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Waste Management in New South Wales: A Review

by

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Briefing Paper No 1/2001

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ISSN 1325-5142
ISBN 0 7313 1685 1

February 2001

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EXECUTIVE SUMMARY

The *Waste Minimisation and Management Act 1995* (the Waste Act) introduced a definition of waste that encompasses substances that are discarded, rejected, unwanted, surplus or abandoned. Regulations under the *Protection of the Environment Operations Act 1997* define liquid and non-liquid waste types into different classes, depending on their likely impacts on the environment (page 1).

Waste is identified in three sectors: municipal; commercial and industrial; and construction and demolition. Municipal waste is defined as the waste arising from domestic premises and from council activities associated with servicing residential and public areas. Commercial and industrial waste includes materials generated by commercial establishments such as offices, stores and hotels, and non-biodegradable waste generated in industrial or manufacturing processes. Building and demolition waste is derived from the construction, refurbishment or demolition of new or existing buildings or structures. Approximately 5.0 million tonnes of waste are disposed of annually in NSW. Of this, approximately 4.0 million tonnes are disposed of in the Sydney Metropolitan Area (page1).

The Waste Act establishes the framework for the strategic planning and funding of waste reduction at a State and regional level and within industry sectors. It sets out roles and responsibilities for all essential stakeholders. The Act also includes the waste hierarchy and incorporates the Government's then 60% waste reduction target by the year 2000 (page 5).

Total waste disposal in NSW adjusted for gross State product decreased from 1990 to 1993 and then stabilised at 20% to 25% below 1990 levels. The 1998 total level of waste disposal was 18% below the 1990 levels when adjusted for gross State product (page 10).

The Waste Act requires a review five years after its date of assent, and a report must be presented to Parliament before 22 December 2001. In August 2000 the Minister announced the review of the Waste Act. In August 1999 the Minister for the Environment Hon Bob Debus MP established the Alternative Waste Management and Practices Inquiry. The Report of the Inquiry was provided to the Minister in April 2000. The Inquiry noted that an ample array of technologies exists to enable management of waste in NSW as a potential resource. No one technology was deemed suitable for waste streams. Four classes of technology and 14 generic types of technologies were described and evaluated (page 12).

In light of the findings of the Alternative Waste Inquiry, Mr Tony Wright was commissioned by the Minister for Urban Affairs and Planning to advise him on, amongst other things, available landfill capacity for solid putrescible waste in the Sydney region and the implications of this on the need or otherwise for the proposed Woodlawn landfill. Recommendation one of the review was that early action to establish a satisfactory new landfill site should be taken (page 22).

On 30 November 2000 the Minister for Urban Affairs and Planning Hon Dr Andrew Refshauge MP granted development consent to the proposal by Collex Waste Management to develop a putrescible waste landfill facility at Woodlawn, 270 kilometres southwest of Sydney (24).

1.0 Introduction

The *Waste Minimisation and Management Act 1995* introduced a definition of waste that encompasses substances that are discarded, rejected, unwanted, surplus or abandoned. Regulations under the *Protection of the Environment Operations Act 1997* define liquid and non-liquid waste types into different classes, depending on their likely impacts on the environment.[1]

In 1997, the NSW waste industry was estimated to be worth more than $600 million, of which $229 million was income generated from the treatment, processing and/or disposal of waste. The public and private waste businesses employed over 3000 people in NSW, a large majority of whom were involved in the collection and transport of waste. The government owned Waste Service NSW is the dominant operator of waste disposal facilities in the Sydney region, and until recently has had an effective monopoly control and ownership of putrescible waste disposal facilities. A number of companies and local councils own and operate non-putrescible landfill sites.[2]

2.0 Waste Types and Quantities

Waste is identified as coming from three sectors: municipal; commercial and industrial; and construction and demolition.[3] Municipal waste is defined as the waste arising from domestic premises and from council activities associated with servicing residential and public areas. Commercial and industrial waste includes materials generated by commercial establishments such as offices, stores and hotels, and non-biodegradable waste generated in industrial or manufacturing processes. Building and demolition waste is derived from the construction, refurbishment or demolition of new or existing buildings or structures.[4] Waste is further divided into commodity types. Several of these types, such as food and paper, are typical of all the above three waste streams and are high in quantity. Concrete and rubble dominate the construction and industry stream, wood is prominent in both the construction and industry and commercial and industrial streams, and plastics and glass are prominent in the commercial and industrial and municipal streams. Metals are a small component of all streams.

Approximately 5.0 million tonnes of waste are disposed of annually in NSW.

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1 NSW EPA, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only)*. June 2000, at 21.

2 NSW EPA, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only)*. June 2000, at 22.

3 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 29.

4 NSW EPA, *NSW State of the Environment 1997*, 1997, at 377.

Approximately 4.0 million tonnes are disposed of in the Sydney Metropolitan Area and 2.5 million tonnes recycled. Waste disposal and recycling estimates (in million tonnes) in the Sydney Metropolitan Area for 1998 are in Table 1 below. Accurate disposal and recycling data for the whole of New South Wales are not available.[5]

Table 1: Disposal and recycling estimates (in million tonnes) for the Sydney Metropolitan Area in 1998[6]

	Disposed of	**Recycled**
Municipal	1.35 mt	0.45 mt
Commercial & Industrial	1.60 mt	0.50 mt
Construction & Demolition	1.00 mt	1.50 mt
Total	**3.95 mt**	**2.45 mt**

The overall position for the three waste sectors and the amount of waste they dispose and recycle are listed in Table 2 (see over).

3.0 The Development of Government Waste Policy

This section traces the history of government waste policy in NSW, leading up to present day institutional arrangements.

- Prior to 1971 each of the 40 metropolitan councils were responsible for solid waste management and the operation of landfill sites[7].

5 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 29.

6 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 29.

