

# Draft Approved Methods for Large Non-metropolitan Landfills

Consultation workshop

# Outline

- Who is affected?
- What do they have to report?
- How will this affect facilities?
- Principles for approved methods
- Draft methods
  - ❖ Estimating amount received & leaving
  - ❖ Estimating stockpiles
  - ❖ Estimating bulk densities
  - ❖ Estimating source of waste
- Alternative methods
- Feedback sought



# Who is affected?

... a licensee, or a person who is the occupier of premises (the relevant premises) that would, if the person held a licence in respect of the relevant premises, be a licensed landfill –

- a) if at least 20 000 tonnes of reportable waste is received in a financial year at the licensed landfill or the relevant premises; and
- b) if the licensed landfill is, or the relevant premises are, outside the metropolitan region.

That is - non-metropolitan landfills receiving 20,000 tpa of waste or more.



# Waste subject to the landfill levy

Any landfills receiving waste that is subject to the levy under the Waste Avoidance and Resource Recovery Regulations 2008 must use the methods described in *Environmental Standard: Approved manner for estimating the volume or weight of waste received at and disposed of to landfill*.

Available on DWER website.



# What do “liable” landfills have to report?

- ▶ Amount of waste received (tonnes per annum)
- ▶ Amount of waste disposed to landfill (tonnes per annum)
- ▶ Amount of material stored in stockpiles at the end of financial year (tonnes)
- ▶ Amount of material removed from the site (tonnes per annum)
- ▶ Destination / fate of material removed from site (recycling, waste-to-energy or disposal to landfill)
- ▶ Material category of waste received
- ▶ Source waste stream of waste received (MSW, C&I or C&D)
- ▶ Geographic source of material received (Perth metropolitan region, Peel region or other regions)

# How does this affect facilities?

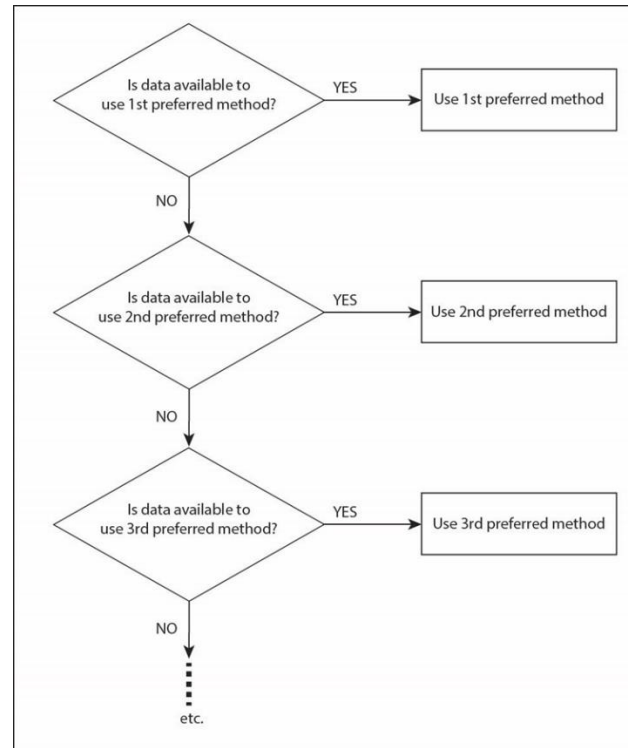
- ▶ Liable entities will be required to inform DWER of their liability
- ▶ Need to record data necessary to report at the end of each financial year
- ▶ Need to keep records
- ▶ Need to compile data in CEO-approved reporting format
- ▶ Need to submit annual data report by 1 October each year



# Principles of approved methods

- ▶ Clear identification of the point at which the data is collected (for example, at point of collection, point of disposal, on entry to the facility or on exiting the facility)
- ▶ Consistent (the same methodology should be used to collect the data for the whole year)
- ▶ Repeatable (the method must be able to be repeated).
- ▶ Maximise accuracy (the most accurate method should be used, i.e. the method should be chosen that minimises the error in the data to be reported)
- ▶ Containerised (the volume and weight of material is easier to measure if it is in containers)
- ▶ Fewer assumptions the better (assumptions introduce error).

