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AUSTRALIAN & NEW ZEALAND BIOSOLIDS PARTNERSHIP SURVEY 2025 – AUSTRALIA RESULTS

Date: 7/05/2026

Prepared for: Australian & New Zealand Biosolids Partnership

Ekistica

About Ekistica

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We deliver innovative solutions to the complex challenges of remote area infrastructure development through a diverse team of more than twenty professional engineers, project managers, engagement specialists and data analysts.

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Disclaimer

Abbreviations

Abbreviation	Definition
ACT	Australian Capital Territory
ANZBP	Australian & New Zealand Biosolids Partnership
ATAD	Autothermal Thermophilic Aerobic Digestion
DS	Dry solids
NSW	New South Wales
NT	Northern Territory
PFAS	Pre- and polyfluoroalkyl substances
QLD	Queensland
SA	South Australia
TAS	Tasmania
TPAD	Thermally Phased Anaerobic Digestion
VIC	Victoria
WA	Western Australia

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Executive Summary

Findings from the 2025 Australia and New Zealand Biosolids Partnership (ANZBP) biosolids production and use survey – Australia show the broad approach to stabilisation, end use and dewatering remain with a few emerging trends. Total dry biosolids production rose nationally, to about 378,000 dry tonnes or 1.8 million wet tonnes.

Anaerobic digestion continues to be the main stabilisation practice. Further stabilisation is undertaken for over half biosolids produced in Australia. Further stabilisation is mostly some form treatment to increase material dryness and stability.

A large majority of the biosolids have been beneficially reused, similarly with previous years with agricultural end use being the most common end use practice. Overall, 82% of biosolids produced in Australia in 2024/25 were beneficially used through a mix of agriculture, land rehabilitation, landscaping and forestry. Over a third of biosolids produced is transported between 151 and 400 km for use.

Management of emerging contaminants remains limited. Five producers, representing approximately 33% of national biosolids production by dry mass, reported actively addressing emerging contaminants through the application of formal, detailed risk assessment frameworks.

Renewable energy is produced at 43 sites, representing just under 50% of biosolids production reported. All sites producing electricity did so from anaerobic digestion processing producing methane. Methane was used for heat on site and electricity production used on and off site.

In terms of biosolids transaction, the mass of biosolids that were given away by the producer compared for the producer paying for removal has doubled since 2023. Two biosolids producers reported sale of their product, in both instances this product was a very dry, stable product. Further biosolids was sold by a third party after further processing.

Trends relating to biosolids production and end use as well as concerns and opportunities identified by biosolids producers include:

- A continuing trend for movement of biosolids or sludge to centralised locations for processing;
- A use of short-term stockpiling to improve biosolids quality and buffer end use risk impacts;
- Existing and predicted upcoming regulation of emerging contaminants is causing diversion of biosolids to landfill and for biosolids producers to take a precautionary approach and stockpile biosolids rather than land apply them;
- Emerging contaminants, changing regulations and cost are seen as the three biggest risks or concerns;
- Emerging contaminants and different end use markets are seen as the biggest opportunities,

1 INTRODUCTION

In 2010, the Australian & New Zealand Biosolids Partnership (ANZBP) commissioned a national survey to identify the main features of biosolids management across Australia and New Zealand. The survey was repeated a further 7 times (mostly biennially) including this survey in 2025. This report pertains to Australia only and collates survey results for the 2024/25 financial year.

Surveys to 2019, inclusive, catalogued and reported the following primary parameters:

- Biosolids production;
- Biosolids end use;
- Biosolids stabilisation grade;
- Biosolids contamination grade; (added in 2013)
- Biosolids main stabilisation process; and
- Biosolids dewatering process.

From 2021, data were collected to both update the survey in line with current and predicted trends and to obtain data that anticipated to be useful to ANZBP members and government departments. These data are:

- Biosolids further stabilisation processes;
- End use management and branding;
- Stockpile volumes;
- Transportation of biosolids to end use site;
- Emerging contaminant management; and
- Renewable energy production.

From 2023 onwards participants were asked to comment on industry risks and opportunities.

The results of this survey are presented on a national and state basis. Some discussion is also provided on significant changes.

2 METHODOLOGY

2.1 METHODOLOGY SUMMARY

The approach used to determine the biosolids production in Australia was to survey, as a minimum, all wastewater treatment plants servicing over 30,000 people. The ANZBP identified that this criterion would capture around about 80% of Australia's population. In the course of the survey many water utilities and councils provided information on plants smaller than this threshold and where they did, the data was included. This year, a total of 404 sites were included in the analysis. Data from 304 sites was provided and for a further 100 sites, data was used from 2021 and 2023 was included in the analysis.

Data from New South Wales and the Australian Capital Territory was consolidated into one group to protect the privacy of the producers in the Australian Capital Territory. The same was done for Western Australia and the Northern Territory.

All classifications are made on the basis of dry tonnes of production unless otherwise stated.

Biosolids from lagoon based systems are only reported if biosolids were removed and beneficially used in that year. Otherwise, the mass reported from that system is zero.

2.2 LIMITATIONS

Data is provided on a voluntary basis by biosolids producers. Some biosolids producers are not able to provide data in a given year in which instance previous year's data are used with no escalation of biosolids production rates. Of the 100 sites where previous data were used in this analysis, about 70 sites actively produce biosolids daily and collectively these sites produce about 12% of national biosolids production on a dry mass basis.

Efforts are made to verify data by comparison with previously provided data, checking production is generally consistent with treatment facility load and biosolids stabilisation methodology and discussions with biosolids producers where an error may have occurred. Stockpile data should be considered to have limited accuracy due to the difficulties of estimating stockpile size, changes in size as biosolids digests in stockpiles ang general reporting errors which cannot be verified like other data in the report.

No onsite verification or verification through other means is performed.

3 CLASSIFICATION

To enable relatively simple analysis and presentation of the data, each area of information, such as end use, is classified into broad groupings. These groupings are discussed below.

3.1 PRODUCTION

Total biosolids production is presented in terms of dry tonnes of biosolids. Data on % dry solids by state are also presented.

3.2 END USE

The following classifications were used for end use:

- Agriculture: for biosolids applied to land for its fertiliser value without value added processing;
- Landscaping: for biosolids used for landscaping or other horticultural use. Note this end use category changed in 2021 from "Landscaping (compost)", as composting is classified as a stabilisation process not an end use;
- Forestry: for biosolids applied to plantation forests to aid tree growth;
- Landfill: for biosolids disposed to landfill;
- Ocean discharge: for biosolids discharged to the ocean;
- Stockpile: for biosolids stored, pending future planning, processing or use;
- Land rehabilitation: for biosolids applied to land, such as mine sites for rehabilitation of the land. This category was expanded in 2021 to include restoration or quarry rehabilitation;
- Other: any other uses; and
- Unspecified: for sites for which no data was provided by the utility or for which the end use could not be identified.

The following uses can be classified as being 'beneficial' uses: agriculture, landscaping, forestry, and land rehabilitation/restoration and quarry rehabilitation.

3.3 STABILISATION GRADE

Due to the different standards and naming conventions used for Stabilisation Grades across Australia, a standardised grading schema was applied as shown in Table 3-1. Stabilisation grade was classified on the basis of an A, B or Unstabilised grading. Some biosolids were not graded by the utility and are marked as NG (not graded) in the survey results.

Table 3-1 Stabilisation Grade

Classification	NSW	VIC	SA	QLD	TAS	WA	NZ
A	A	T1, T2	A	A	A	P1, P2	A
B	B	T3	B	B	B	P3	B
Unstabilised	C	Unstabilised	Unstabilised		Unclassified	P4	Unstabilised

3.4 CONTAMINATION GRADE

Due to the different standards and naming conventions used for Contaminant Grades across Australia, a standardised grading schema was applied (see Table 3-2). Contamination grade was classified on the basis of A, B, C or Restricted / Unsuitable for use. Some biosolids were not graded by the utility and are marked as NG (not graded) in the survey results.

The purpose of this comparison is to allow both long term tracking of biosolids quality changes and offer some comparison between states. The comparison between gradings is not direct and this report does not represent that they are. Gradings across jurisdictions are different and the reader should refer to state guidelines to compare individual contaminant grades.

Changes made for this survey are South Australian biosolids grade C removed and grade B classified as equivalent to standardised grade C in alignment with the 2020 guidelines from those jurisdictions. Victorian and Western Australian classifications remain as C2 equivalent to standardised grade B.

Table 3-2 Contaminant Grading

Classification	NSW	VIC	SA	QLD	TAS	WA	NZ
A	A	C1	A	A	A	C1	A
B	B	C2		B		C2	B
C	C		B	C	B		
Restricted or Unsuitable for use	D, E	Unsuitable for use	Unsuitable for use		Unsuitable for use	Unsuitable for use	Unsuitable for use

3.5 STABILISATION PROCESS

Classification of stabilisation process was made on the basis of the main stabilisation process following the main liquid sewage treatment process. The following stabilisation process categories were used, with categories that have been added over the years denoted in parentheses:

- Aerobic digestion;
- Agitated air drying;
- Air drying;
- Anaerobic digestion;
    - Acid phase digestion;
    - Standard mesophilic anaerobic digestion;
    - Thermophilic phase anaerobic digestion (TPAD);
- Thermal hydrolysis with pre-treatment with anaerobic digestion;
- Autothermal thermophilic aerobic digestion (ATAD);
- Composting;
- Extended aeration (new in 2021);
- Incineration;
- Lagoon storage (used for biosolids stored in liquid form);
- Lime stabilisation;
- Long term storage (of dewatered biosolids);
- Sludge drying beds and drying lagoons;
- Thermal drying;
- Solar drying (new in 2021);
- Pyrolysis and gasification (new in 2021);
- None;
- Other;
- Unspecified (used where no data were provided)

This list is also used to classify further processing steps with the addition of “No further processing”. For example, if a site has aerobic digestion followed by a composting process (on or off site) the main process is aerobic digestion and the further process is composting.

3.6 DEWATERING PROCESS

Classification of the dewatering process was made on the basis of the following categories:

- Belt filter press;
- Conventional centrifuge;
- Drying bed or lagoons;
- Screw press;
- None;
- Other; and
- Unspecified (used where no data were provided)

3.7 BIOSOLIDS MANAGEMENT

Classification of biosolids management was based on the following series of questions. Results are reported on a dry tonne basis or by number of water authorities as relevant. These questions were:

1. Are your biosolids analysed regularly for PFAS or other emerging contaminants that are not yet regulated?
2. Is renewable energy produced from biosolids processing on site (e.g. from biogas produced during sludge digestion)?
    a) No renewable energy is produced from biosolids processing;
    b) Biogas is used to provide heat for onsite use; no electricity is produced;
    c) Biogas is used to provide heat for export; no electricity is produced;
    d) Biogas is used to provide heat for onsite use and electricity is exported to the grid;
    e) Biogas is exported offsite; or
    f) Other
3. If yes to Q2, what is the quantity of this in GWh/yr?
4. Regarding the biosolids which are produced at and removed from site, does the utility/council:
    a) Give biosolids away with costs covered by the recipient;
    b) Receive payment for biosolids;
    c) Pay for removal from site for end use/disposal;
    d) Not applicable/unspecified; or
    e) Other.
5. How are the end use and program risks managed?
    a) The biosolids end-use risks are managed in-house;

b) The biosolids end-use risks are managed by a 3rd party;

c) The biosolids end-use risks are managed by a 3rd party, and audited in-house; or

d) Not applicable.

6. What distance is the bulk of biosolids transported to end use?

a) 1 - 50 km;

b) 51 - 150 km;

c) 151 - 400 km;

d) More than 400 km;

e) No transport; or

f) Not specified (used where no data were provided).

7. Relating to historic biosolids stockpiles:

a) Are there historical stockpiles associated at/with this site?

b) If biosolids are stockpiled, what is the estimated total (dry tonnes) stored?

c) What is the net change in the amount in the stockpile(s) for this financial year?

8. What statement best agrees with your organisation's risk management approach for emerging contaminants?

a) No risk management approach to emerging contaminants;

b) Monitoring only;

c) High-level risk assessment;

d) Detailed formal risk assessment; or

e) Not applicable/unspecified.

9. How are the end use and program risks managed?

a) Sold by a 3rd party but unbranded;

b) Sold by a 3rd party with a brand name;

c) Sold by utility/council but unbranded;

d) Sold by utility/council with a brand name; or

e) Not applicable.

3.8 INDUSTRY RISKS AND OPPORTUNITIES

This year participants were asked to share what they viewed as the most pressing risks and opportunities for the industry in **2024/2025**. The prompts given for the industry risks were based on the categories identified in the 2023 survey of:

- Changing regulations;
- Cost;
- Emerging contaminants;
- Stakeholder and public perceptions;
- Technology risks; and
- Other

The prompts given for the industry opportunities were:

- Emerging technologies;
- Carbon opportunities;
- End use markets;
- Education and collaboration;
- Front end solutions;
- Renewable energy;
- Soil health; and
- Other

Participants were also provided with a space to provide any additional comments and those are mentioned within the report. Results are reported on a count basis.

4 RESULTS

4.1 PRODUCTION

The total biosolids production of Australia identified in the current survey was 378,000 tonnes per year of dry solids, representing an approximate 1.5% increase from the 2023 survey. The previous survey results are shown in Table 4-1.

Table 4-1 Annual Biosolids Production in Australia

Year	Biosolid Production (dry tonnes)	Average Dewatered Solids Content (%)
2010	300,000	25%
2013	333,000	24%
2015	310,000	21%
2017	327,000	18%
2019	371,000	16%
2021	349,000	25%
2023	372,000	23%
2025	378,000	21%

Average solids content of dewatered biosolids is around 21% (weighted average) and this equates to around 1.8 million tonnes of biosolids in dewatered form (also called wet biosolids) produced in 2024/2025.

Biosolids use by state over time is shown in Figure 4-1.

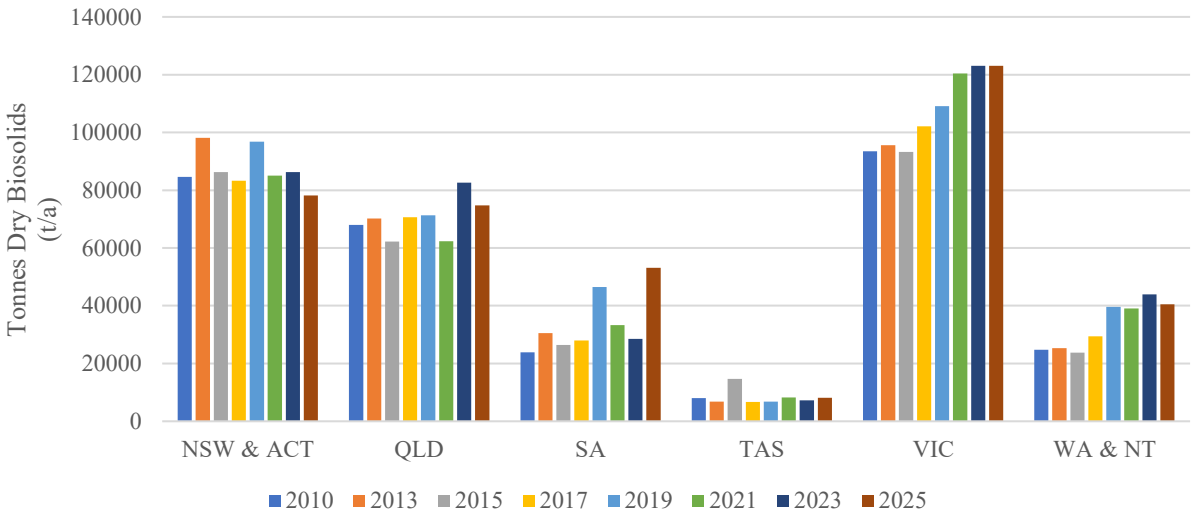

Figure 4-1 Biosolids Total Production, By State Over Time

Due to different stabilisation and drying processes between states, the dry solids content at end use can be significantly different. The average dry solids content by state is shown below.

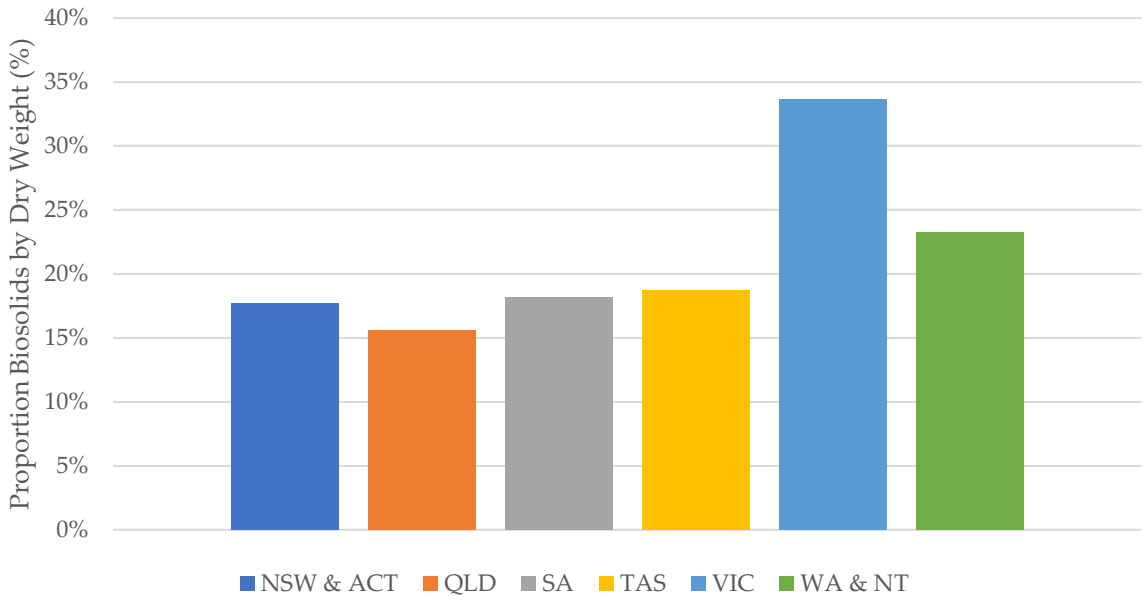

Figure 4-2 Weighted Average Biosolids Dry Solids Content by State, 2025

4.2 END USE

Biosolids end use nationally and for each state is presented in Figure 4-3 to Figure 4-10. Figure 4-4 shows how biosolids end use has changed since the first biosolids production and end use survey in 2010.

Some facilities reported that PFAS levels exceeded the *PFAS National Environmental Management Plan Version 3.0, (HEPA 2025)* which resulted in the biosolids being disposed to landfill, but this has not resulted in a noticeable difference in total mass to landfill from 2023.

Just above 82% of biosolids were beneficially used, a 3% decrease from 2023 but similar to 2021. This is primarily because of an increase in stockpiling end use.