7 Waste Management Authority of NSW (1991) Annual Report 1990-1991, WMA Sydney.

Table 2: Estimated Waste Disposed of and Recycled in the Sydney Metropolitan Area (tonnes per annum)[8]

	Municipal		**Commercial & Industrial**		**Construction & Demolition**		
	Disposed	Recycled	Disposed	Recycled	Disposed	Recycled	Total
Paper/Cardboard	390,000	195,000	210,000	300,000	Nil	Nil	1,095,000
Plastic	100,000	10,000	150,000	20,000	Nil	Nil	280,000
Glass	150,000	90,000	30,000	40,000	Nil	Nil	310,000
Ferrous	30,000	5,000	50,000	40,000	20,000	40,000	185,000
Garden	240,000	150,000	60,000	70,000	30,000	Nil	550,000
Food	280,000	Nil	160,000	Nil	Nil	Nil	440,000
Timber	Nil	Nil	210,000	10,000	100,000	50,000	370,000
Soil/Rubble	Nil	Nil	150,000	10,000	360,000	800,000	1,320,000
Concrete	Nil	Nil	50,000	10,000	160,000	460,000	680,000
Other	160,000	Nil	530,000	Nil	330,000	150,000	1,170,000
Total	**1,350,000**	**450,000**	**1,600,000**	**500,000**	**1,000,000**	**1,500,000**	**6,400,000**

[8] Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 30.

In response to the *Barton Report*[9] on 15 June 1971 the NSW Government established the Metropolitan Waste Disposal Authority. The Authority became responsible for waste disposal and operated landfill sites around Sydney.

- On 1 July 1989 the MWDA was replaced by the Waste Management Authority (WMA).

- In late 1990 the WMA produced and released the *Sydney Solid Waste Management Strategy*[10] for discussion. The strategy emphasised that landfill was filling up fast and the need for more landfill sites.

- Following the above Strategy, State Cabinet recommended the establishment of a new landfill site at Londonderry.

- In March 1991, following community opposition, the Government abandoned the Londonderry site and announced a review of waste disposal strategies. The Minister for Environment Hon Tim Moore MP also announced that the Government would not own or build new landfill facilities[11]. This set the scene for greater industry participation in waste management.

- In October 1991 the Waste Management Authority announced plans for the extension of the Lucas Heights landfill depot.

- 1 March 1992 the Waste Management Authority was disbanded and the waste minimisation, recycling and environmental regulations function transferred to the new Environment Protection Authority. The Authority's other functions were incorporated into a new body, the Waste Recycling and Processing Service (WRAPS).

- Facing community opposition, in September 1992 the development application for the expansion of Lucas Heights landfill depot was withdrawn.

- In September 1992 the Government's Waste Management Green Paper[12] was released. The Government adopted the Australian and New Zealand Environment Council (ANZECC) target of reducing waste by 50 percent per capita by the year 2000. The paper recognised the key regulatory role of the EPA and the right to community based decision making about the location of new landfill sites.

- The NSW Parliament established the Joint Select Committee upon Waste Management

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9 Barton, A.E. Report by AE Barton upon investigations into the problem of waste disposal in the metropolitan area of Sydney. Gov. Printer. 1970. 38pp.

10 NSW Waste Management Authority (1990) Sydney Solid Waste Management Strategy. NSW Government.

11 Environment Minister Media Release, 26 March 1991. Londonderry Tip Dumped.

12 NSW Government (1992) Waste Management Green Paper. A Discussion Paper by the Hon Chris Hartcher MP, Minister for the Environment.

to examine and report upon the Waste Management Green Paper. In September 1993 the Committee reported back to Parliament[13].

- June 1994 the Government released its blueprint for reform of the waste management industry, *No Time to Waste*[14]. Local councils were to group together to form Regional Waste Authorities and produce Regional Waste Management Plans for all normal domestic, commercial and industrial solid waste generated in their regions. Industry was required to develop formal Industry Waste Reduction Plans, to be drawn up by key industry sectors and the EPA under a system supported by conditions placed in licences under the Waste Disposal Act. The plans require industry to: identify the opportunities for reducing waste in product design, production and packaging; identify, on an industry by industry basis, ways to inform consumers about the environmental impact of products; determine methods for reducing, re-using and recycling and safely disposing of waste; agree to targets for reduction, re-use and recycling; specify the time frame for waste reduction and set in place a public monitoring and reporting program.[15]

- In November 1995, the Carr Government's *Waste Minimisation and Management Act* was passed. The Act provides for council waste management functions to be taken over by waste management boards. Industries may be subject to Industry Waste Reduction Plans. The Waste Recycling and Processing Authority is still in operation, but most elements of the *Waste Disposal Act* 1970 have been repealed.

4.0 The Waste Minimisation and Management Act 1995.[16]

The *Waste Minimisation and Management Act* (the Waste Act) establishes the framework for the strategic planning and funding of waste reduction at a State and regional level and within industry sectors. It sets out roles and responsibilities for all essential stakeholders. The Act also includes the waste hierarchy (giving preference to waste avoidance, then reuse, followed by recycling, with waste disposal as the last option). It incorporated the Government's then per capita waste reduction target of 60 percent by the year 2000. As discussed further in chapter 5, by 1998 municipal waste reduction per capita was 22 percent below 1990 levels.

State Waste Advisory Council

Part 2 of the Waste Act establishes the State Waste Advisory Council (SWAC). Its primary function is to provide strategic advice to the Minister for the Environment and the EPA on

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13 NSW Parliament. Joint Select Committee upon Waste Management, September 1993.

14 *No Time to Waste*. NSW Government Policy Statement on Waste. June 1994.

15 *No Time to Waste*, Industry Overview.

16 Elements of this section are taken from: NSW EPA, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only)*. June 2000.

waste issues of State significance. SWAC also has specific statutory roles in the development and review of regional waste plans and industry waste reduction plans, and also provides advice on expenditure under the Waste Planning and Management Fund.

Membership of SWAC is by ministerial appointment and drawn from consumer (1), industry (3), environment (2) and local government (2) groups, and the EPA (1).

Regional Waste Management

Part 3 (sections 9-29) of the Waste Act sets out an integrated planning framework for delivering waste management, consistent with state-wide waste policy, through the establishment of waste management regions and Regional Waste Planning and Management Boards (waste boards). The regional approach aims to ensure cooperative decision making on waste policy and programs by groups of councils and to overcome the fragmentation and duplication of effort between individual councils.

The Waste Act identifies the key objective of waste boards as to co-ordinate the waste services provided in and for the Board's waste management region. Board functions include the coordination of waste services and waste management policies in the region and shared use and development of infrastructure activities between the constituent councils. Boards may also provide waste or recycling services or infrastructure within their regions and may directly engage in the buying or leasing of land, plant, machinery and equipment.

Section 18 of the Waste Act identifies the functions of waste boards, which include the establishment of management and charging policies for the waste services provided by the constituent councils.