- Hierarchy of methods
- Use the most accurate method for the information available



# Material categories

Material categories	
Paper	Organics - Food organics
Cardboard	Organics - Timber / wood
Plastics	Organics - other organics
Metals - Ferrous	Rubber/tyres
Metals - Non-ferrous	Textiles
Glass	Hazardous - asbestos
Concrete	Hazardous - batteries
Bricks	Hazardous - other
Soil, sand, clean fill	E-waste
Organics - Garden organics	



# Draft Methods - Estimating Waste In & Out by weight

1<sup>st</sup> preferred method - weighing

$$\text{Annual waste} = \sum (\text{weight of waste loads})$$



# Estimation by weight - data collection

To estimate total waste by weight, the following data must be recorded for each load

- ▶ Geographical source (Metro, Peel, Other non-Metro)
- ▶ Source waste stream (MSW, C&I, C&D)
- ▶ Material category
- ▶ Weight of the load - weighed on a weighbridge

# Example - Estimation of waste received by weight

Data collected at weighbridge

Load In	Weight (tonnes)	Geographical source	Source waste stream	Material category
Load 1	5	Other non-metro	MSW	mixed putrescible waste
Load 2	4	Other non-metro	C&I	mixed putrescible waste
Load 3	3	Other non-metro	C&I	mixed putrescible waste
Load 4	5	Other non-metro	MSW	mixed putrescible waste
Load 5	3	Other non-metro	MSW	mixed putrescible waste
Load 6	0.5	Other non-metro	MSW	mixed putrescible waste
Load 7	0.05	Other non-metro	MSW	Cardboard
Load 8	6	Other non-metro	MSW	mixed putrescible waste
Load 9	4	Other non-metro	MSW	mixed putrescible waste
Load 10	2	Other non-metro	C&I	Ferrous
<b>TOTAL</b>	<b>32.55</b>			



Data reported to DWER

Geographical source	Waste stream	Material category	Weight (tonnes)
Other non-metro	C&I	Ferrous	2
Other non-metro	C&I	Mixed putrescible waste	7
Other non-metro	MSW	Cardboard	0.05
Other non-metro	MSW	Mixed putrescible waste	23.5
<b>TOTAL</b>			<b>32.55</b>

# Example - Estimation of waste fate by weight

Data collected at weighbridge

Load out	Weight (tonnes)	Fate	Material category
Load 1	10	Recycling	Cardboard
Load 2	10	Recycling	Cardboard
Load 3	12	Recycling	Cardboard
Load 4	20	Recycling	Cardboard
Load 5	15	Recycling	Cardboard
Load 6	8	Recycling	Plastic
Load 7	20	Recycling	Cardboard
Load 8	10	Recycling	Non-ferrous
Load 9	15	Recycling	Ferrous
Load 10	20	Recycling	Ferrous
<b>TOTAL</b>	<b>140</b>		



Data reported to DWER

Fate	Material category	Weight (tonnes)
Recycling	Cardboard	87
Recycling	Ferrous	35
Recycling	Non-ferrous	10
Recycling	Plastic	8
<i>Recycling sub-total</i>		<i>140</i>
Landfill	Mixed putrescible waste	21,587
<b>TOTAL</b>		<b>21,727</b>

# Draft Methods - Estimating Waste In & Out by Volume

2<sup>nd</sup> preferred method - estimation of volume and convert to weight

$$\text{Annual waste} = \sum (\text{volume of waste load}) \times (\text{density of waste})$$

# Estimation by volume - data collection

To estimate total waste by volume and convert to weight, the following data must be recorded for each load

- ▶ Geographical source (Metro, Peel, Other non-Metro)
- ▶ Source waste stream (MSW, C&I, C&D)
- ▶ Material category
- ▶ Volume of the load
- ▶ Density of the material / load
  - ❖ Either facility's own figures or use default values

# Example - Estimation of waste received by volume, converting to weight

Data collected at gatehouse / entrance

Load In	Load volume (m <sup>3</sup> )	% fullness	Geographical source	Source waste stream	Material category	Material bulk density (t/m <sup>3</sup> )	Weight (tonnes)
Load 1	15	100%	Other non-metropolitan	MSW	mixed putrescible waste (compacted)	0.425	6.38
Load 2	20	100%	Other non-metropolitan	C&I	mixed putrescible waste (compacted)	0.425	8.50
Load 3	1	100%	Other non-metropolitan	C&I	mixed putrescible waste (uncompacted)	0.087	0.09
Load 4	3	80%	Other non-metropolitan	MSW	mixed putrescible waste (uncompacted)	0.087	0.21
Load 5	15	100%	Other non-metropolitan	MSW	mixed putrescible waste (compacted)	0.425	6.38
Load 6	1	100%	Other non-metropolitan	MSW	Cardboard	0.1	0.10
Load 7	6	80%	Other non-metropolitan	C&I	Ferrous	0.5	2.40
Load 8	3	100%	Other non-metropolitan	C&I	Co-mingled recycling	0.063	0.19
Load 9	10	100%	Other non-metropolitan	MSW	mixed putrescible waste (compacted)	0.425	4.25
Load 10	0.5	100%	Other non-metropolitan	MSW	mixed putrescible waste (uncompacted)	0.087	0.04
<b>TOTAL</b>							<b>28.53</b>