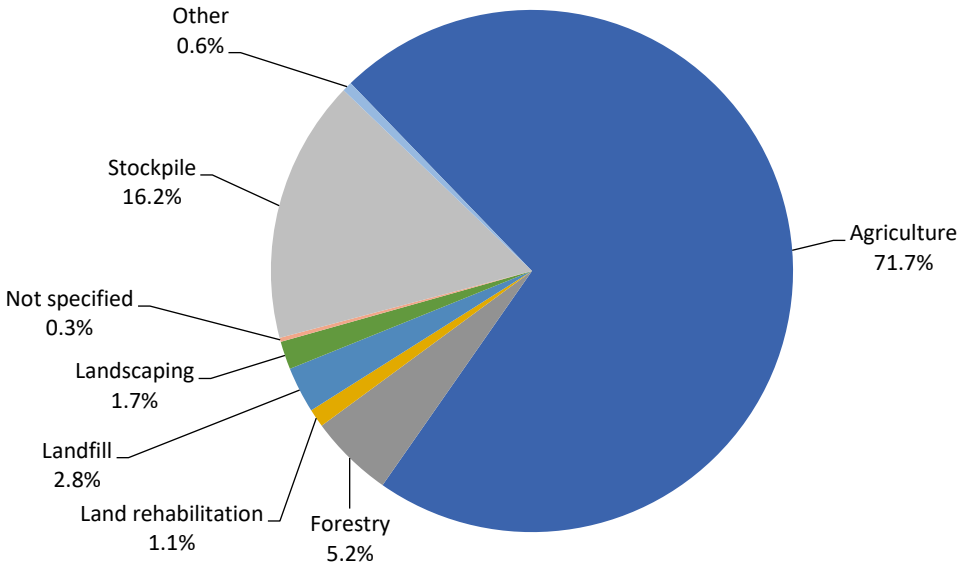

Figure 4-3 Biosolids End Use (Dry Mass Basis), Australia 2025

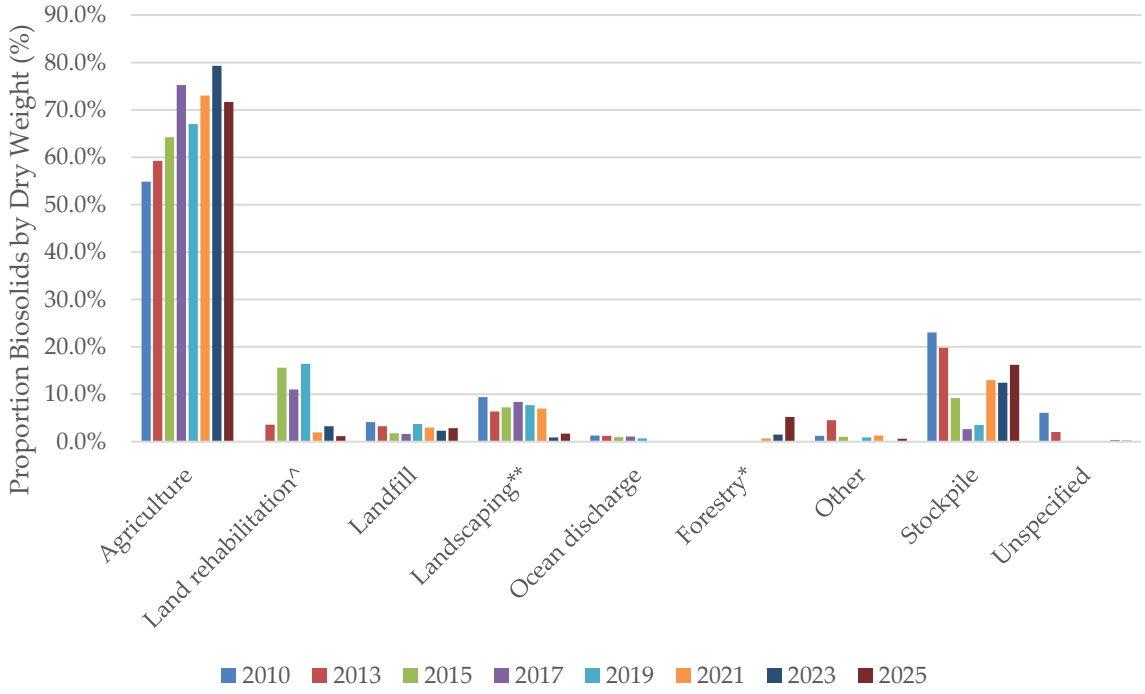

Figure 4-4 Biosolids End Use (Dry Mass Basis), Australia 2010 to 2025

^ Includes landform restoration or quarry rehabilitation (bulk fill)
**Included as 'Other' 2010 to 2019*
*** 'Landscaping' changed from 'Landscaping (compost)' in 2021*

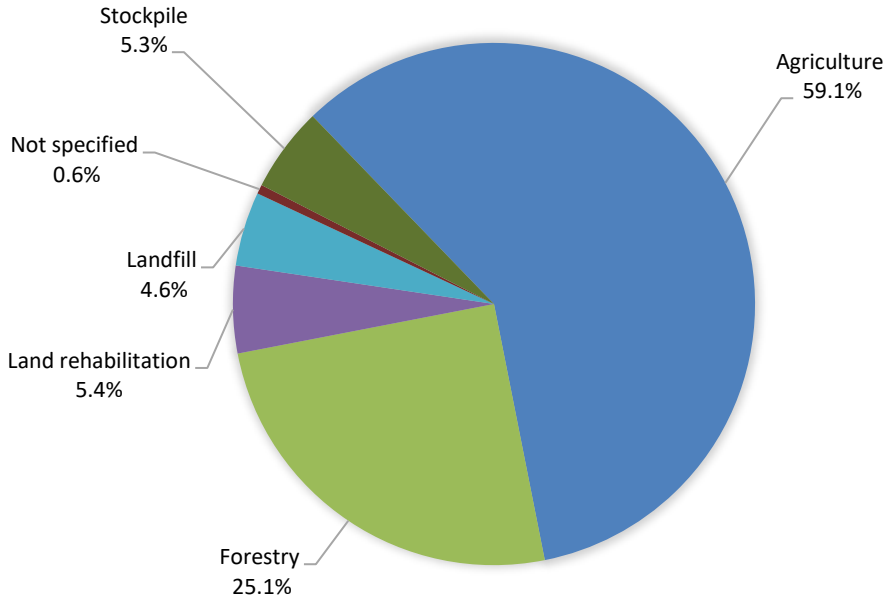

Figure 4-5 Biosolids End Use (Dry Mass Basis) NSW & ACT 2025

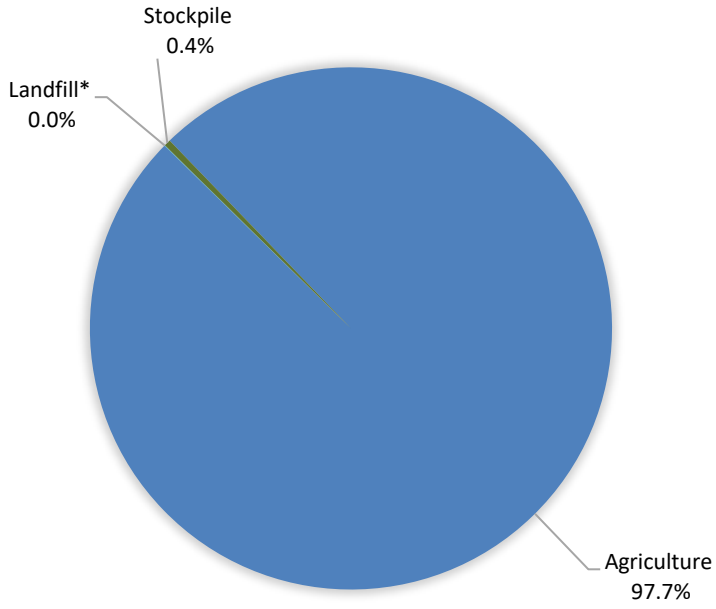

Figure 4-6 Biosolids End Use (Dry Mass Basis) QLD 2025

** Note that values of 0.0% denote data less than 0.1%. This has been included in figures despite not showing any value, as 1 decimal place does not capture values <0.1%.*

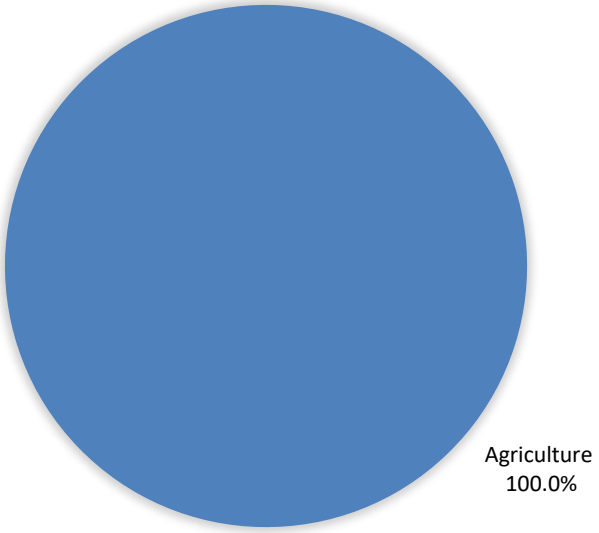

Figure 4-7 Biosolids End Use (Dry Mass Basis) SA 2025

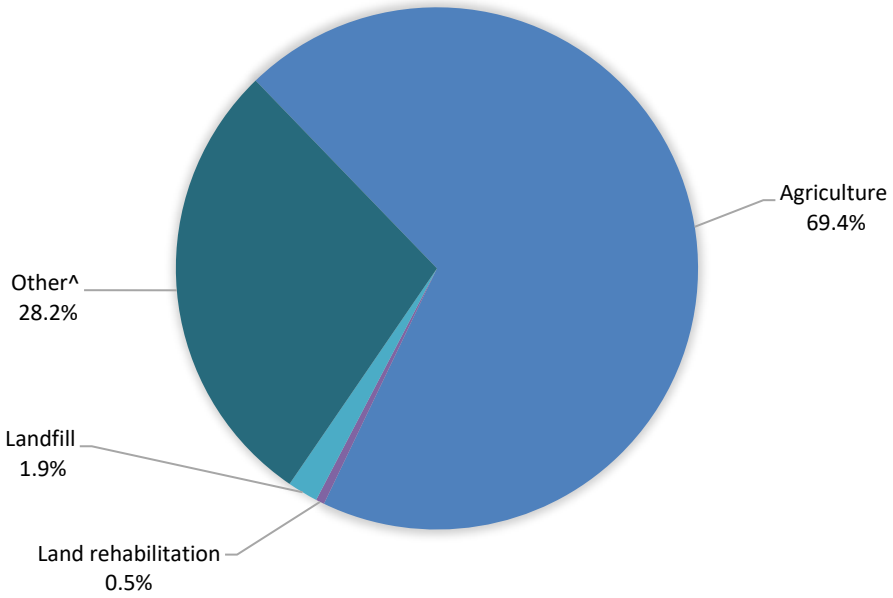

Figure 4-8 Biosolids End Use (Dry Mass Basis) TAS 2025

^ Sent for offsite processing by a composting facility

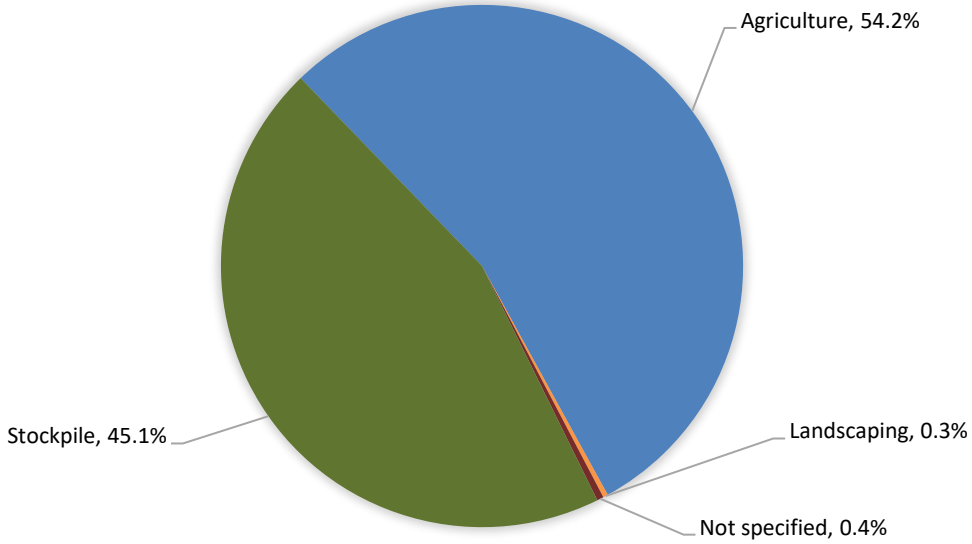

Figure 4-9 Biosolids End Use (Dry Mass Basis) VIC 2025

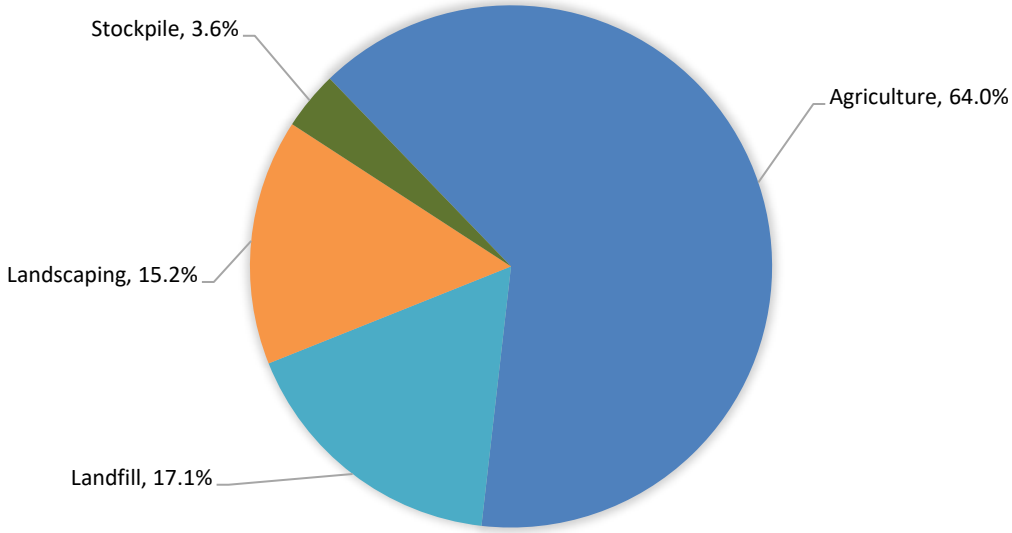

Figure 4-10 Biosolids End Use (Dry Mass Basis) WA & NT 2025

4.3 STABILISATION GRADE

Biosolids stabilisation grade nationally and for each state is presented in Figure 4-11 to Figure 4-18 respectively.

As in 2023, stabilisation grade A and B biosolids make up majority of biosolids. In 2025, there has been a shift towards more stabilisation A biosolids than stabilisation B compared to 2023, primarily related to changes in practices in Queensland, and Western Australia & Northern Territory. Figure 4-12 shows how stabilisation grade has changed since the first biosolids production and end use survey in 2010. The increase in unstabilised biosolids from

2023 to 2025 is believed to be a reporting error that could not be confirmed which is a limitation of self-reporting of biosolids data.