Waste boards must prepare regional waste plans in accordance with the principles set out in the Waste Act. The plans must document the strategies and targets for waste reduction within the region, including:

- developing options for waste reduction, management and disposal;
- managing and reducing waste that cannot be recycled or otherwise recovered;
- identifying time frames for achieving strategies and targets;
- developing mechanisms for monitoring performance.

Boards and their constituent councils must comply with Regional Waste Plans that have been approved by the Minister.

There are currently eight Regional Waste Boards in the greater metropolitan area: Inner Sydney, Western Sydney, Southern Sydney, Macarthur, Northern Sydney, Hunter, Illawarra and Central Coast. Board directors are chosen from nominees of the constituent councils, and councils are required to comply with the obligations contained in the Regional Waste Plan.

One formal rural regional waste board has been established in south eastern NSW. In the rest of rural NSW, the Government has established rural pilot waste management boards with less formal structures than the boards but with similar waste minimisation and management objectives.

The Waste Planning and Management Fund provides recurrent and program funds to the waste boards and rural pilots. Boards may require contributions from constituent councils to finance their arrangements and initiatives. Some boards currently receive such contributions.

Industry Waste Reduction Plans

Part 4 of the Waste Act establishes an industry waste reduction planning framework that seeks to provide for: the preparation; implementation; monitoring and enforcement of industry waste reduction plans that are designed to ensure greater industry responsibility for waste reduction.

Industry Waste Reduction Plans (IWRPs) seek to encourage industry to participate and co-operate with the EPA in the negotiation and preparation of an industry waste reduction plan for the industry, and if such a plan is in force with respect to the industry, to comply with the plan.

Where an industry does not negotiate an IWRP in good faith or does not comply with the requirements of an IWRP, or is particularly diverse or complex or competitive, the Minister can authorise the preparation of an IWRP without negotiation for that industry sector.

To date, no industries have been subject to a non-negotiated IWRP. However, national schemes, such as the Used Packaging Materials National Environment Protection Measure, (which is subject to its own national consultation and impact assessment process) can be adopted through the non-negotiated IWRP provisions.

The Waste Act permits the Minister to regulate an industry where it has not complied with an IWRP or has not cooperated with the EPA in preparing an IWRP. The regulations may require the following:

- the prohibition or restriction of the sale of such products or classes of products as may be prescribed;

- the implementation and operation of recycling, reuse, refundable deposits or take-back and utilisation schemes;

- that a percentage of products recovered must be used in reused or reprocessed;

- a performance bond to ensure compliance with any such scheme.

To date, no regulations have been made under these provisions.

Waste provisions in the Protection of the Environment Operations Act 1997

The Environment Protection Authority has a regulatory role in the management of waste. The waste provisions of the *Protection of the Environment Operations Act* establish a licensing system for waste activities and facilities, including the waste disposal levy on material received at licensed facilities.

Licensing of waste activities and facilities

Regulatory provisions that were previously included in the *Waste Minimisation and Management Act* were integrated with other environmental protection licensing systems when the *Protection of the Environment Operations Act* (POEOA)commenced on 1 July 1999. The provisions contained in the POEO (Chapter 3) relate to: licensing requirements; licensing conditions; offences; enforcement and investigation provisions; and financial provisions (waste levy) applicable to waste facilities and transporters. Further regulatory requirements are set out in the Protection of the Environment Operations (Waste) Regulation 1999.

Activities that may require a licence include generation, storage, transporting, processing, or disposal of wastes that are considered to pose hazards to the environment and/or human health or to degrade the amenity of the surrounding community.

Supervisory licensee powers for putrescible landfills

Under section 87 of the Protection of the Environment Operations Act, licensees that are not public authorities may not hold licences for facilities that receive putrescible waste unless a separate licence for the facility is granted to a public authority (called a supervisory licence). The supervisory licensee is to impose conditions on the licence with respect to the following matters:

- the types and volumes of waste received at the waste facility;
- the design of the waste facility;
- the separation, reuse, reprocessing and recycling of waste received at the facility.

In issuing a licence to the operator of a facility that accepts putrescible waste but is not a public authority, the appropriate regulatory authority is required to:

- impose a condition on the licence requiring the occupier to charge for the disposal of putrescible waste at the waste facility in accordance with the directions of the public authority holding the supervisory licence.

This provision requires the supervisory licensee to determine the disposal fee for putrescible waste received at the facility.

The Waste Planning and Management Fund and Waste levy

Section 88 of the *Protection of the Environment Operations Act* requires waste facilities to pay contributions on all the wastes they receive. These contributions are known generally as the waste levy. The Act excludes waste facilities that are used solely for the purposes of reusing, recycling or reprocessing waste from paying the levy. The current waste levy applies at a differential rate. Contributions are as follows:

- waste originating or disposed of in the Sydney Region, $17 a tonne;
- waste originating and disposed of in the Extended Regulated Area (ie, outside Sydney), $8 a tonne.

The EPA collects the levy, and contributions are Crown revenue paid into the Consolidated Fund.

Section 73(1) of the Waste Act established the Waste Planning and Management Fund. The Fund supports Waste Board programs, community waste grants, kerbside collection and other initiatives. The Government's initial commitment to the Waste Fund was $60 million over five years from 1995-96 to 1999-2000. In the financial year ending June 1999 the Fund allocated $25.1 million, and in the previous year $14.75 million.[17] From 1 July 2000, 55 percent of the waste levy contributions will be hypothecated to the Waste Planning and Management Fund.[18] Budget estimates for the waste disposal levy, including this additional 55 percent, are shown in Table 3 below.

Table 3: Waste Disposal Levy Revenue and Hypothecated amounts to the Waste Planning and Management Fund.[19]

	2000-01 budget $m	2001-02	2002-03	2003-04
		Forward estimates $m		
Waste Disposal Levy	76	73	68	63
55 % Hypothecated to Waste Fund	41.8	40.1	37.4	34.6

17 NSW Environment Protection Authority, *Annual Report 1998-99*, at 93.

18 NSW Environment Protection Authority, *Annual Report 1999-2000*, at 40.

19 Waste disposal levy figures obtained from: NSW Government, *Budget 2000-01. Budget Statement Budget Paper No 2*. 2000.