Data reported to DWER

Geographical source	Waste stream	Material category	Weight (tonnes)
Other non-metropolitan	C&I	Co-mingled recycling	0.19
Other non-metropolitan	C&I	Ferrous	2.40
Other non-metropolitan	C&I	mixed putrescible waste (compacted)	8.50
Other non-metropolitan	C&I	mixed putrescible waste (uncompacted)	0.09
Other non-metropolitan	MSW	Cardboard	0.10
Other non-metropolitan	MSW	mixed putrescible waste (compacted)	17.00
Other non-metropolitan	MSW	mixed putrescible waste (uncompacted)	0.25
<b>TOTAL</b>			<b>28.53</b>

# Example - Estimation of waste fate by volume, converting to weight

Data collected at gatehouse / exit

Load Out	Load volume (m <sup>3</sup> )	% fullness	Fate	Material category	Material bulk density (t/m <sup>3</sup> )	Weight (tonnes)
Load 1	15	100%	Recycling	Cardboard	0.1	1.50
Load 2	20	100%	Recycling	Plastic	0.1	2.00
Load 3	20	100%	Recycling	Co-mingled recycling	0.063	1.26
Load 4	15	80%	Recycling	Plastic	0.1	1.20
Load 5	20	100%	Recycling	Cardboard	0.1	2.00
Load 6	20	100%	Recycling	Cardboard	0.1	2.00
Load 7	20	80%	Recycling	Ferrous	0.5	8.00
Load 8	20	100%	Recycling	Co-mingled recycling	0.063	1.26
Load 9	20	100%	Recycling	Cardboard	0.1	2.00
Load 10	20	100%	Recycling	Tyres	0.3	6.00
<b>TOTAL</b>						<b>27.22</b>



Data reported to DWER

Fate	Material category	Weight (tonnes)
Recycling	Cardboard	7.5
Recycling	Co-mingled recycling	2.52
Recycling	Ferrous	8
Recycling	Plastic	3.2
Recycling	Tyres	6
<b>Recycling sub-total</b>		<b>27.22</b>
Landfill	Mixed putrescible waste	34,681
<b>TOTAL</b>		<b>34,708.22</b>



# Draft Methods - Estimating Stockpiles

1<sup>st</sup> preferred method - weight mass balance

$$Weight_{stockpile} = Weight_{original} + Weight_{received} - Weight_{left\ site} - Weight_{contamination\ removed}$$

- Need to know the amount in the stockpile at the start of the financial year.

2<sup>nd</sup> preferred method - estimation of volume and convert to weight

$$Weight_{stockpile} = (volume\ of\ waste) \times (density\ of\ waste)$$

# Determining source of waste

- ▶ Record information for each load at the gatehouse
- ▶ Infer from / ask regular customers
- ▶ Infer from type of vehicle (e.g. Council recycling truck)
- ▶ Conduct regular surveys (four per year)

# Draft Methods - Bulk Densities

- ▶ Measure bulk density - average
- ▶ Bulk density survey
- ▶ Use “default values”

Material category	Default bulk density (t/m <sup>3</sup> )
Paper	0.2
Cardboard	0.1
Plastics	0.14
Metals - Ferrous	0.5
Metals - Non-ferrous	0.14
Glass	0.347
Concrete	1.5
Bricks	1.2
Soil, sand, clean fill	1
Organics - Garden organics	0.15
Organics - Food organics	0.5
Organics - Timber / wood	0.19
Organics - other organics	0.3
Rubber/tyres	0.3
Textiles	0.15
Hazardous - asbestos	0.31
Hazardous - other	0.2
Mixed co-mingled recyclables (uncompacted)	0.063
Other / mixed - putrescible	0.3
Other /mixed - inert	1.3

# Draft Default Values - Vehicle Volumes

If volume of load is unknown and too difficult to obtain, default values can be used.

Vehicle type	Assumed volume (m <sup>3</sup> )
Small vehicle (car, ute, van, trailer)	1
Open truck - small, 2 axles	3
Open truck - large 2 axles	6
Open truck - 3 axles	10
Open truck - 4 axles	12
Open truck - 5 axles	18
Open truck - 6 axles	20
Open truck - 8 axles	20
Open truck - 9 axles	32
Open truck - 11 axles	40
Compactor truck - volume unknown	10

# Alternative methods

- ▶ Facilities can propose alternative methods for estimating any parameter
  - ❖ Weights received, disposed and leaving the site
  - ❖ Bulk densities
  - ❖ Source of waste
- ▶ Any alternative methods proposed must be accurate, repeatable and consistent.
- ▶ Alternative methods must be approved by DWER

# Feedback

- ▶ Consultation webpage on DWER website

<https://www.der.wa.gov.au/our-work/consultation/524-open-consultation-approved-method>

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