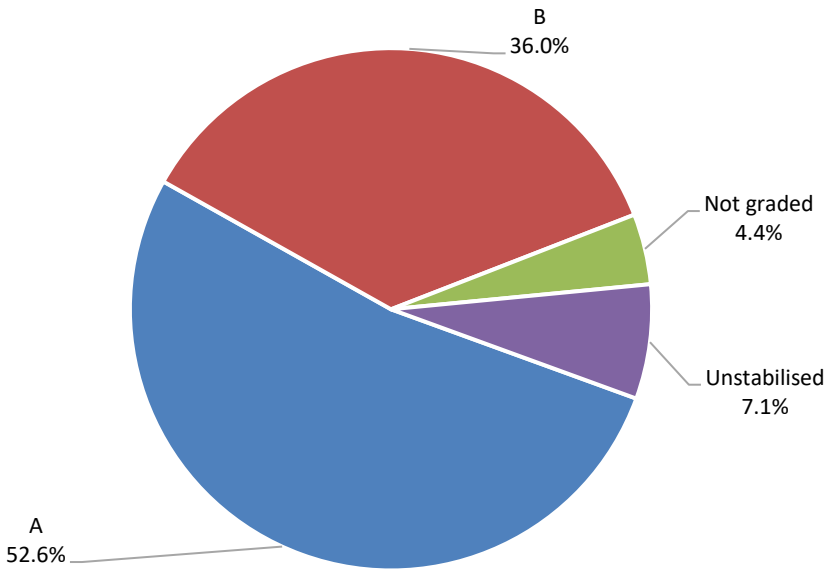

Figure 4-11 Stabilisation Grade (Dry Mass Basis), Australia 2025

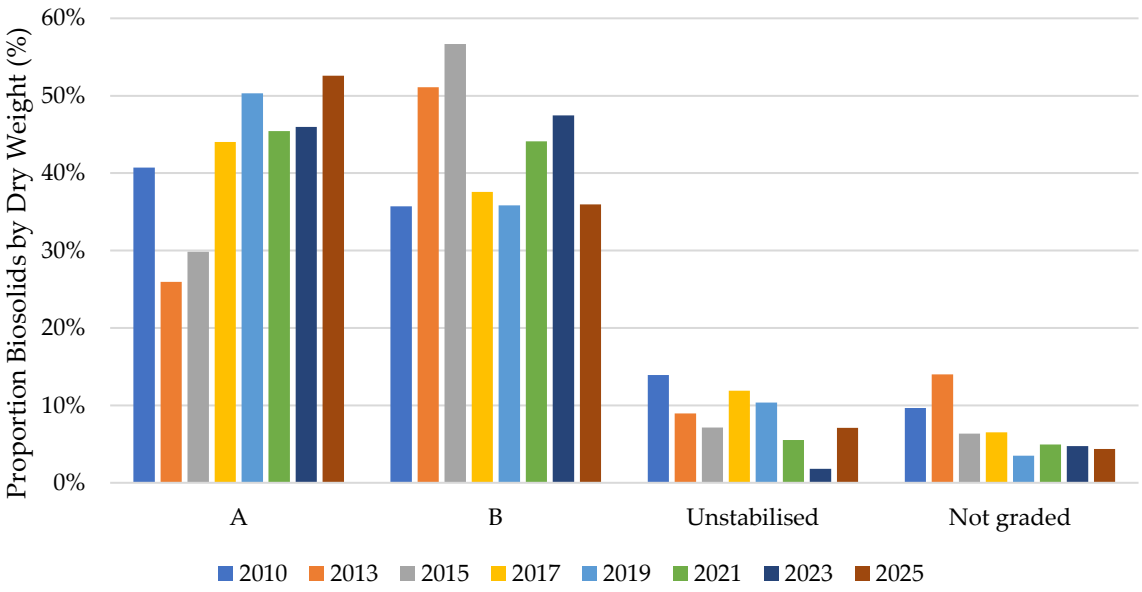

Figure 4-12 Stabilisation Grade (Dry Mass Basis), Australia 2010 to 2025

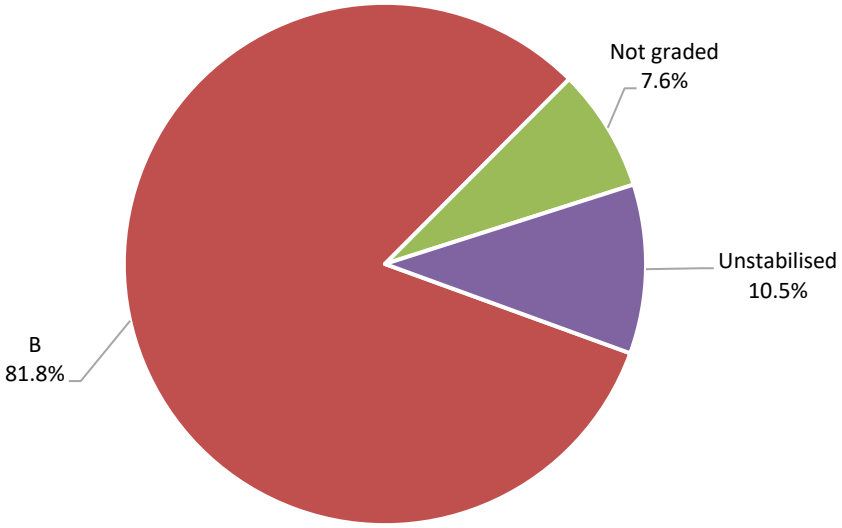

Figure 4-13 Stabilisation Grade (Dry Mass Basis) NSW & ACT 2025

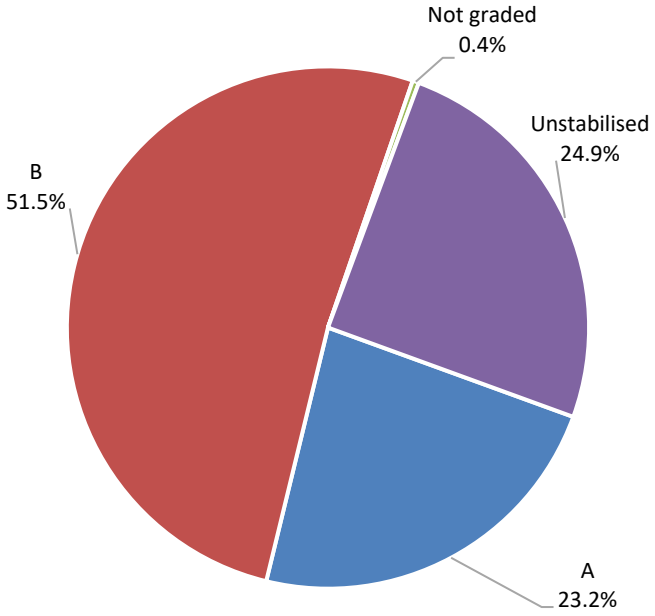

Figure 4-14 Stabilisation Grade (Dry Mass Basis) QLD 2025

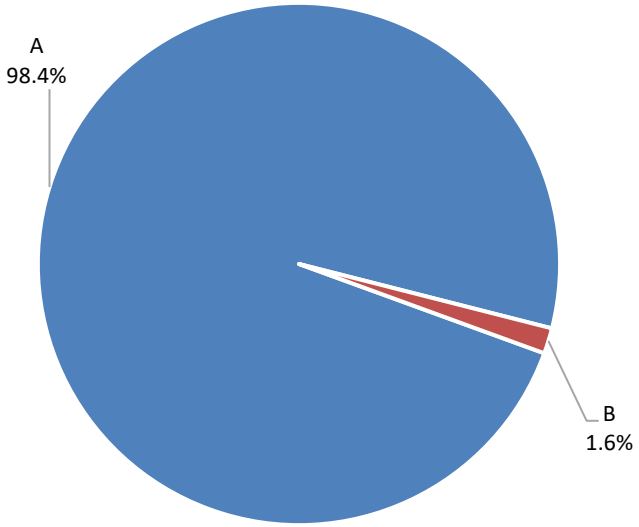

Figure 4-15 Stabilisation Grade (Dry Mass Basis), SA 2025

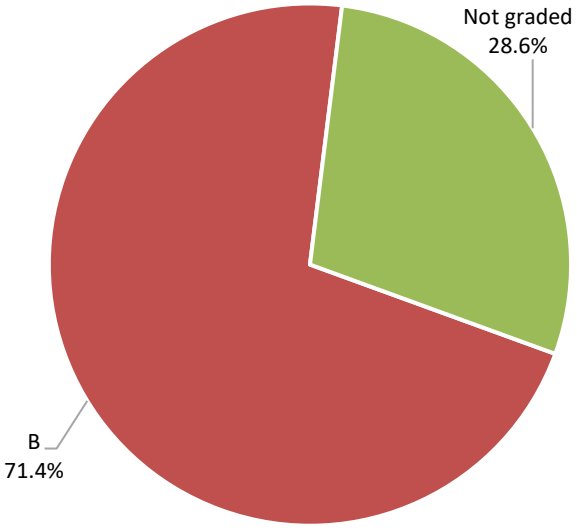

Figure 4-16 Stabilisation Grade (Dry Mass Basis), TAS 2025

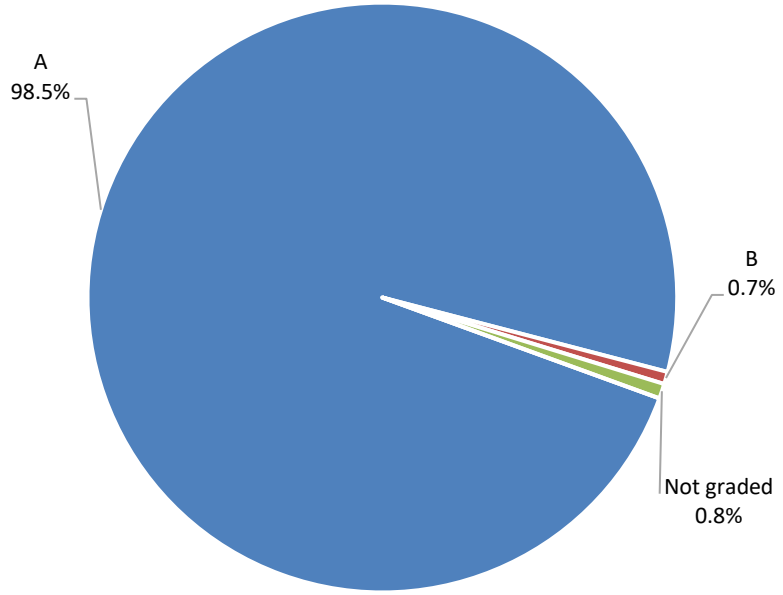

Figure 4-17 Stabilisation Grade (Dry Mass Basis), VIC 2025

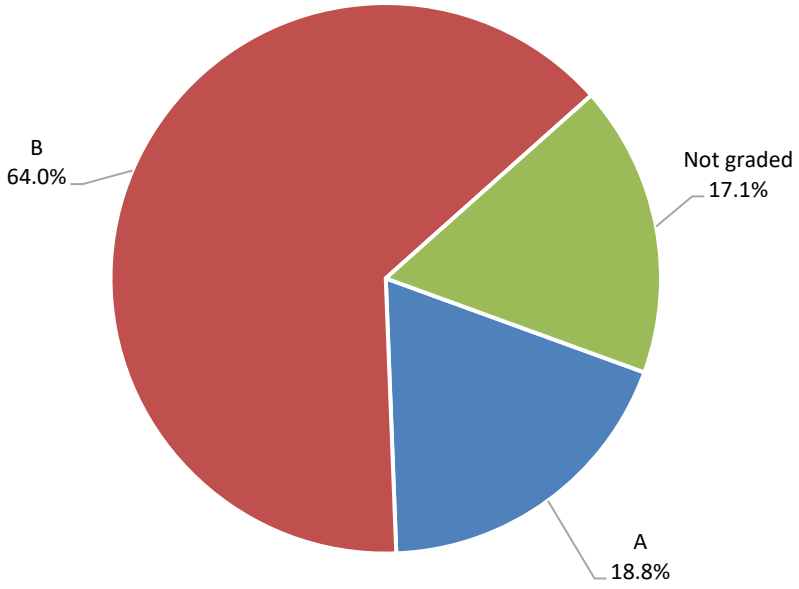

Figure 4-18 Stabilisation Grade (Dry Mass Basis), WA & NT 2025

4.4 CONTAMINANT GRADE

Biosolids contaminant grade nationally and for each state is presented from Figure 4-19 to Figure 4-26. Figure 4-20 shows how contaminant grade has changed since the first biosolids production and end use survey in 2010.

Biosolids classified as contaminant grade A have dropped from 4.4.% to 0.2% since the 2023 survey.

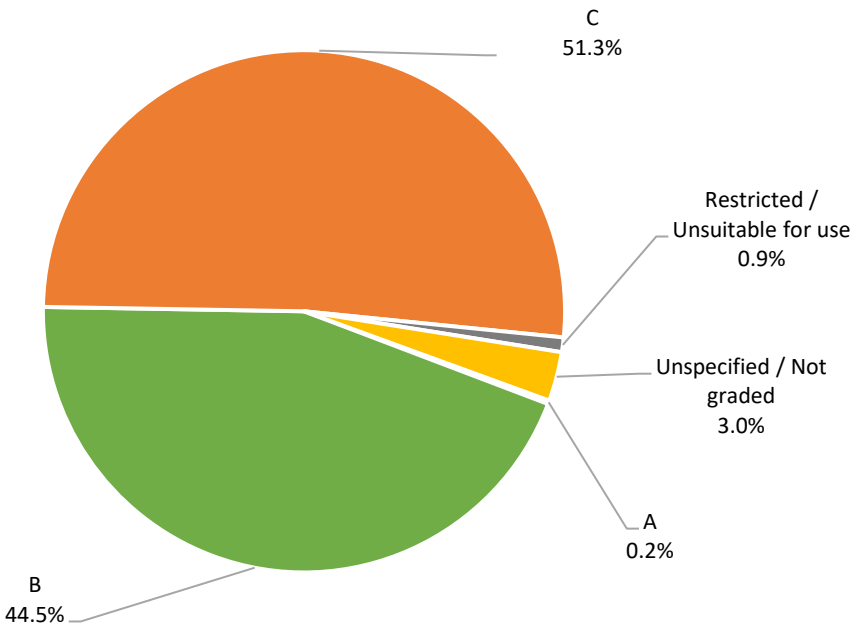

Figure 4-19 Contaminant Grade (Dry Mass Basis), Australia 2025

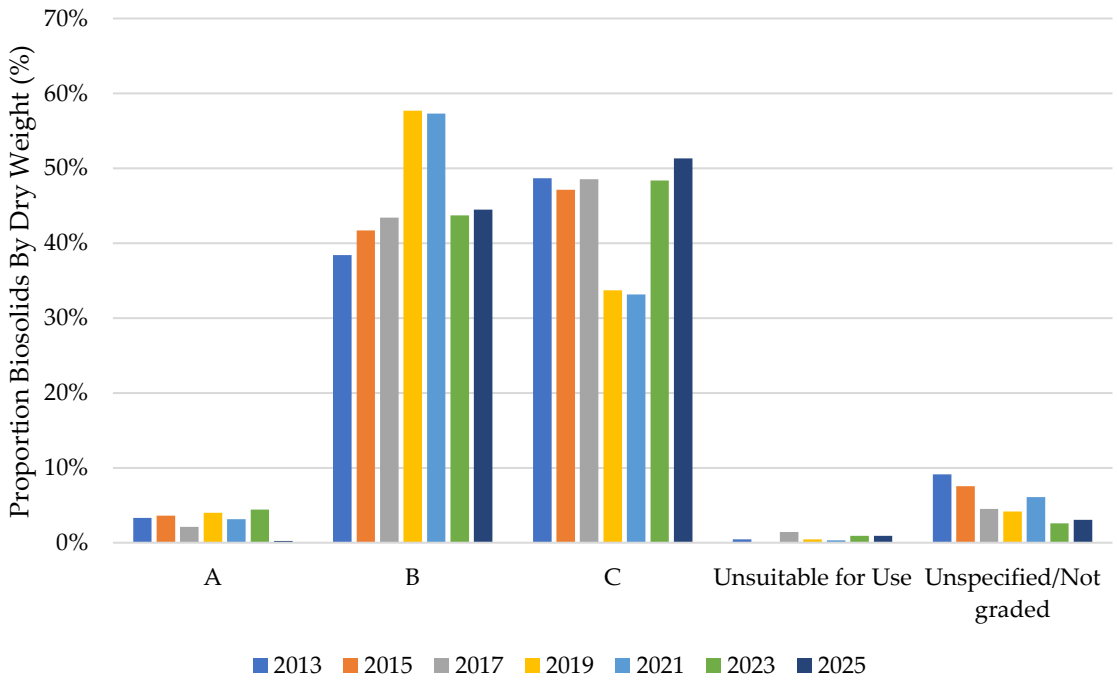

Figure 4-20 Contaminant Grade (Dry Mass Basis) Over Time, Australia 2013 to 2025

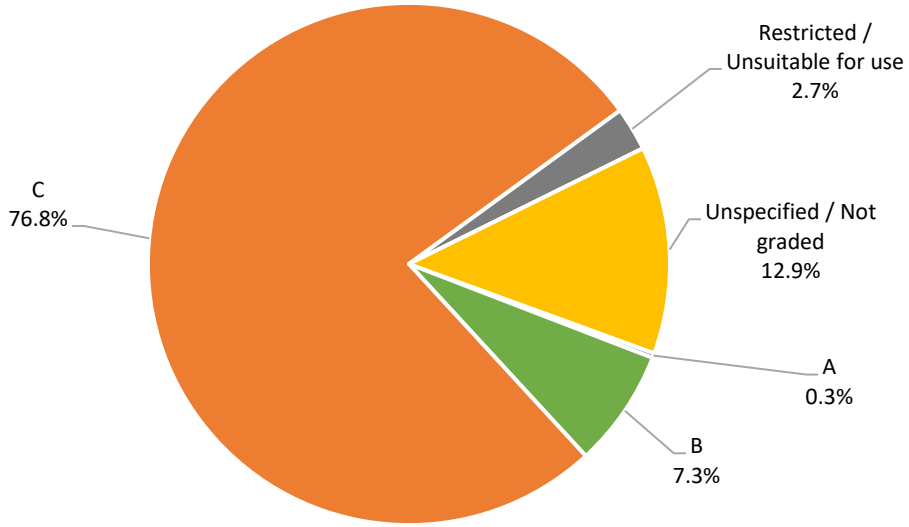

Figure 4-21 Contaminant Grade (Dry Mass Basis), NSW & ACT 2025

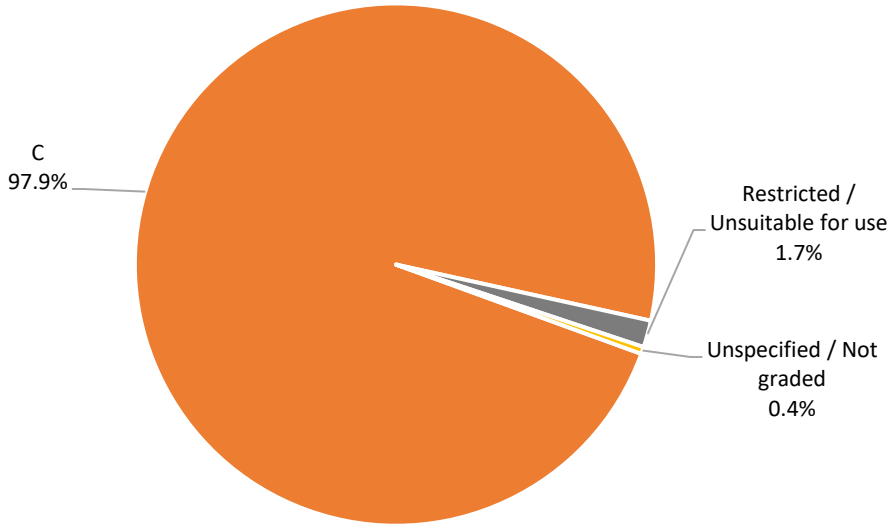

Figure 4-22 Contaminant Grade (Dry Mass Basis), QLD 2025

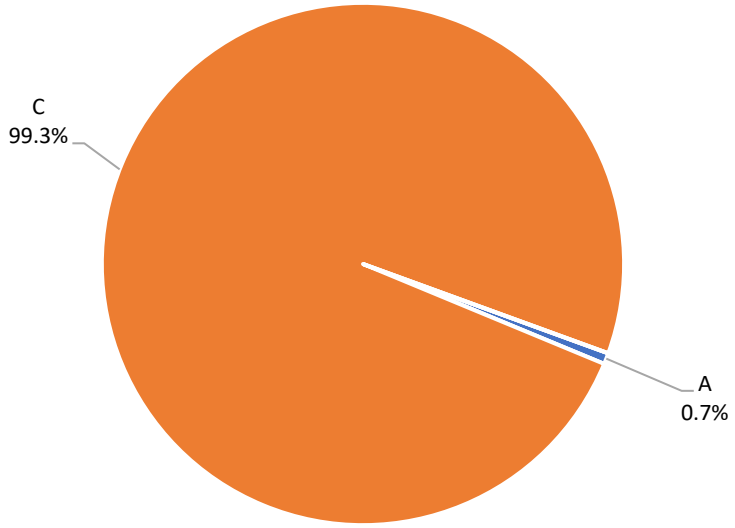

Figure 4-23 Contaminant Grade (Dry Mass Basis), SA 2025

Note that the actual grade according to South Australian guidelines is B, C is with normalised grading.

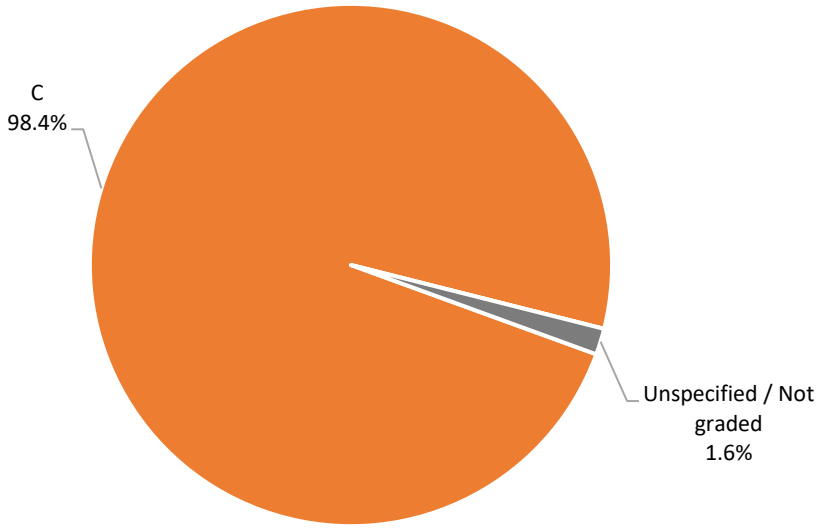

Figure 4-24 Contaminant Grade (Dry Mass Basis), TAS 2025

Note that actual grade according to Tasmanian guidelines is B, C is with normalised grading.