5.0 Waste Reduction Performance

The Environment Protection Authority notes that historically, waste disposal data has focused on the Sydney Metropolitan Area, with little reliable baseline data for beyond the region. International waste disposal comparisons are usually made in terms of kilograms of waste disposed per $100 of gross domestic product or gross State product. Total waste disposal in NSW adjusted for gross State product decreased from 1990 to 1993 and then stabilised at 20% to 25% below 1990 levels. The 1998 total level of waste disposal was 18% below the 1990 levels when adjusted for gross State product.[20]

Wright reports that municipal waste disposal has declined steadily over the decade, to be some 16% below 1990 gross tonnage and 22% below per capita disposal levels by 1998. Currently some 1.350 million tonnes of municipal waste is disposed to landfill annually. Kerbside recycling has been a key contributing factor in waste reduction over the decade. Approximately 0.450 million tonnes is recycled annually.[21] Kerbside waste collections currently recover about 20 percent of domestic waste generated in the Sydney Metropolitan area, compared with 8 percent in 1990. In 1999-2000, each person (equivalent) in Sydney set aside about 68 kilograms of waste for recycling, compared with around 30 kilograms per year in 1990.[22]

In the commercial and industrial sector, waste disposal rates show a strong correlation with the rate of economic activity. A sharp decline in waste disposal in the early nineties was followed by a moderate increase to current disposal levels. Waste disposal in the sector has decreased since 1990 by around 25% (after normalisation), or around 9% in actual terms. Currently some 1.6 million tonnes is disposed to landfill each year. Whilst data on reuse and recycling of commercial and industrial resources is not collected, the Alternative Waste Inquiry estimates that around 0.5 million tonnes is recycled annually.

Waste disposal in the construction and demolition sector has increased by around 14% since 1990 (after normalisation), or around 58% in actual terms. The Environment Protection Authority points to increased construction activity in recent years, reduced illegal dumping and improved data collection. Data on reuse and recycling of materials in the construction and demolition sector is described as extremely scant, and the Alternative Waste Inquiry estimates that approximately 1.5 million tonnes are recycled per annum, with approximately 1 million tonnes disposed to landfill.[23]

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20 NSW Environment Protection Authority, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only).* June 2000 at 21.

21 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 31.

22 NSW Environment Protection Authority, *Annual Report 1999-2000*, at 42.

23 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 31.

6.0 Reviews of the Waste Minimisation and Management Act

There are currently two reviews of the Waste Act, one a statutory review and the other a competition policy review. Under the Competition Principles Agreement endorsed by the Council of Australian Government in 1995, the NSW Government undertook to conduct a review of all State legislation that restricts competition by the year 2000. To fulfil this commitment a review of the *Waste Minimisation and Management Act* and the waste provisions in the *Protection of the Environment Operations Act* were conducted. The Review Group comprised representatives of the NSW EPA, the Cabinet Office and NSW Treasury, and released an issues paper in June 2000. Public submissions were invited to the review, and once submissions have been received and considered, the Review Group will prepare its final report and submit it to the Minister for the Environment.[24]

Several provisions of the Waste Act are considered to be potentially in conflict with Part IV of the *Trade Practices Act* (Commonwealth) and the NSW Competition Code. For example, a public authority, which as supervisory licensee of a putrescible landfill operation sets the price for waste disposal, could be considered as being potentially in conflict with Part IV of the Trade Practices Act (Cwlth) and the NSW Competition Code. To deal with this potential conflict, section 18 was protected from Part IV of the Trade Practices Act and the NSW Competition Code until 20 July 2000. The findings of the National Competition Policy Review of the Waste Act will inform the statutory review, and it will be recommended that the statutory review implement the outcomes of the National Competition Policy Review.[25]

The Waste Act requires a review five years after its date of assent, and a report must be presented to Parliament before 22 December 2001. In August 2000 the Minister announced the review of the Waste Act, and noted that the following issues shall be considered:[26]

- Existing waste disposal target;
- Current waste management hierarchy;
- State Waste Advisory Council;
- Institutional arrangements under the legislation for regional waste planning and management;

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24 NSW EPA, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only)*. June 2000, at 3.

25 NSW EPA, *National Competition Policy Review Issues Paper. Waste Minimisation and Management Act 1995 & Protection of the Environment Operations Act 1997 (waste provisions only)*. June 2000, at 2.

26 NSW EPA, *Review of the Waste Minimisation and Management Act 1995, Terms of Reference*. See EPA Website: http://www.epa.nsw.gov.au

- Industry waste reduction planning framework;
- Operation of the Waste Planning and Management Fund;
- Waste regulatory regime;
- Waste contributions under section 88 of the *Protection of the Environment Operations Act 1997*.

It was noted that two reports will guide the Minister in the review. These are the National Competition Policy Review, as discussed above, and the Alternative Waste Management Technologies and Practices Inquiry report, which is discussed below.

7.0 The Alternative Waste Management and Practices Inquiry

In August 1999 the Minister for the Environment Hon Bob Debus MP established the above Inquiry. The Report of the Inquiry was provided to the Minister in April 2000. The Terms of Reference for the Inquiry were: to describe and assess current and emerging waste management technologies and practices in Australia and overseas. The technologies were to be assessed by six criteria, also listed in the Terms of Reference.

The Inquiry noted that an ample array of technologies exists to enable management of waste in NSW as a potential resource. No one technology was deemed suitable for waste streams. Four classes of technology and 14 generic types of technologies were described and evaluated. These were:[27]

- Mechanical Separation Technologies, incorporating material sorting and waste separation;
- Biological Technologies, incorporating land application, open windrow composting, vermicomposting, enclosed composting, anaerobic digestion and fermentation;
- Thermal Technologies, incorporating incineration, pyrolysis/gasification and waste melting;
- Landfill Technologies, incorporating conventional wet landfill, conventional dry landfill and bioreactor landfill.

Each of these classes are discussed below.

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[27] Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 51-65.

Mechanical Separation Technologies
Waste separation is an important part of resource recovery because separation can lead to increased value of materials. The relevance of waste separation technologies depends on the extent to which waste is prevented from mixing at source.

Material Sorting Technologies
These use automated and manual sorting to separate mixed recyclable material to groups of specific materials. The outputs are suitable for reuse, recycling or reprocessing. The main technology types, Material Recovery Facilities (MRFs) perform two key functions in waste separation – consolidation of pre-sorted collected materials for transport to reprocessors, and sorting of co-mingled waste streams to aggregate specific commodities. NSW has many sophisticated MRF sorting technologies for mixed recyclables, whereby co-mingled paper and packaging materials may be effectively sorted to type as recyclate streams.

