	0.007	0.007
Hg, 99.9% 1h; discrete receptor maximum	0.008	0.009	0.008	0.009	0.009	0.008

- "SEPP (AQM): State Environment Protection Policy (Air Quality Management)"
- "ND: no data - no data available for this time period"
- "GLC: ground level concentration"
- "ug/m3: micrograms per cubic metre (1 microgram is one millionth of a gram)"

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