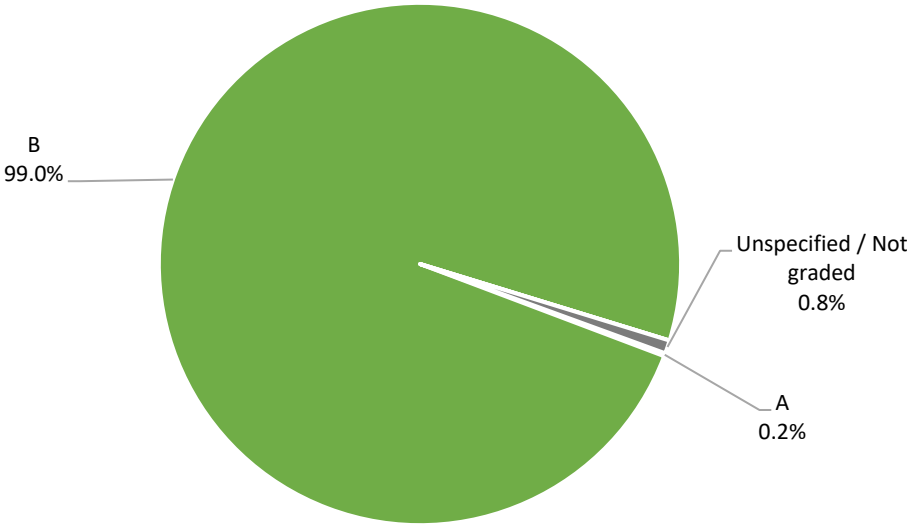

Figure 4-25 Contaminant Grade (Dry Mass Basis), VIC 2025

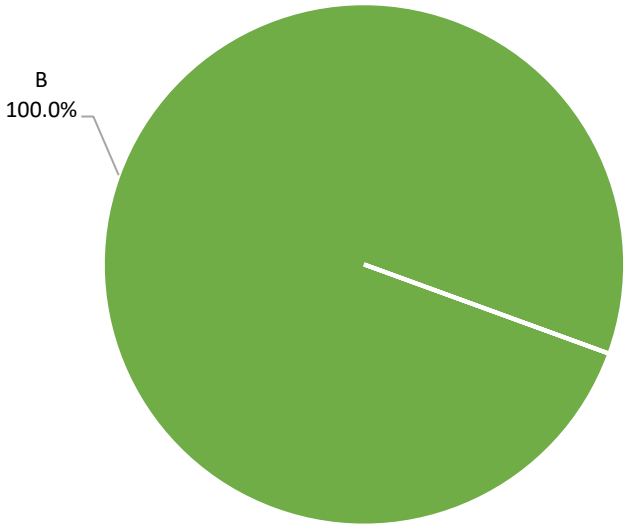

Figure 4-26 Contaminant Grade (Dry Mass Basis), WA & NT 2025

4.5 STABILISATION PROCESS

4.5.1 Main Stabilisation Process

Information was collected on main stabilisation processes. This information nationally and for each state is presented from Figure 4-27 to Figure 4-33.

Anaerobic digestion was previously the main stabilisation method for over 35% of biosolids produced and has now increased to over 50%. This is primarily due to a significant producer changing their reporting methodology.

Anerobic digestion includes different types of anaerobic digestion the most common being mesophilic process and other processes such as TPAD and acid phase digestion.

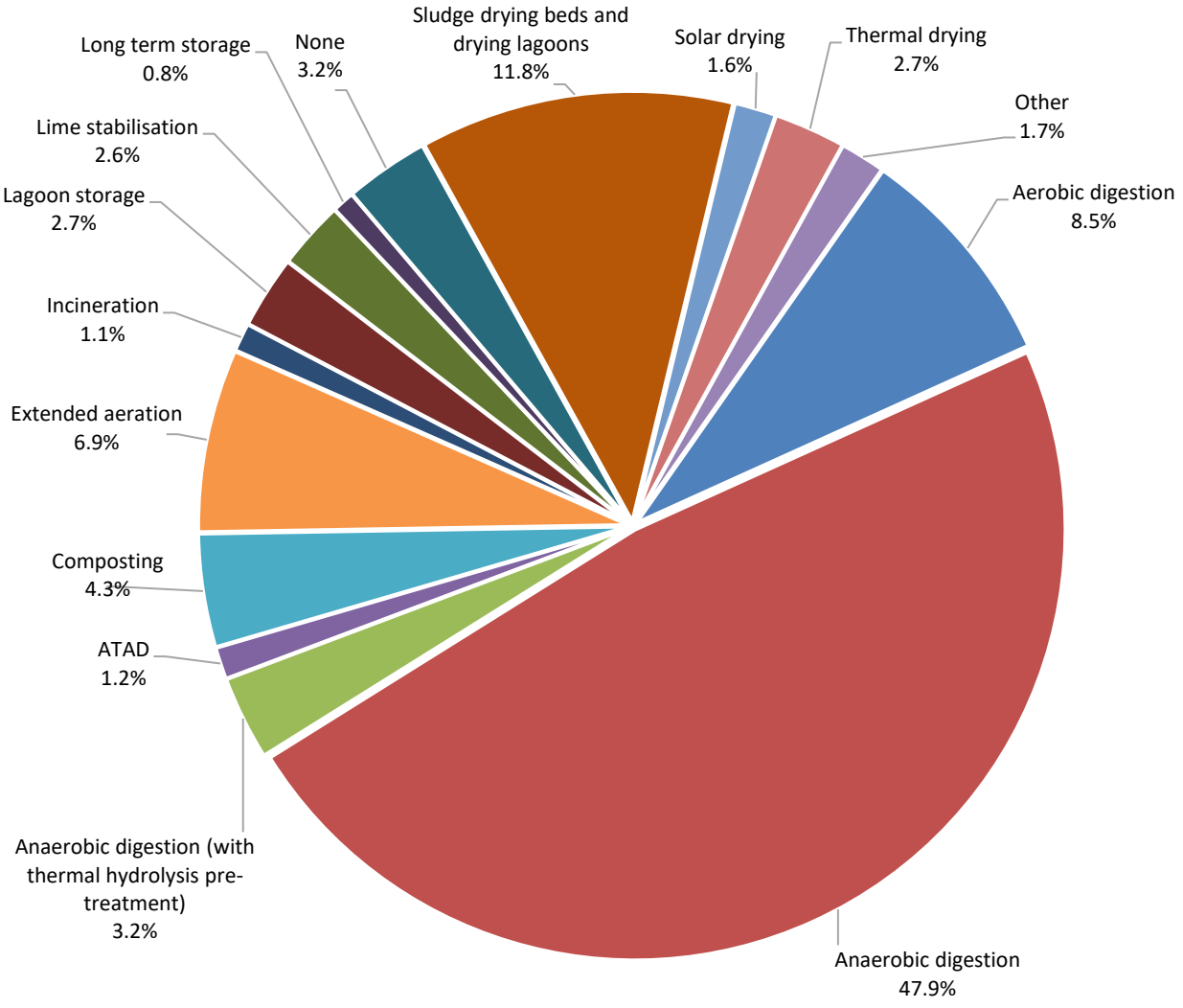

Figure 4-27 Main Stabilisation Process (Dry Mass Basis), Australia 2025

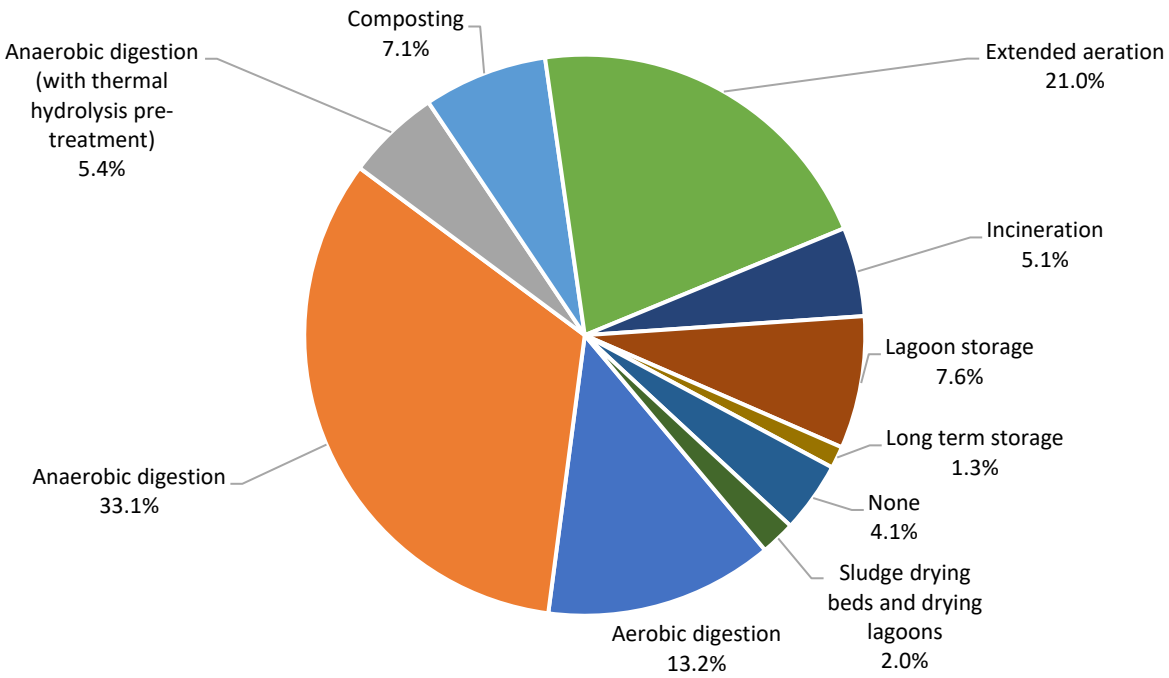

Figure 4-28 Main Stabilisation Process (Dry Mass Basis), NSW & ACT 2025

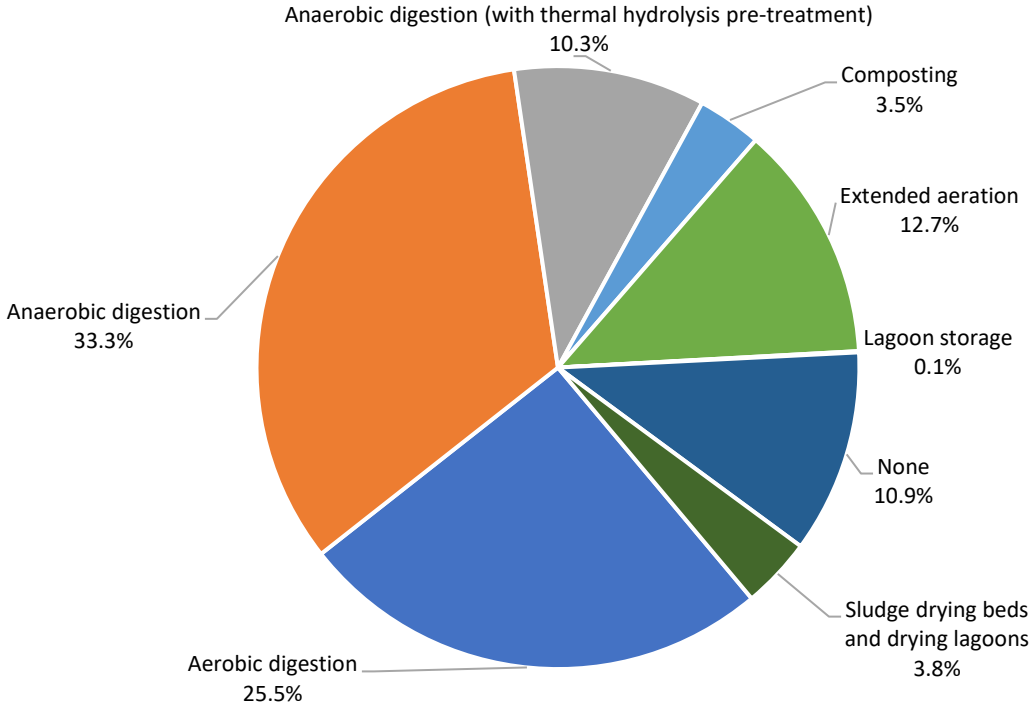

Figure 4-29 Main Stabilisation Process (Dry Mass Basis), QLD 2025

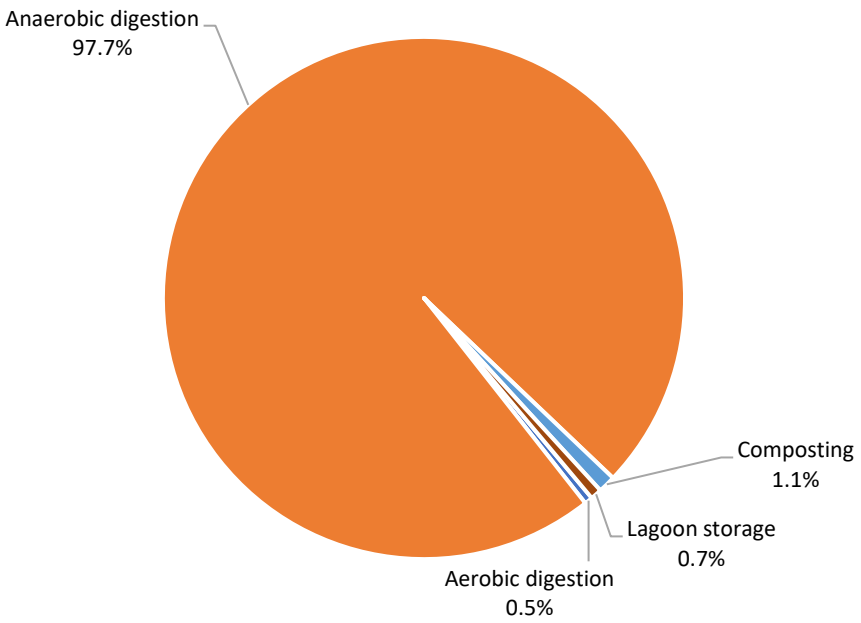

Figure 4-30 Main Stabilisation Process (Dry Mass Basis), SA 2025

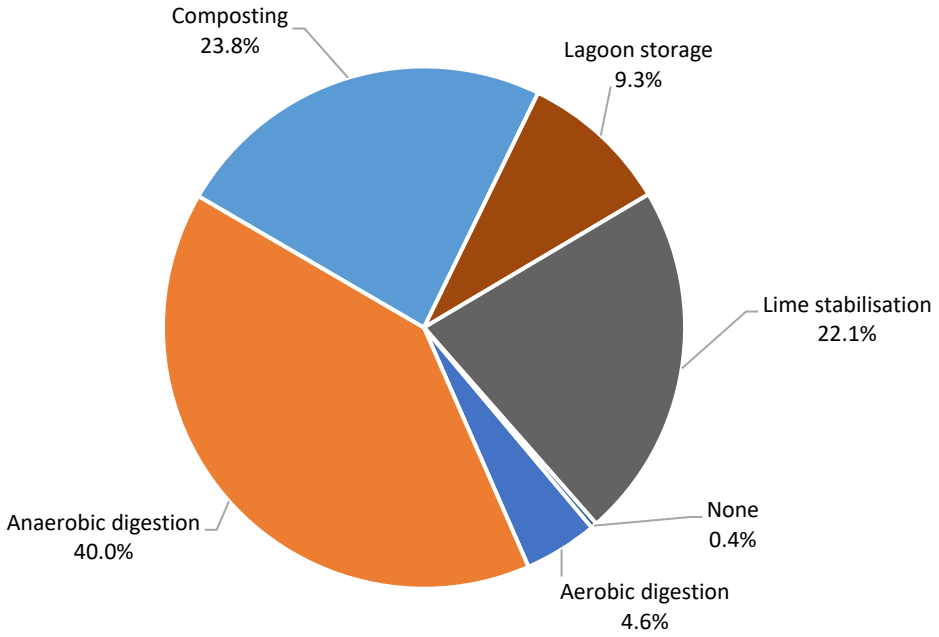

Figure 4-31 Main Stabilisation Process (Dry Mass Basis), TAS 2025

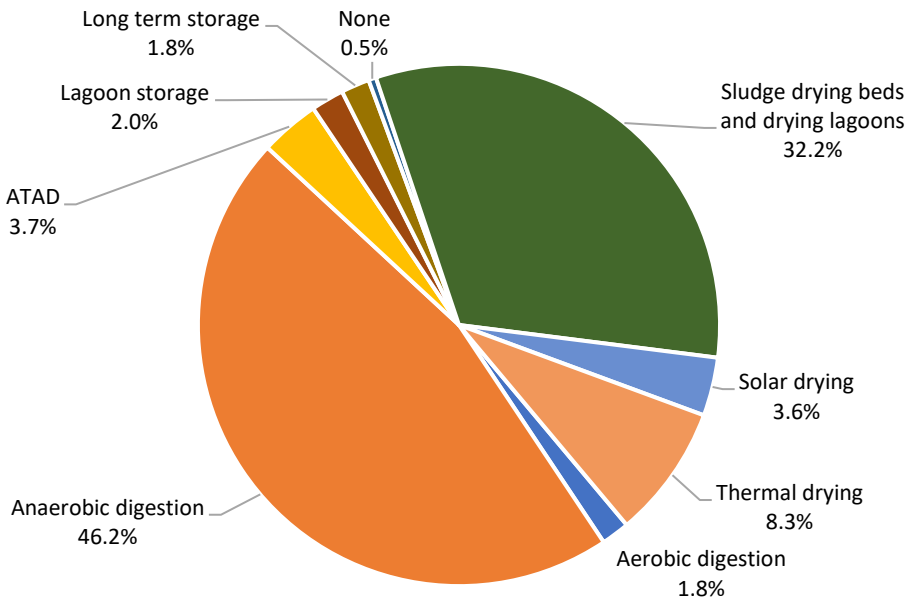

Figure 4-32 Main Stabilisation Process (Dry Mass Basis), VIC 2025

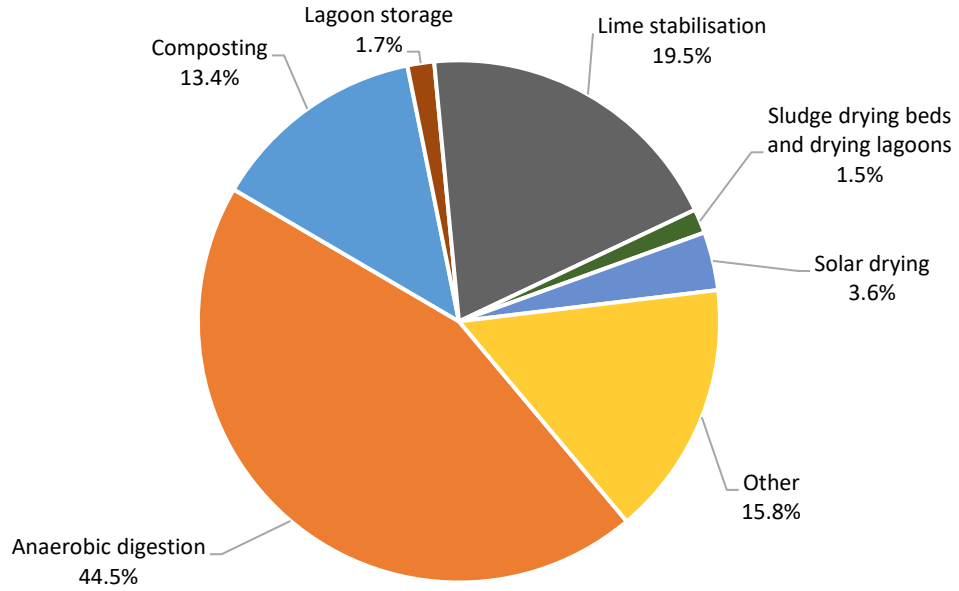

Figure 4-33 Main Stabilisation Process (Dry Mass Basis), WA & NT 2025

4.5.2 Further Stabilisation Processes

Information was collected on further stabilisation processes, the name was updated from secondary stabilisation processes as there was confusion with this terminology. This information nationally and for each state is presented from Figure 4-34 to Figure 4-40.