Waste Separation
These technologies use a variety of physical processes, such as drums and pulverises, to separate mixed residual wastes. The aim is to recover specific waste streams for further processing or reduced volume disposal.

Biological Treatment Technologies
A variety of technologies are available for processing organic material from commercial and industrial and municipal waste sources. Decomposition is achieved by microbial activity within biologically degradable wastes.

Land Application
This involves direct injection of organic wastes to increase the availability of nutrients in farm soils. Typical waste materials include sewage sludge, agricultural wastes and grease trap wastes.

Open Windrow Composting
Composting involves the decomposition of organic materials by microbial activity under open, aerobic conditions to produce a stable organic material containing plant nutrients. The material can be used as a good soil conditioner. The simplest large scale composting processes uses open windrows, which can be applied to garden waste, food waste and sewage sludge. Open windrow composting uses relatively low technology, and is most effective in situations where the proportion of organic material in the waste stream is high and markets for the product are readily available.

Vermicomposting
These technologies uses worms to consume organic wastes including sewage sludge, food and animal wastes. The product is high quality compost suitable for soil conditioning.

Enclosed Composting
Controlled atmosphere and moisture conditions are used to improve the rate of organic waste decomposition (over open windrow composting) and to control odours. Food, sewage sludge and garden wastes can be used to produce good quality compost.

Anaerobic Digestion
This involves the biological degradation of organic materials by microbial activity in the absence of oxygen. It takes place in digestor tanks or reactors, which enable control of temperature and pH levels for optimising process control. The process produces methane suitable for energy generation, and a nutrient rich organic digestate suitable for soil conditioning.

Fermentation
These technologies involve biological degradation or organic wastes to produce a chemical feedstock or liquid fuel. Primary inputs have been agricultural wastes, but recent developments take municipal organics including food wastes and sewage sludge.

Mechanical Biological Treatment
There are several forms of this technology to allow compost based processing of source separated waste or mixed municipal waste. One of the processes involves waste separation such as shredding, followed by a biological process, either aerobic or anaerobic. The process results in a significant reduction of biologically decomposable substances. The product is low in gas formation potential and has a low carrying potential of pollutants.

Thermal Technologies
Thermal waste technologies are well established in Europe and North America, with incineration the most widely used thermal process. Energy recovery is usually in the form of heat and electricity.

Incineration
These technologies recover the calorific energy contained in residual wastes. Heat and steam for electricity generation is produced through combustion of the input waste. Conventional incinerators consume some 200 to 400 tonnes of waste per day. However, air pollution control is critical because particulates and dust, Nitrogen oxide, acid gases and dioxins, furans, polyaromatic hydrocarbons and heavy metals may be generated.

Pyrolysis/Gasification/Melting
Pyrolysis involves indirectly heating carbon rich material. The aim is to achieve thermal degradation of the material at a temperature of some 500 degrees centigrade in the absence of oxygen and under pressure. Useable energy of around 200 to 400 kWh/tonne of waste is generated in the process. Energy production and greenhouse gas production are lowered due to the starved air conditions. Less volatile heavy metal species are produced in the char, while volatile species need to be caught by gas cleaning systems and treated as hazardous materials. A liquid fraction is also produced which, with further processing, may be used as a synthetic oil. Gasification involves heating carbon rich waste in a slightly reduced oxygen atmosphere. The majority of carbon is converted to a gaseous form, leaving an inert residue. Gasification is widely considered an energy efficient technique for reducing the volume of solid waste and for recovering energy. Waste melting refers to thermal technologies that operate at sufficiently high temperatures to completely oxidise or reduce the waste and produce an inert glassy slag.

Landfill Technologies

Landfill is the disposal of waste to land. In 1998, 62 percent of waste was landfilled in NSW. Landfill technology is based on anaerobic decomposition, which depends on hyrdrolysis (breakdown of complex organics to monomers), acidification, and methanogenisis (methane and carbon dioxide formation).

Conventional Wet Landfill

These mature technologies are used to facilitate waste decomposition in a controlled manner. As the process of biodgradation takes place methane and carbon dioxide are released. Landfill gas is usually collected from large scale developments by a piped collection system, and may be combusted to produce electricity. Landfills now use a liner or natural geological barrier beneath the waste, aimed at water protection.

Conventional Dry Landfill

These are feasible in low precipitation climates where the minimisation of water infiltration inhibits the biodegradation of waste. This reduces or eliminates leachate and landfill gas formation because of the dry stable conditions.

Bioreactor Landfill

These landfills rely on enhanced microbial decomposition that result in an accelerated process compared with conventional landfill. The rate of anaerobic decomposition is accelerated by recirculation of leachate and sometimes sewage sludge. The process aims to improve gas production and to reduce the time taken to achieve landfill stabilisation.

Table 4 below summarises the different technologies and their input wastes and output products, if any.

Table 4: Input Wastes and Output Products by Waste Technology Type[28]

Technology Class	Input Waste Types	Output Products
Mechanical Separation Technologies		
Material Sorting	Mixed dry recyclables, including: • paper/cardboard • packaging plastics, paper, glass, metals.	Reprocessible materials by type
	Industrial dry recyclables, including: • paper/cardboard, • metals, plastic, glass, • timber, concrete, spoil	Reprocessible materials by type
Waste Separation	Mixed residual waste	Organic mass for biological organic processes. High calorific material (RDF) for thermal processes or reduced volume landfill. Inert materials, metals.
Biological Technologies		
Land Application	Agriculture wastes, sewage sludge, gypsum, specific organic wastes including grease trap wastes.	Soil improvement.
Open Windrow Composting	Garden waste, sewage sludge.	Compost, soil conditioner.
Vermicomposting	Sewage sludge, food and garden waste.	Compost, soil conditioner.
Enclosed composting	Mixed organic waste, including food, garden and preseparated waste.	Compost, soil conditioner.
Anaerobic Digestion	Mixed organic waste, including food and garden waste.	Biogas fuel/green energy. Digestate material for compost.
Fermentation	Agricut. wastes, mixed organic wastes.	Liquid fuel.

[28] From: Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 7.