Data recorded under 'None' did not record a main stabilisation process. This is in contrast to data recorded under 'No further stabilisation' where only one 'main stabilisation process' was utilised. A significant portion of sites did not report anything for this question this year.

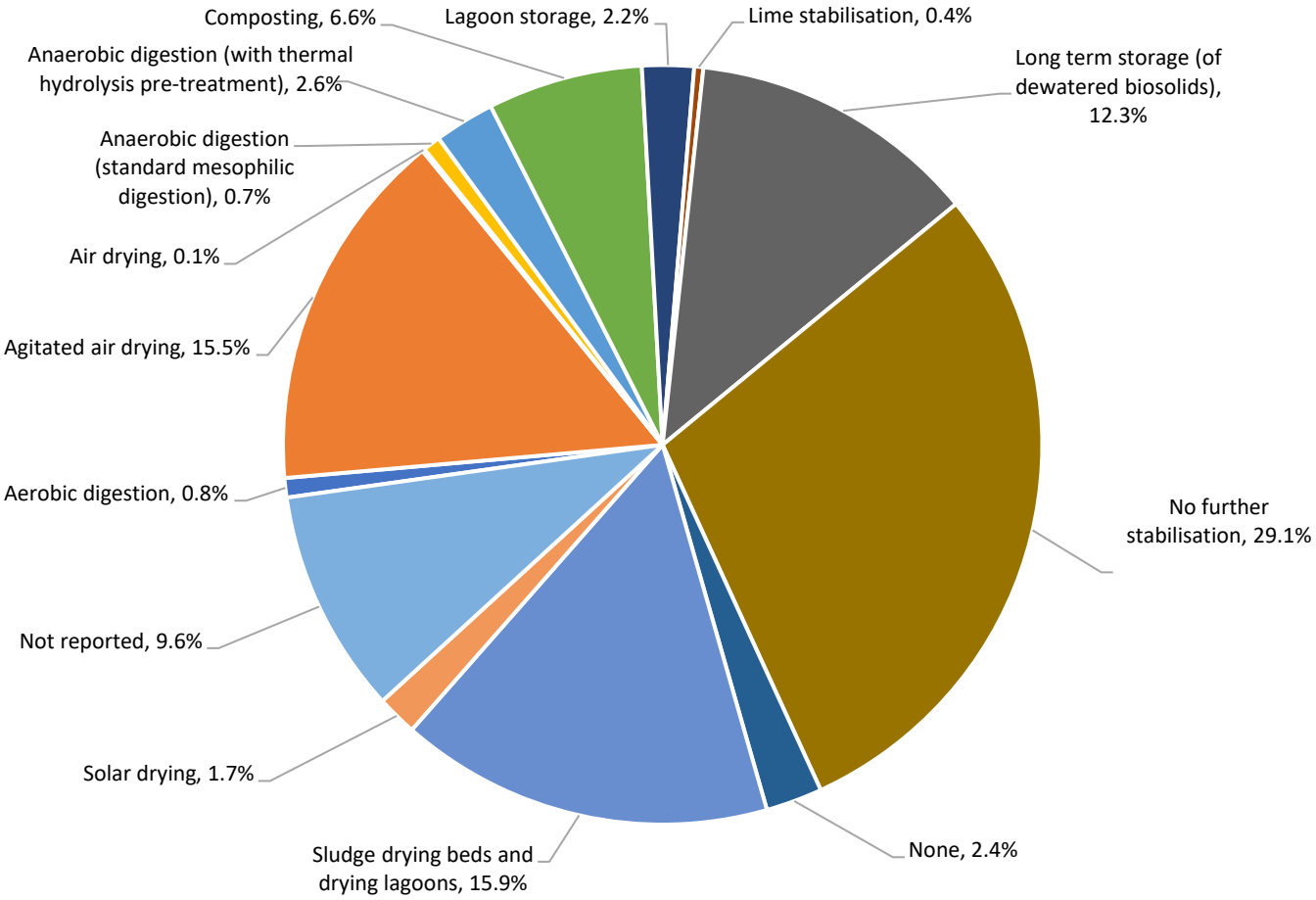

Figure 4-34 Further Stabilisation Process 2025 (Dry Mass Basis), Australia 2025

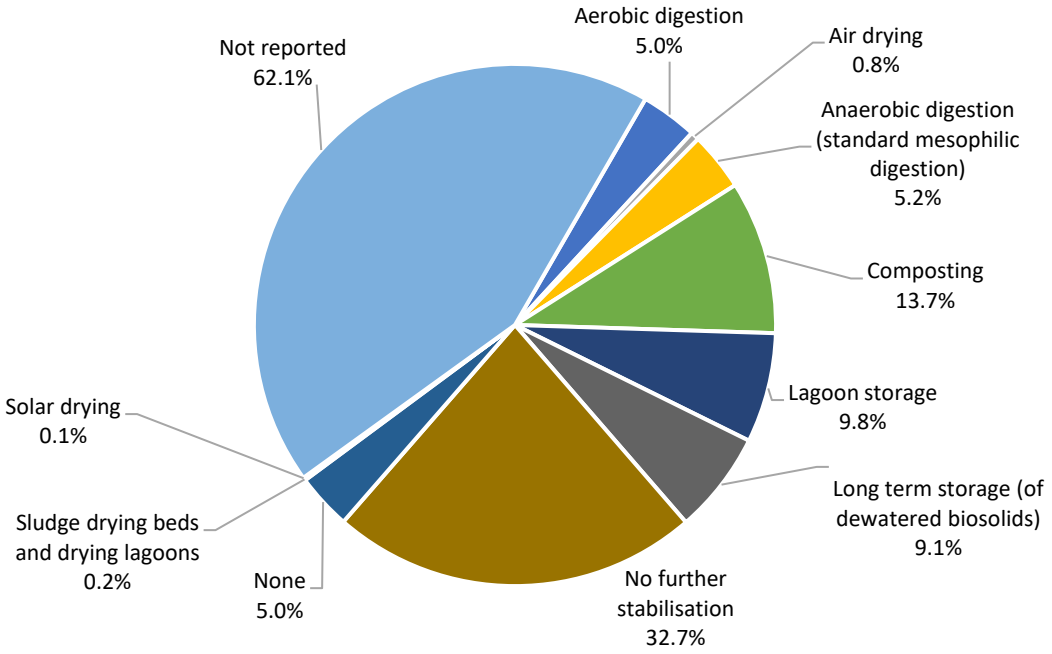

Figure 4-35 Further Stabilisation Process (Dry Mass Basis), NSW & ACT 2025

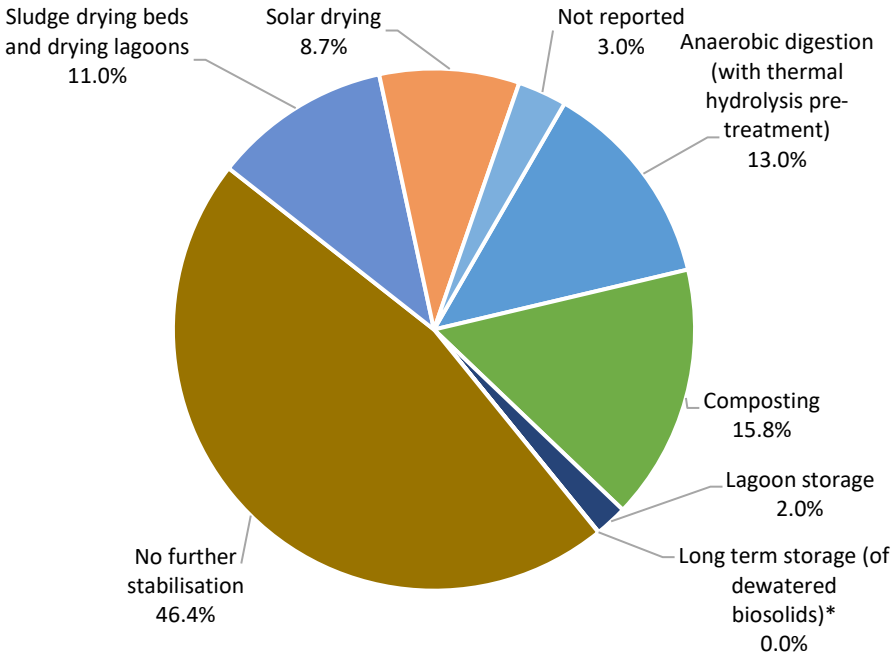

Figure 4-36 Further Stabilisation Process (Dry Mass Basis), QLD 2025

** Note that values of 0.0% denote data less than 0.1%. This has been included in figures despite not showing any value as 1 decimal place does not capture values <0.1%.*

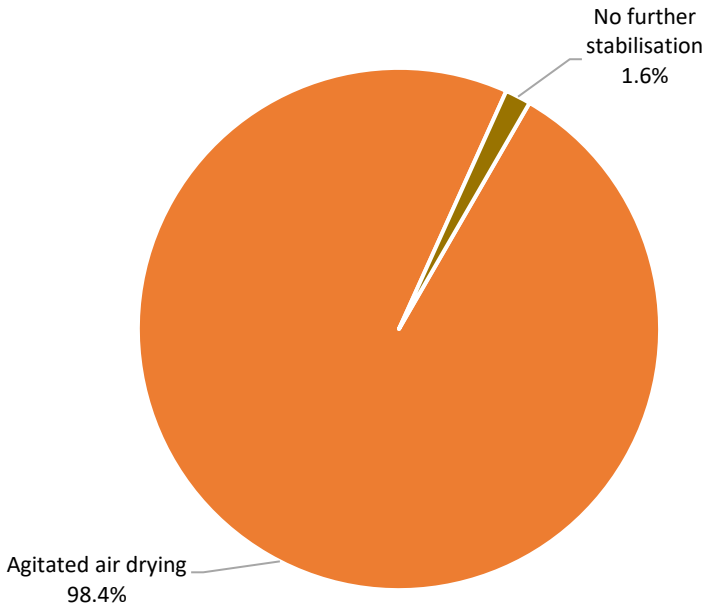

Figure 4-37 Further Stabilisation Process (Dry Mass Basis), SA 2025

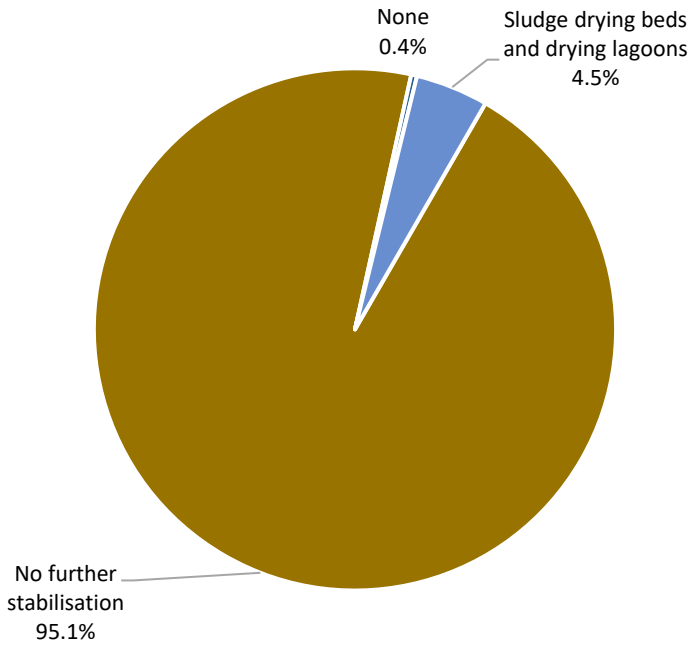

Figure 4-38 Further Stabilisation Process (Dry Mass Basis), TAS 2025

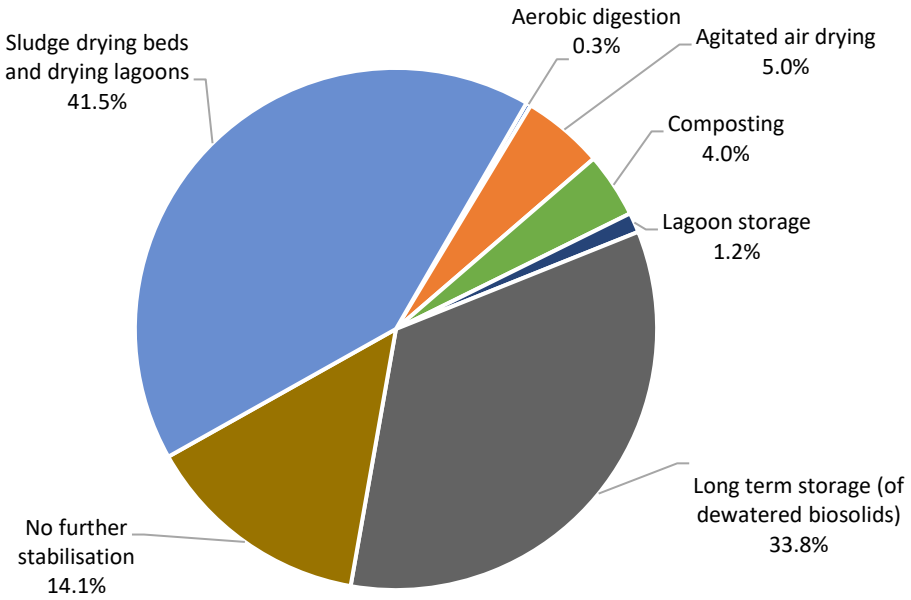

Figure 4-39 Further Stabilisation Process (Dry Mass Basis), VIC 2025

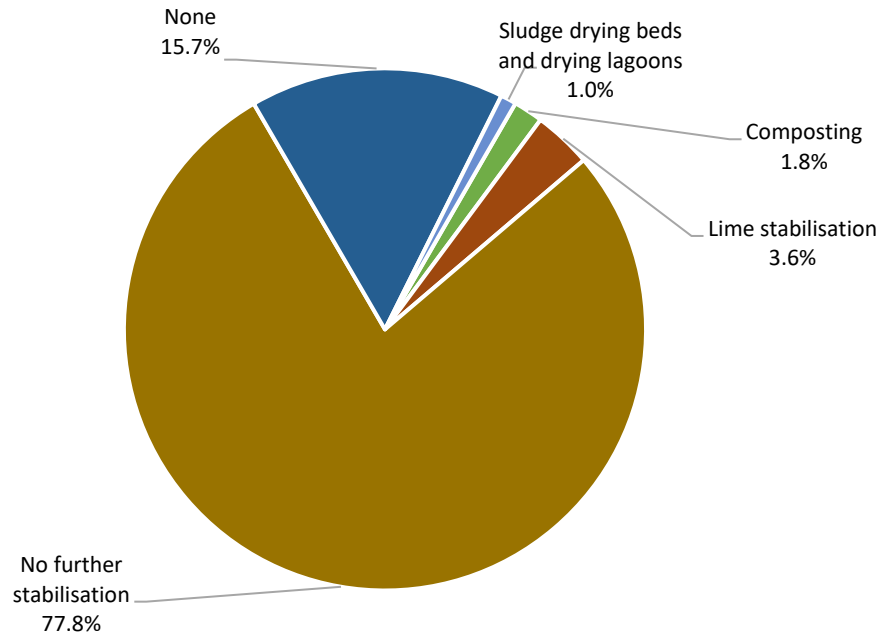

Figure 4-40 Further Stabilisation Process (Dry Mass Basis), WA & NT 2025

4.6 DEWATERING PROCESS

Biosolids dewatering process nationally and for each state is presented in Figure 4-41 to Figure 4-47. There was very little change in the proportion of dewatering processes from recent surveys with the most significant being a near 5% increase in using drying beds or lagoons.

Example reported dewatering processes in the 'Other' category include geobags, contract dewatering, volute dehydrator, piston press, rotary screw press and fan press.

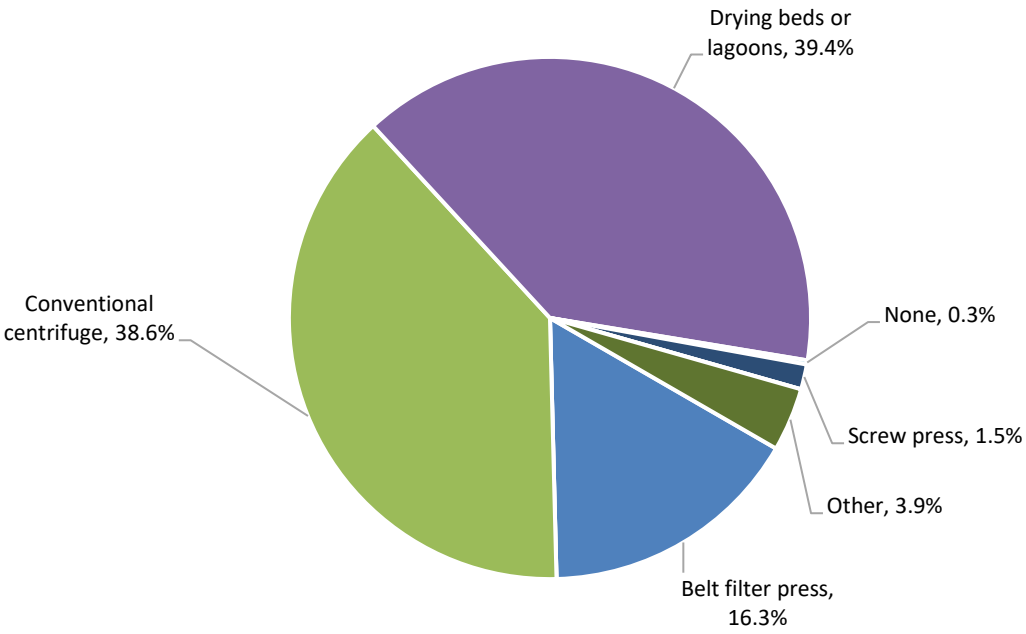

Figure 4-41 Dewatering Process (Dry Mass Basis), Australia 2025

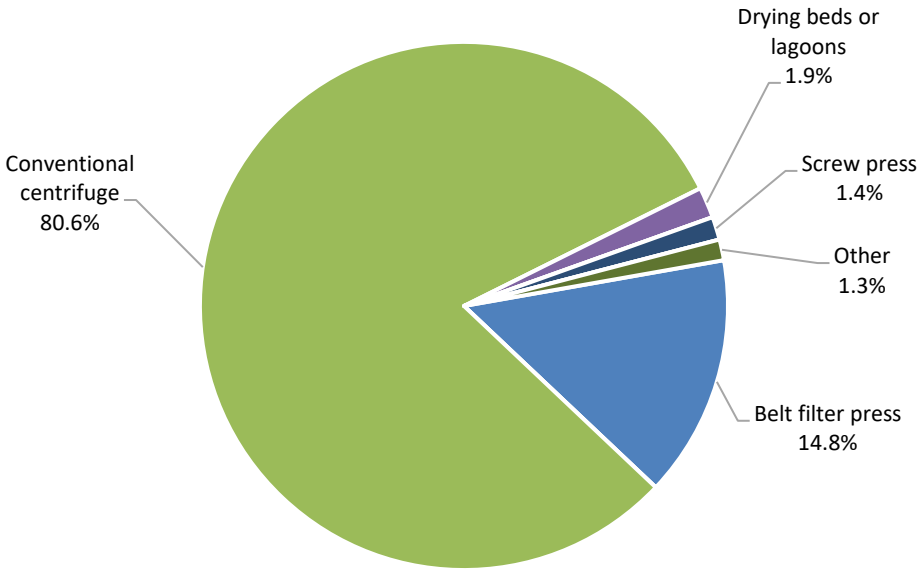

Figure 4-42 Dewatering Process (Dry Mass Basis), NSW & ACT 2025

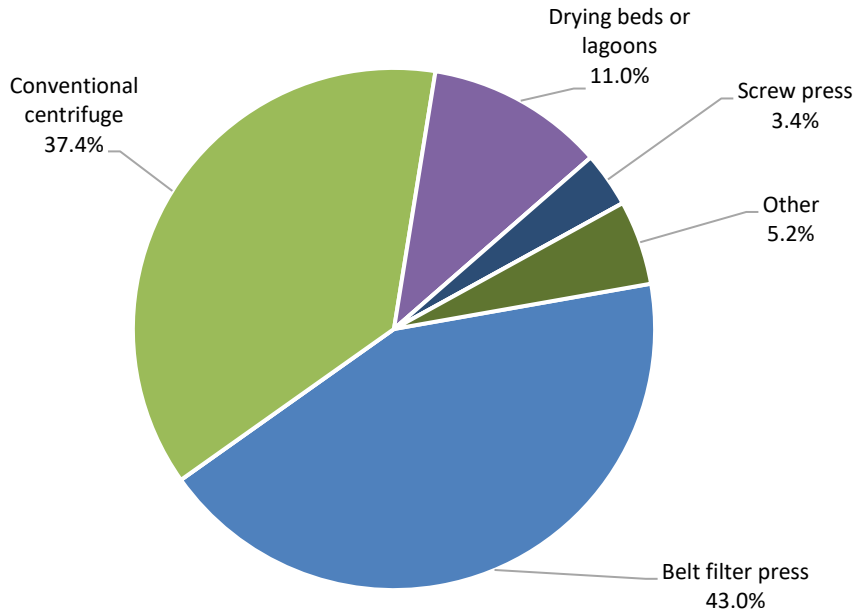

Figure 4-43 Dewatering Process (Dry Mass Basis), QLD 2025

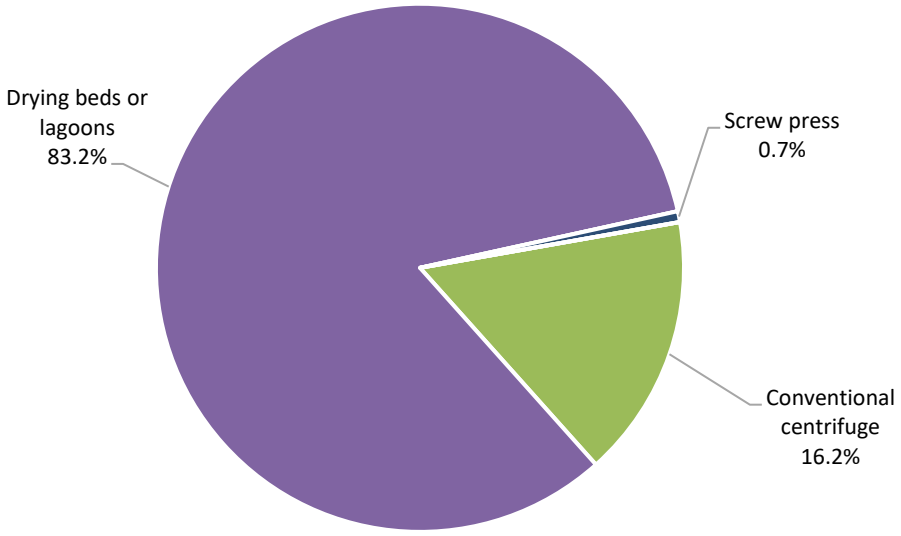

Figure 4-44 Dewatering Process (Dry Mass Basis), SA 2025

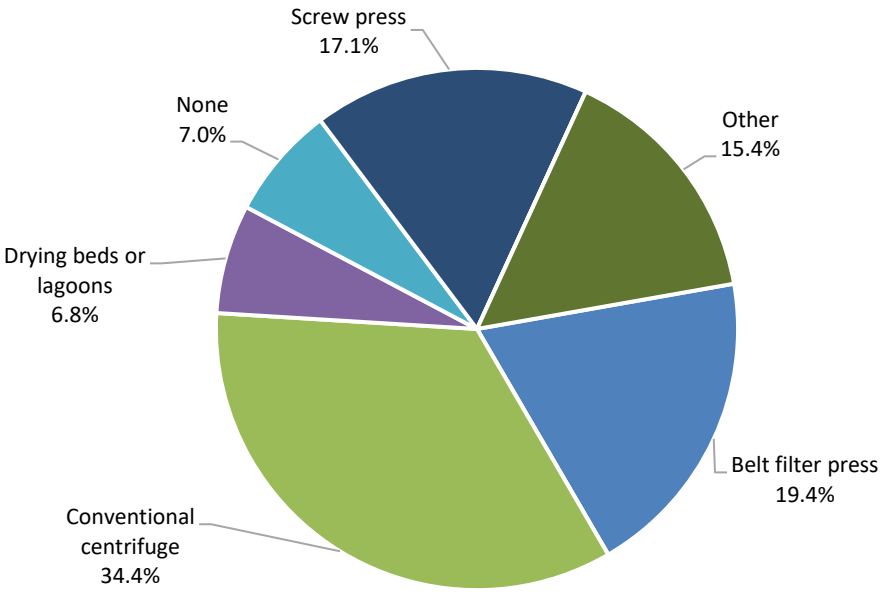

Figure 4-45 Dewatering Process (Dry Mass Basis), TAS 2025

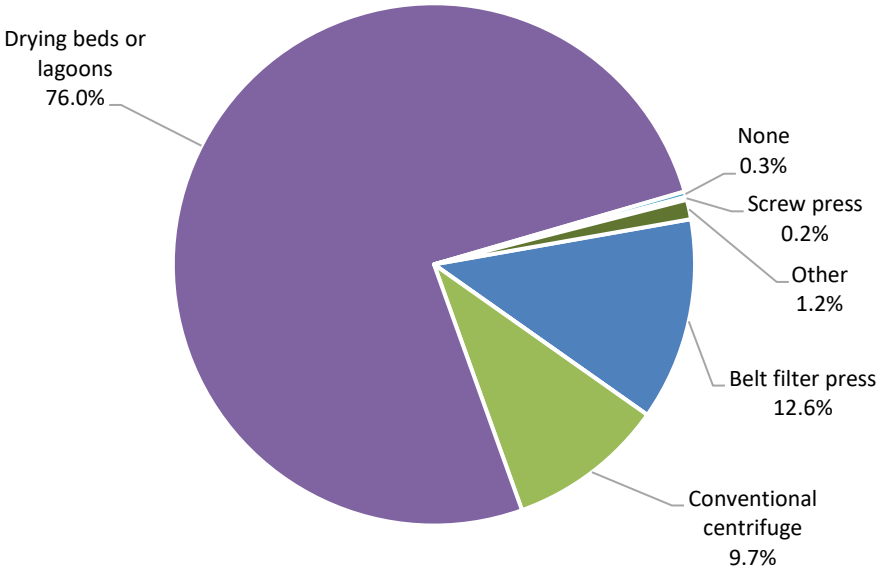

Figure 4-46 Dewatering Process (Dry Mass Basis), VIC 2025

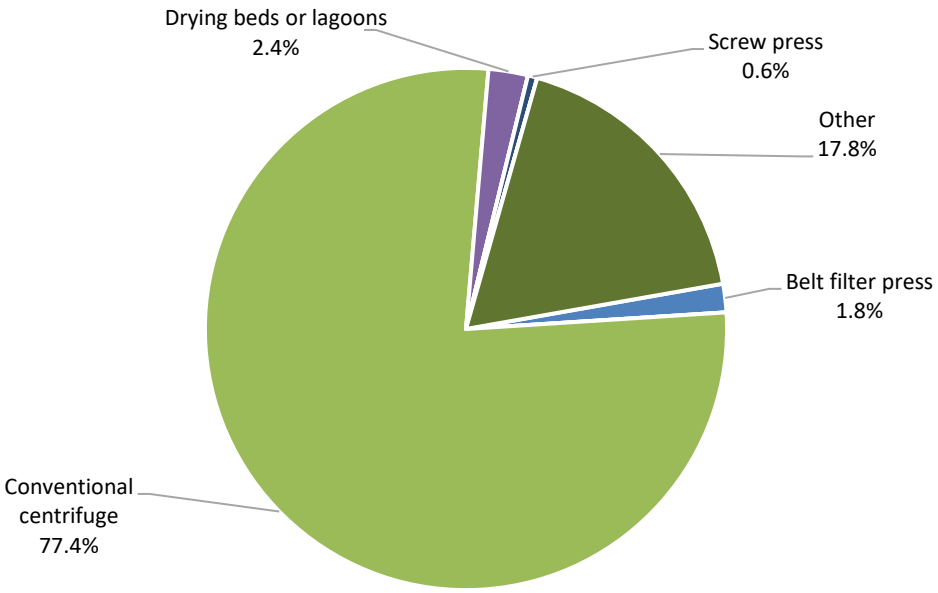

Figure 4-47 Dewatering Process (Dry Mass Basis), WA & NT 2025

4.7 BIOSOLIDS MANAGEMENT

4.7.1 Transportation Distances

Transportation distances for biosolids to end use for Australia and each state are presented in Figure 4-48 to Figure 4-54.

For biosolids transported to landfill, 80% is transported less than 50 km with 2% and 7% transported 51 to 150 km and 151 to 400 km respectively.

Biosolids transport classified as 'Other' is biosolids produced in South Australia which are transported all over the state, generally a distance of between 50 and 350 km, hence the high response percentage of this category.

Biosolids which is reported as having 'No transport' is a result mostly of stockpiling of biosolids onsite but also where biosolids is removed by others through a contract or direct sale or having being given away to an end user and the biosolids producer categorises it this way.

Since 2023 'No transport' has increased by approximately 6% due to the redistribution from 'Not specified'. Other categories remained the same.

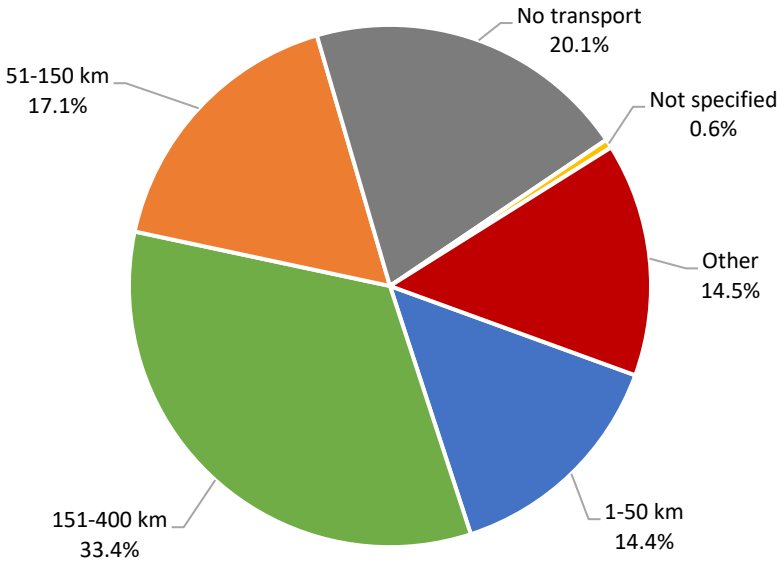

Figure 4-48 Transportation Distances (Dry Mass Basis), Australia 2025

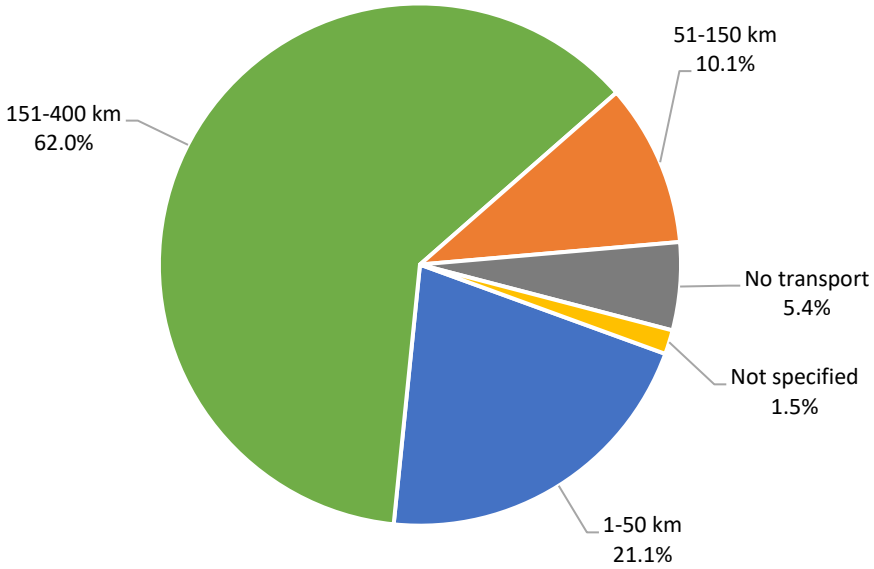

Figure 4-49 Transportation Distances (Dry Mass Basis), NSW & ACT 2025

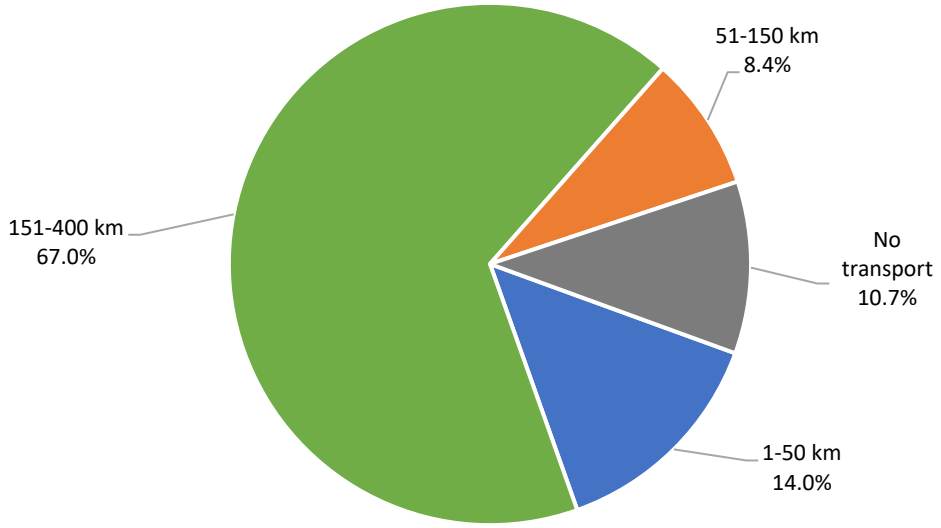

Figure 4-50 Transportation Distances (Dry Mass Basis), QLD 2025

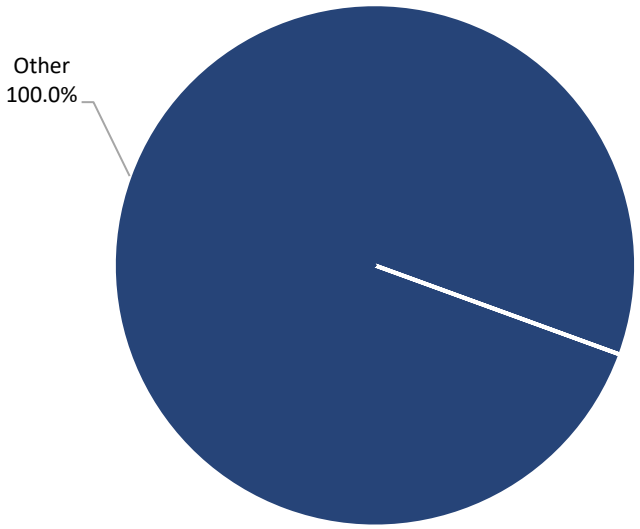

Figure 4-51 Transportation Distances (Dry Mass Basis), SA 2025

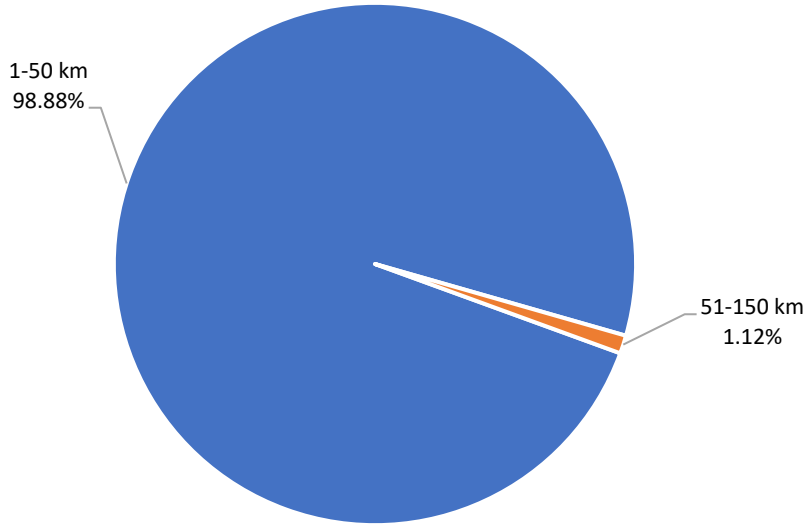

Figure 4-52 Transportation Distances (Dry Mass Basis), TAS 2025

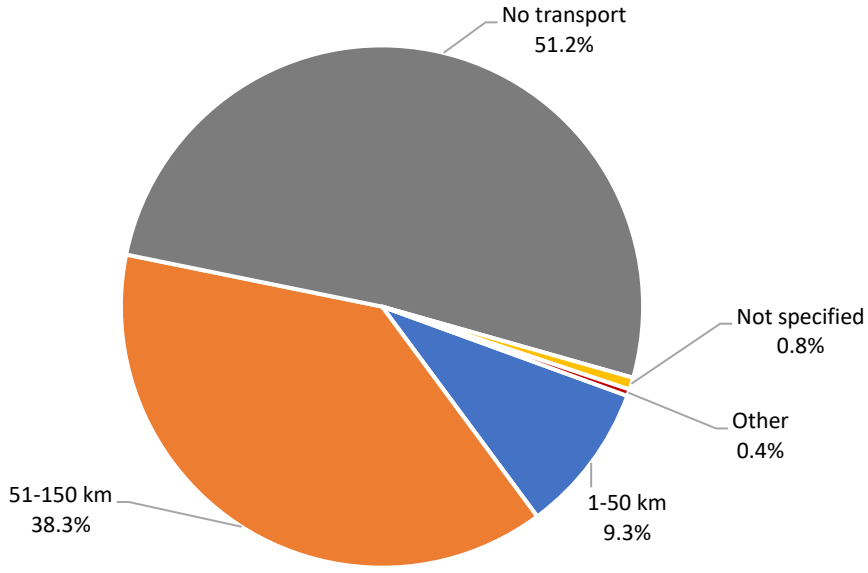

Figure 4-53 Transportation Distances (Dry Mass Basis), VIC 2025

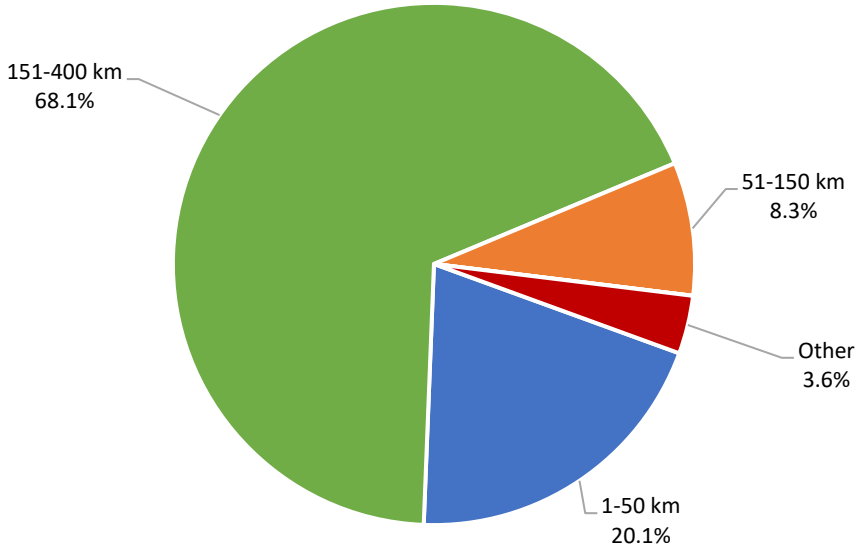

Figure 4-54 Transportation Distances (Dry Mass Basis), WA & NT 2025

4.7.2 Historical Stockpiles

Data collection on historic stockpiles of biosolids started in 2021. Table 4-2 shows a summary of results from 2021, 2023 and 2025 surveys. From data and commentary supplied, producers are making efforts to opportunistically remove historic stockpiles of biosolids.