Thermal Technologies		
Incineration	Mixed residual waste. High calorific specific wastes.	Heat/steam/energy.
	Special wastes including clinical and hazardous.	Waste destruction.
Pyrolysis/ Gasification	Sewage sludge, agriculture wastes. Mixed organic waste, including food and garden waste, paper pulp and preseparated residual waste.	Pyrolysis oil or Syngas/green energy.
Waste melting	Metal and hazardous wastes, mixed residual waste potential.	Syngas/green energy Heat/energy. Metal residue.
Landfill Technologies		
Conventional Wet Landfill	Mixed residual waste.	Methane/green energy.
Conventional Dry Landfill	Mixed residual waste.	Nil.
Bioreactor Landfill	Mixed residual waste.	Methane/green energy.

7.1 An Evaluation of the Above Technologies

The Alternative Waste Inquiry then evaluated each of the above technologies and gave them a score out of 100. The evaluation criteria were: technical issues; environmental issues; social issues; and economic issues. Each criteria was allocated 25 points. The results are summarised in Table 5 below.

Table 5 – Technology Evaluation[29]
Each category is given a score out of 25, with totals out of one hundred.

	Tech-nical / 25	Environ-mental / 25	Social /25	Economic /25	Total /100
Mechanical					
Material Sorting	19.8	22.5	21.4	17.8	**81.5**
Waste Separation	19.6	16.0	11.0	15.2	**61.8**
Biological					
Land Application	14.6	20.4	10.4	16.2	**61.6**
Open Windrow Compost	19.6	15.4	14.8	18.6	**68.4**
Vermi-composting	16.8	17.2	17.4	18.7	**70.1**
Enclosed Composting	18.3	19.6	18.2	15.6	**71.7**
Anaerobic Digestion	16.8	17.0	15.0	15.8	**64.6**
Fermentation	13.6	17.2	15.0	16.0	**61.8**
Thermal					
Incineration	19.2	15.0	6.8	9.8	**50.8**
Pyrolysis/gasification	16.8	15.4	15.0	15.0	**62.2**
Waste Melting	17.0	17.4	12.6	14.2	**61.2**
Landfill					
Conventional Wet Landfill	23.6	8.4	9.0	20.0	**61.0**
Conventional Dry Landfill	23.6	11.8	9.0	17.0	**61.4**
Bioreactor Landfill	21.2	9.2	10.0	20.0	**60.4**

The authors of the report stated that the evaluation results indicated that each of the above classes could make a contribution in an integrated waste management system that aims for increase resource conservation. The following conclusions were made:

- Mechanical technologies – these perform specific purposes which precede other treatment processes. Material sorting technologies score very well due to their maturity and modest cost in sorting dry recyclables, which are then reprocessed to create new paper and packaging procedures. Waste separation technologies score moderately for their ability to segregate mixed residual wastes so that various fractions can then be processed using composting or gasification technologies.

- Biological technologies – these score very well on an aggregated basis. The composting technologies produce a moderate to high quality soil conditioner with strong market acceptance. They are mature technologies with moderate to good environmental characteristics and social impact and good economic viability.

[29] From: Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 69.

- Thermal technologies – these are a mixed bag. Incineration scores poorly overall due to economic and social issues and low resource conservation capabilities. The new thermal technologies of pyrolysis/gasification and waste melting are proven for specific materials and some of the former are reaching commercial status for mixed waste treatment. These technologies produce energy at moderate cost and score moderately well on the criteria.

- Landfill technologies – these score moderately on the criteria, mainly due to their maturity, flexibility and low costs. These factors balance their poor performance in resource conservation, moderate environmental risks and low social acceptability.

The authors of the Alternative Waste Inquiry Report also developed three scenarios to demonstrate what might be achieved by integrating improved management practices and compatible technologies. The scenarios cover each waste generating sector: municipal; commercial and industrial; and construction and demolition. The three scenarios are explained below:

Scenario 1 Carry on much as now. Based on current systems of waste minimisation and management. The total indicative cost of this scenario is $571 million.

Scenario 2 Improve current initiatives. Based on increased recycling and streaming of various wastes. The total indicative cost of scenario 2 is $600 million. Compared to scenario 1, significant gains can be made in waste minimisation at modest cost.

Scenario 3 Aggressive initiatives. Incorporating a variety of initiatives to capture and beneficially use waste streams. The total indicative cost of scenario 3 is $649 million.

The authors concluded that: the construction and demolition sector offers good scope for further recycling without major overall cost impact; and there are immediate opportunities for further waste minimisation in the commercial and industrial sector to scenario 2 level without major overall financial cost impost. Table 6 below provides some of the waste diversion rates (ie, waste that is diverted from landfill to recycling or reuse or other beneficial use) and indicative costs (taking into account costs and revenues) for each sector and scenario.

Table 6: Scenario Indicative Financial Outcomes[30]

	Municipal	Commercial / Industrial	Construct./ Demolition
Scenario 1 (current)			
% Diverted	25	24	60
Indicative cost per tonne	$139.23	$81.43	$59.95
Scenario 2 (improved)			
% Diverted	49	42	67
Indicative cost per tonne	$146.33	$85.63	$62.72
Scenario 3 (aggressive)			
% Diverted	66	63	76
Indicative cost per tonne	$156.40	$95.97	$66.35

Table 7 summarises the waste flows for each of the three scenarios, including: the percentage of waste recycled; the tonnage of waste recycled; and the residual amount of waste for each sector.

Table 7: Scenario Resource Flows (million tonnes per annum -mtpa)[31]

Scenario 1 (Current) Flow Plan				
Sector	**Streamed, Recycled (% of total)**	**Streamed, Recycled (mtpa)**	**Residual (mtpa)**	**Total (mtpa)**
Municipal	25	0.450	1.350	1.800
C& I	24	0.500	1.600	2.100
C & D	60	1.500	1.000	2.500
Total	**38**	**2.450**	**3.950**	**6.400**
Scenario 2 (Improved) Flow Plan				
Sector	**Streamed, Recycled (% of total)**	**Streamed, Recycled (mtpa)**	**Residual (mtpa)**	**Total (mtpa)**
Municipal	49	0.886	0.914	1.800
C& I	42	0.888	1.212	2.100
C & D	67	1.682	0.818	2.500
Total	**54**	**3.456**	**2.994**	**6.400**

30 From: Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 15.

31 From: Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 15.

Scenario 3 (Aggressive) Flow Plan				
Sector	**Streamed, Recycled (% of total)**	**Streamed, Recycled (mtpa)**	**Residual (mtpa)**	**Total (mtpa)**
Municipal	66	1.188	0.612	1.800
C& I	63	1.319	0.781	2.100
C & D	76	1.900	0.600	2.500
Total	**69**	**4.407**	**1.993**	**6.400**

Scenario 2 mainly involves improvements in municipal and commercial and industrial recycling rates. The authors identify key programs to achieve this including: collection of garden waste; increased recycling rates from 'partial participants'; treatment and reprocessing of a portion of the residual waste stream; targeted food waste collection from commercial and industrial sector; and increased source separation rates by small to medium enterprises of dry recyclable materials. To achieve scenario three involves a dramatic improvement in recycling, source separation, streaming and collection in all sectors.[32]

7.2 Key Recommendations from the Alternative Waste Inquiry

The Alternative Waste Inquiry made 14 recommendations, some with many sub-components. However, the Inquiry also developed several 'themes' which were considered to be central to the waste management industry. These 'themes' are discussed below.