These data should be considered to have limited accuracy due to the difficulties of estimating stockpile sizes, changes in size as biosolids digests in stockpiles and general reporting errors which cannot be validated like other data in the report. Producers may or may not include the recently stockpiled biosolids in this historical data.

Table 4-2: Summary of Reported Historic Stockpile Data

Reported parameter	2021	2023	2025
Number of sites with reported historic stockpiles	70	65	83
Total mass of reported historical stockpiles (dry tonnes)	2.5 million	2.6 million	2.6 million
Mass removed from stockpiles in last year (dry tonnes)	74,000	5,000	85,400
Mass added to stockpile in last year (dry tonnes)	45,000	75,000	29,500
Median stockpile size (dry tonnes)	1100	130	1160
Sites reporting stockpiles of over 10,000 dry tonnes		9	9

4.7.3 Emerging Contaminant Measurement

Participants were asked if their biosolids was analysed regularly for PFAS (Pre- and polyfluoroalkyl substances) or other emerging contaminants that are not yet regulated. Their responses are shown in Figure 4-55 and Table 4-3. By dry tonne, 92% of biosolids was reported to undergo analysis, up from 86% in 2023.

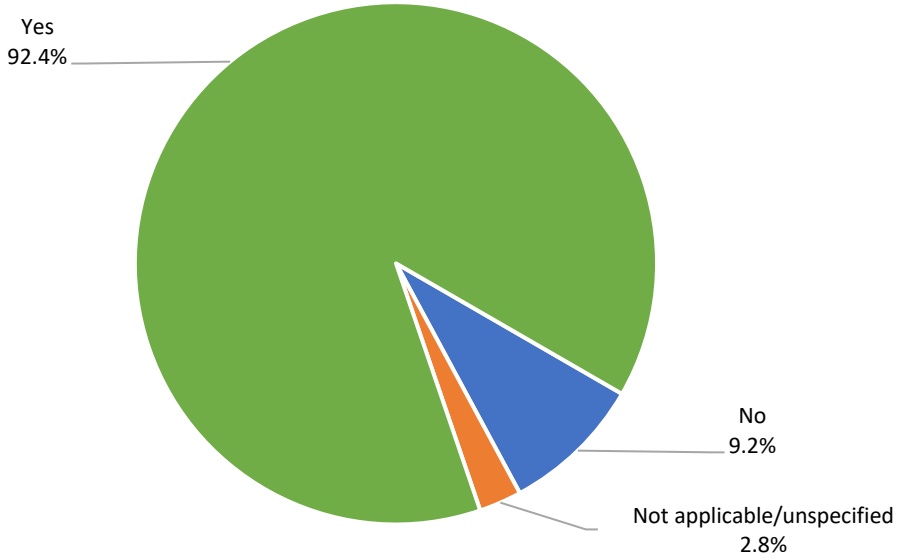

Figure 4-55 Biosolids Analysed for Emerging Contaminants (Dry Mass Basis), Australia 2025

Table 4-3 Emerging Contaminant Analysis Approach by State (Dry Mass Basis), Australia 2025

Response	NSW & ACT	QLD	SA	TAS	VIC	WA & NT	Total
No	19%	0%	1%	0%	2%	0%	5%
Yes	80%	90%	99%	100%	98%	96%	91%
Not applicable	1%	10%	0%	0%	0%	4%	3%

4.7.4 Emerging Contaminant Risk Management

Participants were asked which statement best agrees with their organisation's risk management approach for emerging contaminants:

- No risk management approach to emerging contaminants;
- Monitoring only;
- High-level risk assessment; and
- Detailed formal risk assessment.

Figure 4-56, shows the risk assessment approach (by dry tonne) of biosolids producers. Five biosolids producers reported managing their biosolids using a detailed risk assessment approach.

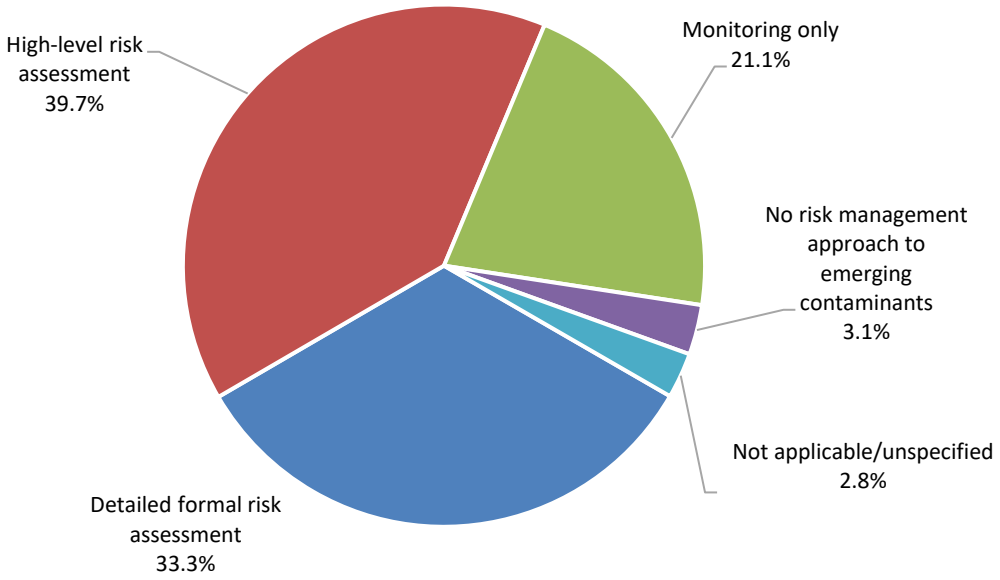

Figure 4-56 Organisational Approach to Managing Emerging Contaminants (Dry Mass Basis), Australia 2025

4.7.5 Renewable Energy

Participants were asked if renewable energy was produced from biosolids, 43 sites reported positively to this question, representing just under 50% of biosolids production by dry mass in 2025. All sites producing electricity did so from anaerobic digestion processing producing methane. Figure 4-57 shows if and how renewable energy is used nationally on a dry mass basis.

In 2025, no producers reported export of either biogas or heat but electricity is exported to the grid in some instances.

Figure 4-58 shows the number of sites which used biogas for energy production onsite, categorised by dry tonnes of biosolids produced; a stand in for size of the treatment facility. For context, 85% of the reported sites produce less than 5 dry tonnes per day and 4% of reported sites produce 5 to 10 dry tonnes per day.

The 25 sites producing heat from biogas were across the 0 to 5 dry tonnes per day size range.

Electricity production from biogas was in place at sites from as small as 0.36 dry tonnes per day.

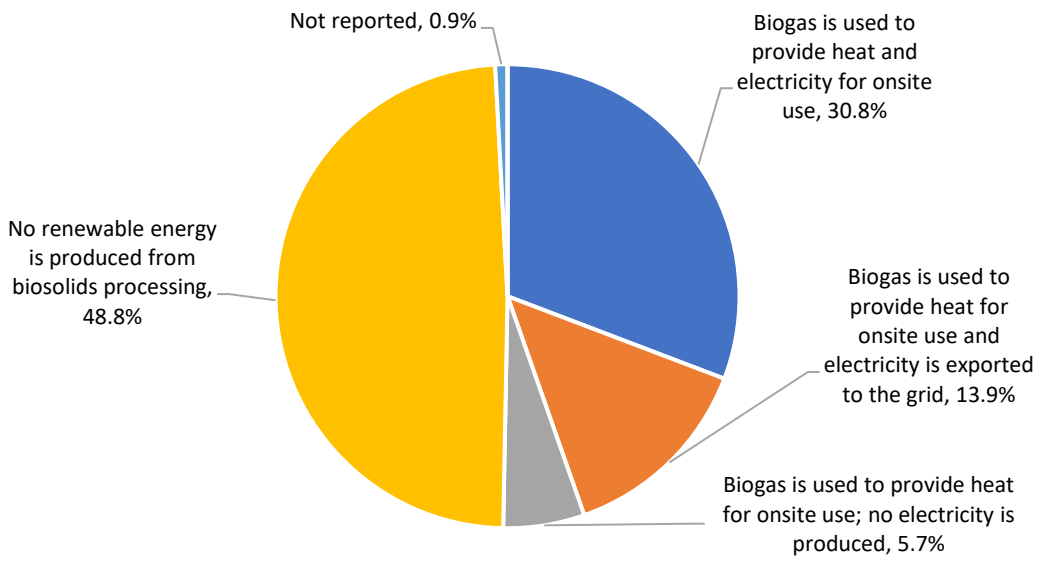

Figure 4-57 Biosolids Used to Produce Renewable Energy (Dry Mass Basis), Australia 2025

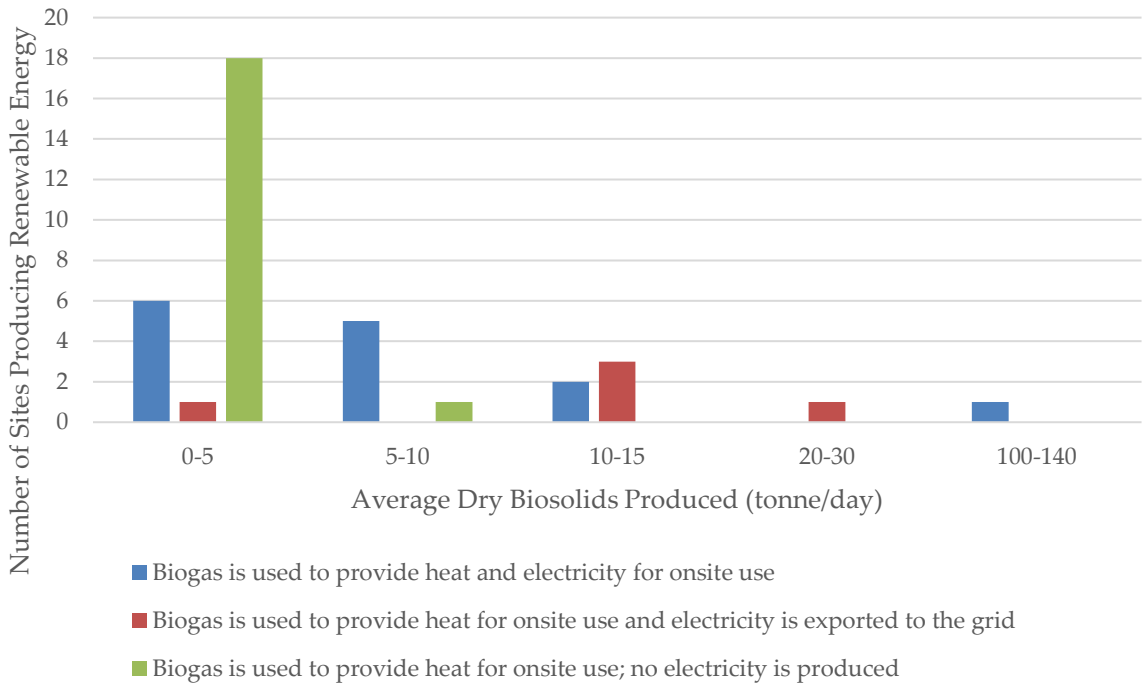

Figure 4-58 Number and Size of Sites Producing Renewable Energy (Dry Mass Basis) 2025

4.7.6 Biosolids Transaction

Producers were asked about the transaction that takes place when biosolids are removed from site. The biosolids which are removed or disposed of, does the producer:

- Receive payment for biosolids
- Give biosolids away
- Pay for removal from site for end/use disposal.

This question targets the transaction between the producer and the end user, not any third party which may reprocess and sell a product containing biosolids. Results are shown in shown in Figure 4-59.

Overall, the mass of biosolids that were given away has doubled from 7.3% to 14.6%. This is considered to be an improvement on paying for removal of biosolids. Receival of payment for biosolids decreased slightly compared to 2023, back in line with the 2021 survey. This likely reflects the opportunistic nature of receiving payment for biosolids. Two producers received payment for biosolids, selling a reasonably dry and well stabilised product.

The producers reporting 'Other' were not able to specify what transaction was used.