Theme 1 – The Triple Manifesto
The Inquiry concluded that in regards to waste management, choices of State or regional waste technologies, practices and strategy are inextricably linked. Determinations of one area cannot be made without impacts on the other areas, and all contribute to sustainable waste management. The Inquiry urged the Government to adopt this triple manifesto as the defining framework for waste management, and recommended that Government reviews of waste management legislation are based on moving the paradigm from waste disposal toward resource management.

Theme 2 – The Marketplace
This theme concerns a much more deliberate inclusion of the marketplace for resources in the waste management business. The materials handled by the waste industry can have value, yet the mind-set is often turned to the cost side of the business rather than the revenue side. The Inquiry recommended that the Government initiate and promote actions to stimulate the market for recyclate.

Theme 3 – Waste Management Technologies
This theme notes that there is an ample array of technologies that exist to enable

32 Wright,T *et al, Report of the Alternative Waste Management Technologies and Practices Inquiry*, April 2000, Office of the Minister for the Environment, at 110.

management of a greater amount of waste in NSW as a potential resource. The Inquiry noted that no one technology is suitable for all waste streams. The Inquiry noted that the Government should guide adoption of a portfolio that comprises all classes of technologies, on the basis of end-market demands, waste streams available and regional circumstances.

Theme 4 – Integrated Waste Management Practices
The fourth theme is that no single waste management practice, treatment technology and disposal technique can handle the full array of waste sources, types and recycling possibilities. Integrated waste management is based on the idea of an overall approach coordinating logistics, waste streams, recyclables streams, treatment technologies and markets. The three components of integrated waste management practice are: waste streaming, where like materials are similarly classified and collated; system integration, where responsibility for sequential activities, waste streams and geographic areas are aligned and broadened; and industry arrangements where the roles and responsibilities of the institutions and private sector corporations involved in waste management are clearly focused.

Theme 5 – Costs of Potential Improvements
The Inquiry noted that improved and integrated management practices and technologies can bring about good waste reduction outcomes at moderate cost.

8.0 The Need for a New Landfill Tip for Sydney – the Wright Inquiry

In light of the findings of the Alternative Waste Inquiry, Mr Tony Wright was commissioned by the Minister for Urban Affairs and Planning to advise him on:[33]

- Available landfill capacity for solid putrescible waste in the Sydney region, to accommodate current and future projected demand from 2001 to 2020 for the three waste scenarios as outlined in the Alternative Waste Inquiry;

- The implications of the above on the need or otherwise for the proposed Woodlawn landfill;

- Scope for a new major landfill to compromise the likely rate of introduction of improved technologies and practices…;

- Likely mid to long term justification of such a new major landfill in the light of the various assumptions on the likely rate of the introduction of improved technology and practices.

The Minister for Urban Affairs and Planning, the Hon Dr Refshauge MP, said: "While Sydney's waste disposal needs can be accommodated in the short term, we will not be

[33] Wright,AG *Independent Public Assessment – Landfill Capacity and Demand*. September 2000.

letting any significant landfill proposal go ahead until we know how much space we need in the longer term."[34]

Wright noted that waste management is in a period of transition. Many people already regard waste as a potential resource, and others are moving towards that view. Innovative technologies and practices are emerging to facilitate this modern regard for waste, and markets are being further developed for the new products that can be created. Wright concluded that integrated waste management, that strives for maximum resource conservation, must rely on a portfolio of treatment and disposal technologies. Landfill will remain a part of the technology mix, but should make a decreasing contribution to the way waste resources are managed.[35]

The estimated Sydney putrescible landfill capacity at January 2001 is 20.8 million tonnes of waste. This capacity is being drawn down at a current rate of around 2.0 million tonnes per year. The Report then examined demand for putrescible waste landfill space under various scenarios and compared these to available landfill capacity. Three main variables were required to be brought together to make this analysis. They were:

- Waste diversion scenario – the actual waste diversion scenario level achieved over time. The three scenarios from the Waste Inquiry Report as discussed above were used. These were: scenario 1 – carry on much as now; scenario 2 – improved initiatives; scenario 3 – aggressive initiatives. A fourth highly optimistic scenario was also developed, termed ultimate initiatives.

- Time required to implement waste diversion scenarios – the rate of take-up of initiatives to bring about these scenarios. Nine schemes were developed, with varying take up rates spanning the range from business as usual to a rapid implementation time frame;

- Landfill input rate mix – the allocation of waste input among the available landfills in order to make best use of available landfill capacity at an impact level acceptable to the community.

The review confirmed the Waste Inquiry view that Sydney could progressively accomplish the Improved Initiatives Scenario and later the Aggressive Initiatives Scenario. The progressive take up scheme (scheme 5 of the 9 developed) was noted as keeping up with the pace of reform in the best-performing United States cities. The Fast take up scheme (scheme 7) was noted as being optimistic but possibly achievable. At the progressive and fast take up rates (ie schemes 5 and 7), a significant and continuing landfill capacity shortfall will be encountered after 2006.[36]

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34 Media Release, Deputy Premier, Minister for Urban Affairs and Planning, Minister for Aboriginal Affairs, Minister for Housing, "Independent expert to assess need for landfill sites." 6 July 2000.

35 Wright,AG *Independent Public Assessment – Landfill Capacity and Demand*. September 2000, at viii.

36 Wright,AG *Independent Public Assessment – Landfill Capacity and Demand*. September

Recommendation one of the review was that early action to establish a satisfactory new landfill site should be taken. The review also recommended that:[37]

- the Government should limit the flow of material to landfills by driving aggressive programs to minimise waste creation, and to divert waste created to beneficial use;

- the Government should consider ways to strengthen waste avoidance initiatives as a focus of the statutory review of the the Waste Management Act;

- the Government should establish a basis to closely monitor the waste treatment and disposal industry competitive positioning and pricing, possibly through licence regulation;

- contract arrangements for waste disposal, reprocessing and collection should be framed so the that the contractor takes the flow continuity risk (for example, Northern Sydney Waste Board has framed its proposed waste disposal contract in a way that sets no downside limit on waste disposed, thus the contractor takes the flow continuity risk). Contracts ought to be framed to promote extraction of maximum value from the discarded resource.

- The Government should adopt as a long term goal the following waste treatment/disposal principle: Waste should as far as practicable be treated or disposed of in the region which provides the best outcome in terms of all economic, social and environmental factors.

With the Government stating at the beginning of the Inquiry that the recommendations will help determine the applications for new landfill disposal sites, conservation groups immediately criticised the report for recommending that a new landfill site proceed. The Waste Crisis Network stated: "This will inflict city sponsored environmental degradation on long suffering rural communities, creating even greater inequity between urban and rural dwellers. Shipping city waste to the bush is tantamount to poisoning the air, land, and water of rural communities."[38]

9.0 The Approval of a New Landfill Disposal Site

The Northern Sydney Waste Board currently disposes of residual putrescible waste generated in its region at the Lucas Height Waste Management Centre. Due to future capacity restrictions at Lucas Heights, the Board sought expressions of interest for the

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2000, at xii.

37 Wright,AG *Independent Public Assessment – Landfill Capacity and Demand*. September 2000, at xiv.

38 Waste Crisis Network, "Landfill Report - A missed opportunity. Lack of vision for waste free future will poison rural communities." Media Release 9 October 2000.

provision of alternative landfill capacity for an estimated 400,000 tonnes of waste per annum for a minimum 25 year period from 1 January 2001. Several landfill proposals, including those by Collex at Muswellbrook and Woodlawn, were proposed in response.[39]

On 25 September 1998, the Board announced that it would enter into negotiations with Collex for the development of its Muswellbrook proposal, with in principle support for the Woodlawn proposal. The Board entered into a contract for the development of the Muswellbrook proposal, with a provision that the contract applies to Woodlawn if Muswellbrook fails to secure the necessary statutory proposals. On 27 January 1999, the then Minister for Urban Affairs and Planning refused development consent for Collex's Muswellbrook proposal. Collex then proceeded with the lodgement of a development application for the Woodlawn proposal.[40]

On 16 February 1999 Collex Waste Management lodged with the Department of Urban Affairs and Planning an application for a putrescible landfill operation at Woodlawn. The site is a former open cut mine site, approximately seven kilometres west of Tarago on the Goulburn – Bombala railway line and 250 km southwest of Sydney. The mine closed down in March 1998 when the Melbourne based company Denehurst Pty Ltd collapsed owing $27 million. 160 mine workers were stood down and are owed $6.5 million in entitlements.[41] It was expected that royalties from the landfill project would fund the payout to the miners.

After a Commission of Inquiry which recommended the proposal proceed, and the waste inquiry reports as detailed above, on 30 November 2000 the Minister for Urban Affairs and Planning Hon Dr Andrew Refshauge MP granted development consent to the proposal.

The Minister attached 161 conditions to the consent, including granting approval for 20 years, and limiting the annual inputs of waste into the facility. For the first five years of operation, the facility is limited to accepting 400,000 tonnes per annum, decreasing to 360,000 tonnes per annum for the next five years, then 325,000 tonnes per annum for the following five years, and 290,000 tonnes per annum for the final five years. The Minister may approve increasing the amount of waste disposed only if the need for additional capacity is demonstrated by an independent public assessment of landfill capacity and demand in the Sydney region.[42] However, with these conditions limiting the capacity of

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39 Department of Urban Affairs and Planning, *Proposal by Collex Waste Management Pty Ltd for the Woodlawn Waste Management Facility, Mulwaree Shire. Report on theAssessment of a Development Application Pursuant to the Section 80 of the Environmental Planning and Assessment Act 1979*, at 12.

40 Department of Urban Affairs and Planning, *Proposal by Collex Waste Management Pty Ltd for the Woodlawn Waste Management Facility, Mulwaree Shire. Report on theAssessment of a Development Application Pursuant to the Section 80 of the Environmental Planning and Assessment Act 1979*, at 12.

41 "Greenies cost axed miners $3m" in *The Sydney Morning Herald*, 6 December 2000.

42 Department of Urban Affairs and Planning, *Determination of a Development Application Under Section 80(1) of the Environmental Planning and Assessment Act 1979*, 30 November 2000.

the landfill, the administrator for Denehurst has stated that only $3 million of the mine workers entitlements could be guaranteed.[43]

The mine void in which landfilling is to take place has a depth of about 200 metres and a volume of approximately 25 million cubic metres. Given waste inputs of 400,000 to 500,000 tonnes per annum, the projected life of the landfill per se (ie, ignoring the conditions of consent as above) is 40 to 50 years.[44]

The Woodlawn site is to accept containerised waste from Sydney, to be transported by rail to an intermodal transfer facility approximately six kilometres from the site, from where trucks will transport the waste to the landfill. The landfill is to operate as a 'bioreactor landfill', which as noted in section 7.0 of this paper, involves the recirculation of landfill leachate which results in an increase in gas production and a more rapid settlement and stabilisation of the waste.

10.0 Conclusion

There are a multitude of forces that influence the development of waste policy and practice. One of the most important is the actions of every person, who must deal with their 'rubbish' every day. How rubbish is dealt with on an individual level has repercussions throughout the waste management industry. It is apparent that we are on the edge of commencing a whole new range of waste treatment technologies. The rate at which these are adopted will ultimately be determined by market and regulatory forces. This is where the community must guide decision makers and indicate, both by their actions and words, how they would like their rubbish to be managed.

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43 "Greenies cost axed miners $3m" in *The Sydney Morning Herald*, 6 December 2000.

44 Department of Urban Affairs and Planning, *Proposal by Collex Waste Management Pty Ltd for the Woodlawn Waste Management Facility, Mulwaree Shire. Report on theAssessment of a Development Application Pursuant to the Section 80 of the Environmental Planning and Assessment Act 1979*, at 8.