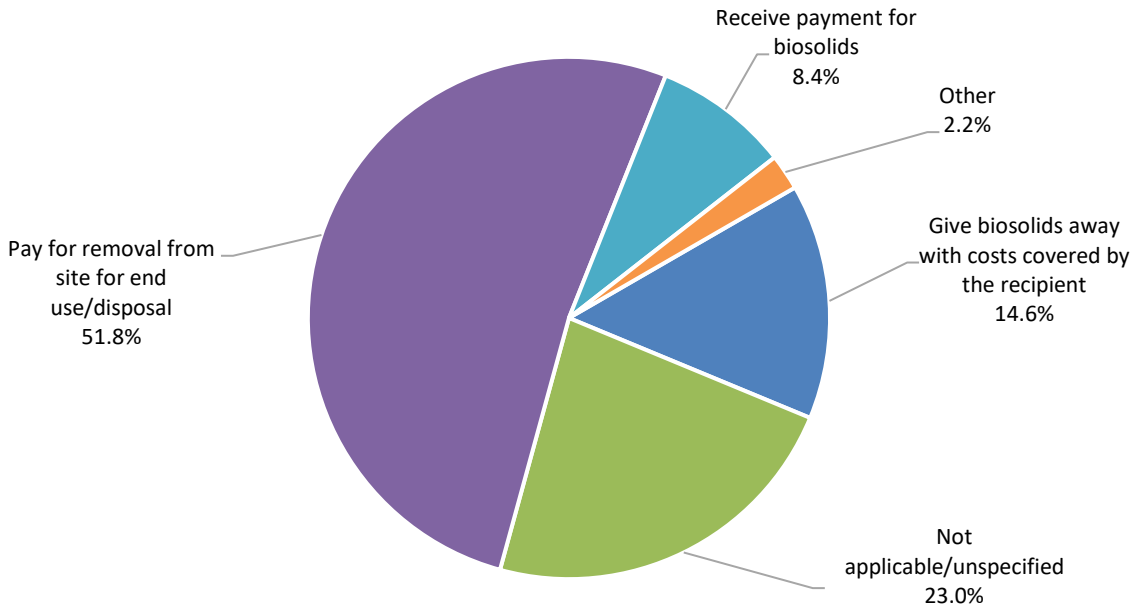

Figure 4-59 Biosolids Transaction (Dry Mass Basis), Australia 2025

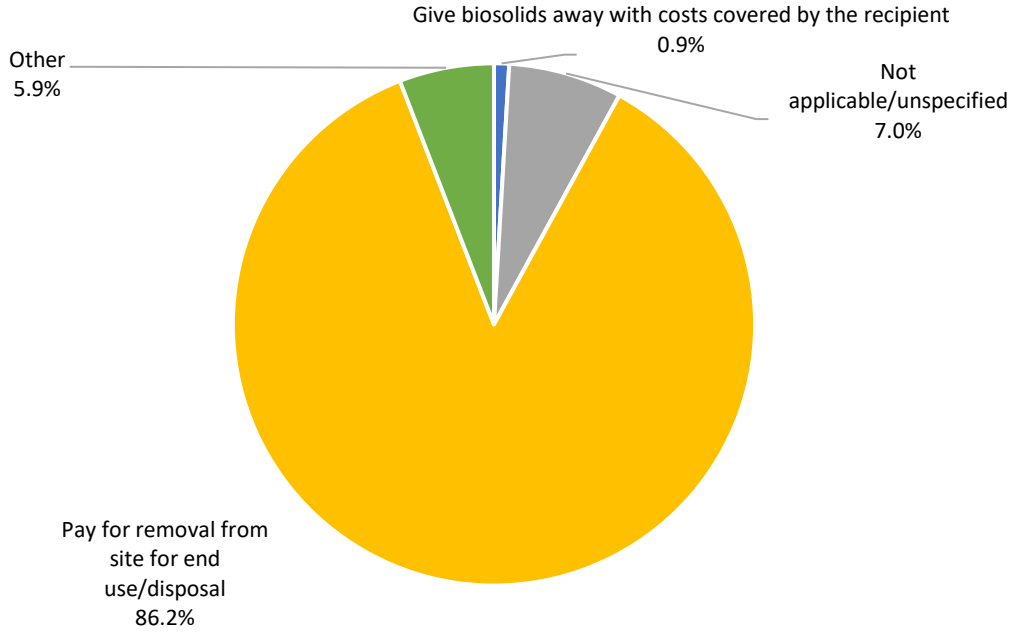

Figure 4-60 Biosolids Transaction (Dry Mass Basis), NSW & ACT 2025

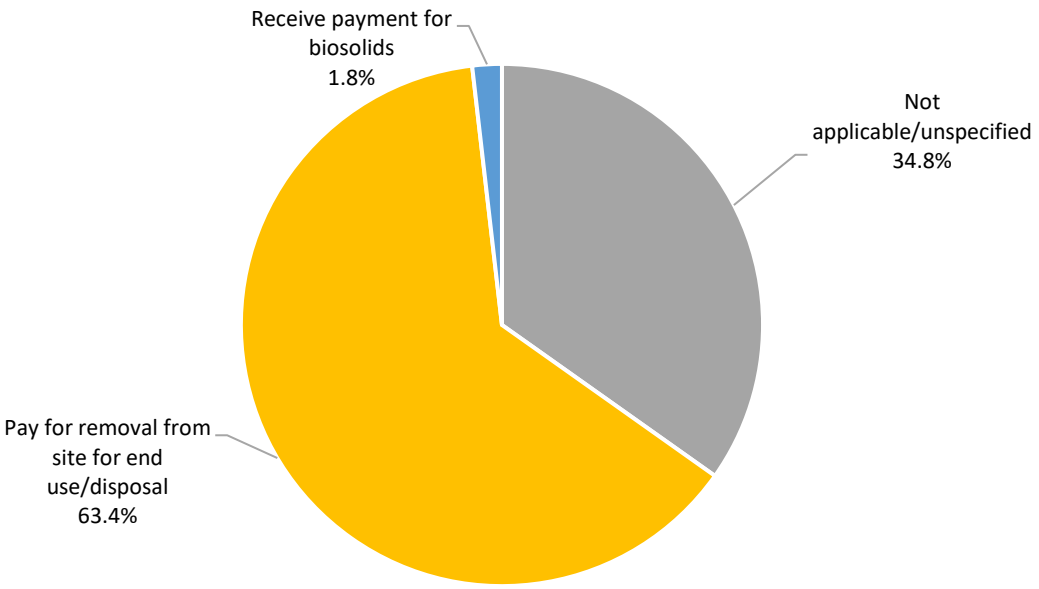

Figure 4-61 Biosolids Transaction (Dry Mass Basis), QLD 2025

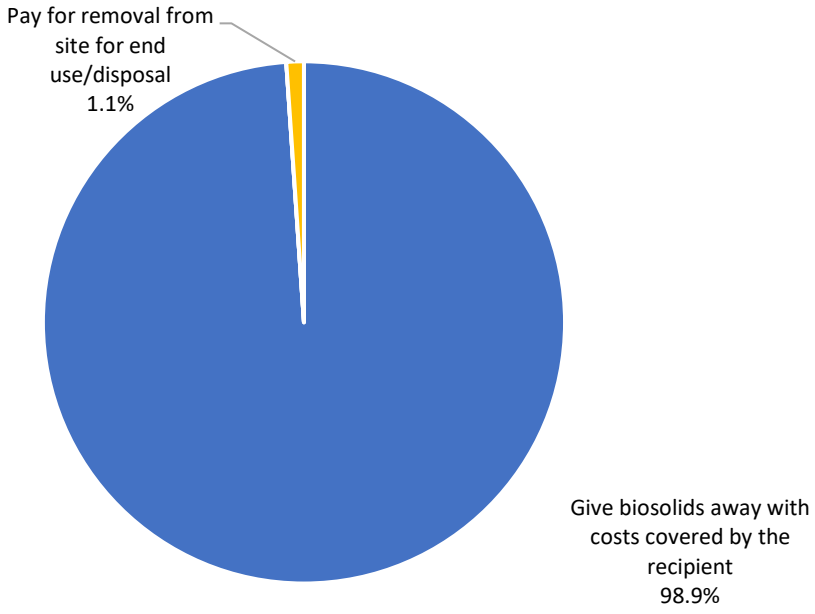

Figure 4-62 Biosolids Transaction (Dry Mass Basis), SA 2025

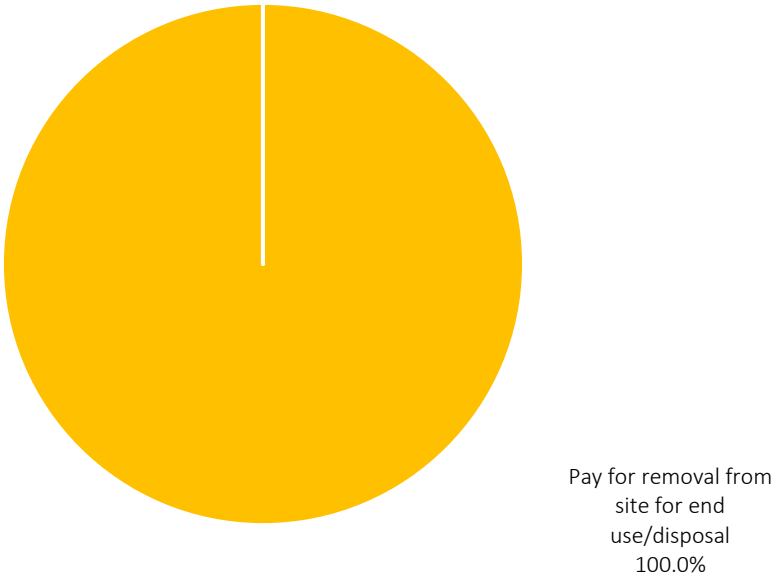

Figure 4-63 Biosolids Transaction (Dry Mass Basis), TAS 2025

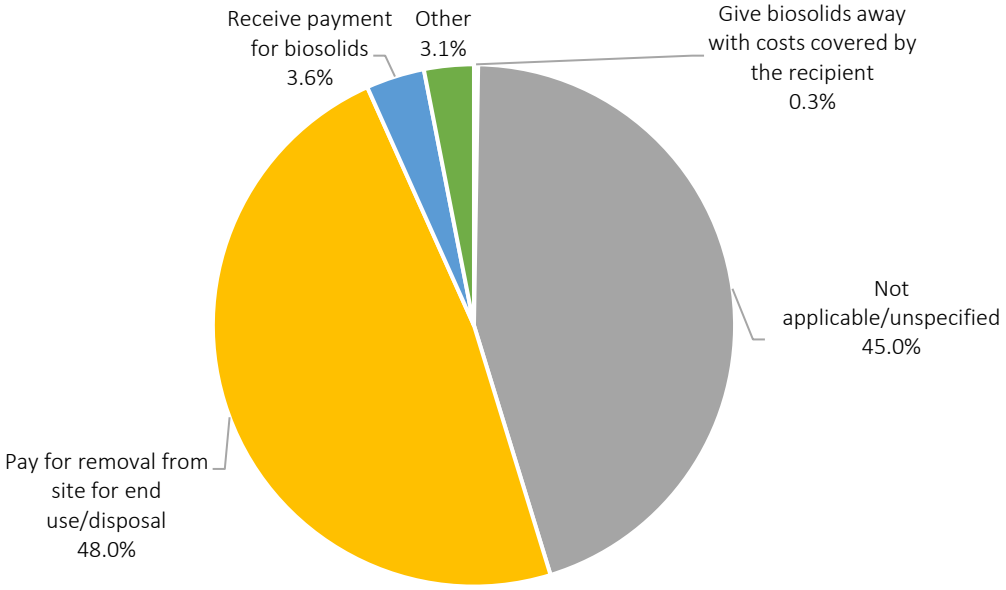

Figure 4-64 Biosolids Transaction (Dry Mass Basis), VIC 2025

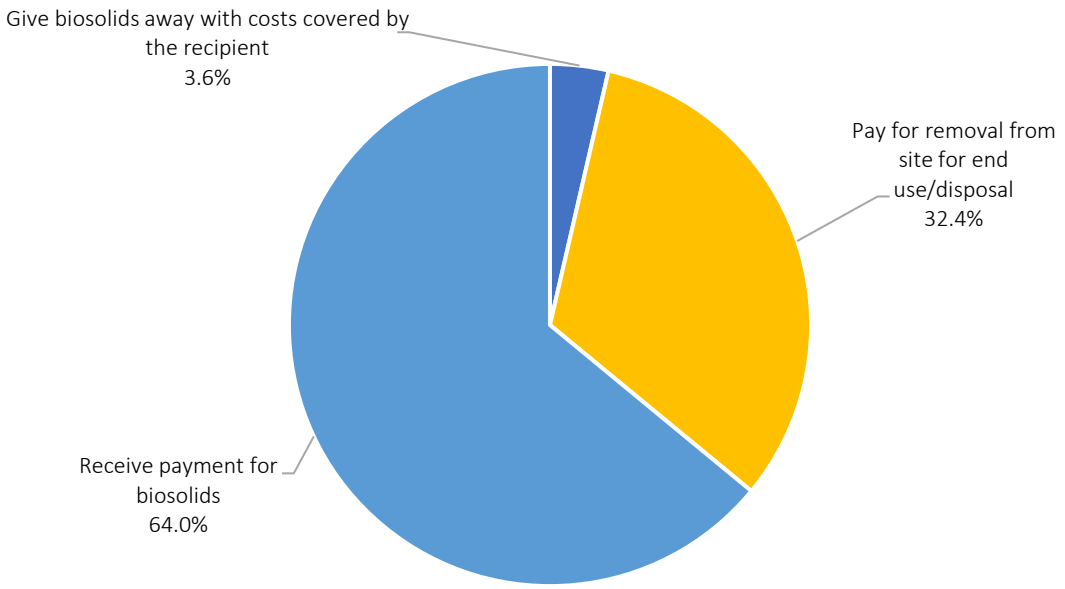

Figure 4-65 Biosolids Transaction (Dry Mass Basis), WA & NT 2025

4.7.7 End Use Management

Participants were asked how their biosolids end use risks are managed with the following statements as options:

- The biosolids end-use risks are managed by a 3rd party
- The biosolids end-use risks are managed by a 3rd party and audited in house
- The biosolids end-use risks are managed in-house

Results are shown in Figure 4-66. These results are very similar to 2023 reported practices with the main changes being a decrease in 'Not specified' and an increase in 'Not applicable'.

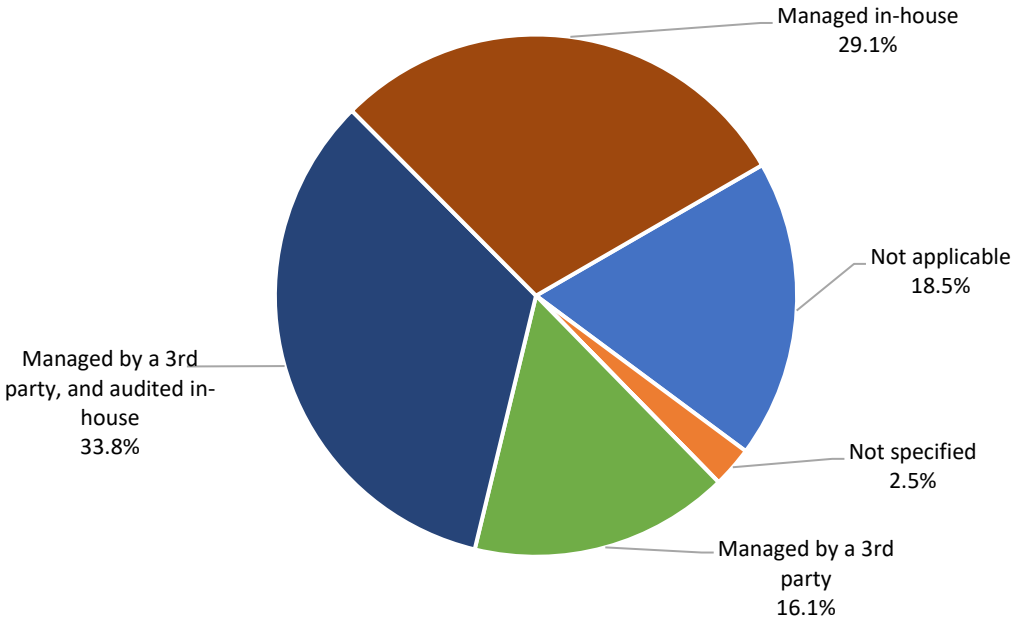

Figure 4-66 Biosolids End Use Program Management (Dry Mass Basis), Australia 2025

4.7.8 Biosolids Product Branding

Participants were asked if their biosolids were ultimately sold and if the biosolids were a branded product. Biosolids product branding nationally and for each state is presented from Figure 4-67 to Figure 4-73.

This data set includes biosolids directly selling biosolids and those indirectly selling i.e. those reprocessing biosolids. There is therefore discrepancy between this data and that presented in section 4.7.6 Biosolids Transaction. There are also reporting discrepancies between the biosolids transaction and biosolids branding which could not be resolved.

The breakdown of the quantity of biosolids sold directly or indirectly across Australia in 2025 is shown in Figure 4-74. Indirectly usually being sent to a third party for processing.

Biosolids reported as 'Sold by a 3rd party with a brand name' was stabilised through composting as either the main or further stabilisation process.

Biosolids reported as 'Sold by a utility/council with a brand name' was through a single site using thermal drying as the biosolids stabilisation process.

Biosolids reported as 'Sold by a 3rd party but unbranded' underwent extensive stabilisation through composting, anaerobic digestion with thermal hydrolysis pre-treatment or incineration.

Biosolids reported as 'Sold by a utility/council but unbranded' was stabilised through solar drying and agitated air drying.

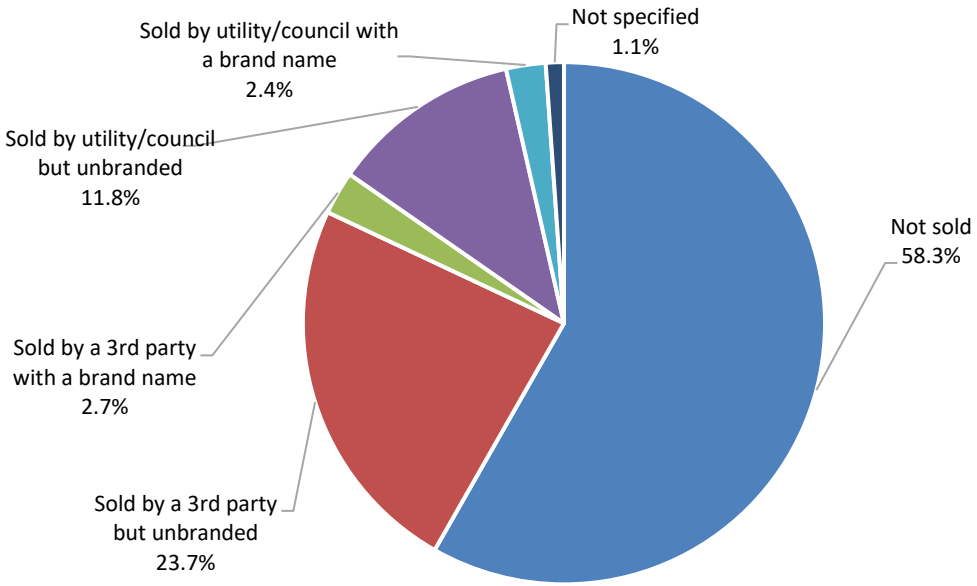

Figure 4-67 Biosolids Product Branding (Dry Mass Basis), Australia 2025

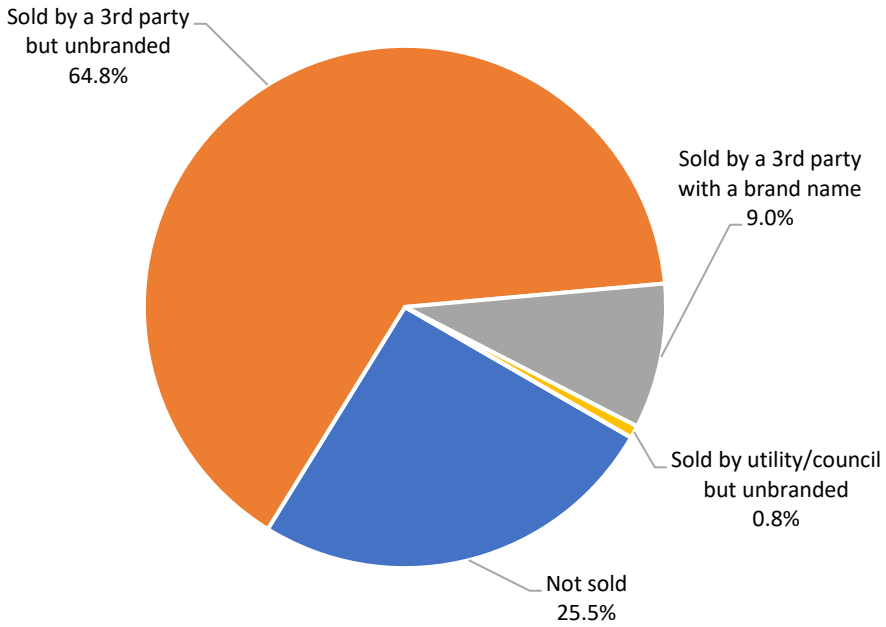

Figure 4-68 Biosolids Product Branding (Dry Mass Basis), NSW & ACT 2025

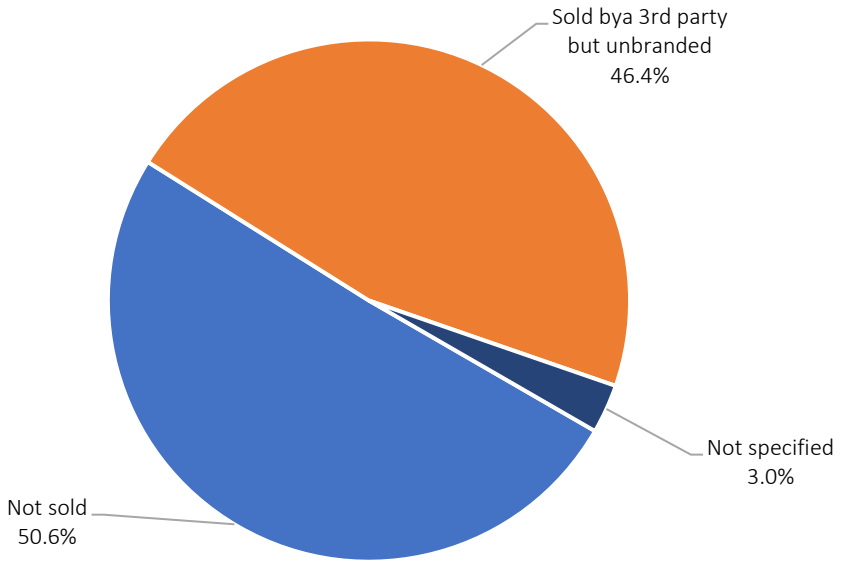

Figure 4-69 Biosolids Product Branding (Dry Mass Basis), QLD 2025

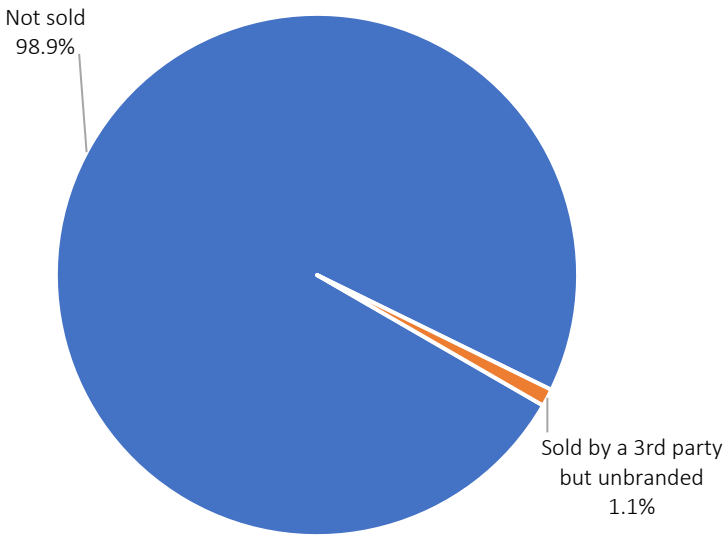

Figure 4-70 Biosolids Product Branding (Dry Mass Basis), SA 2025

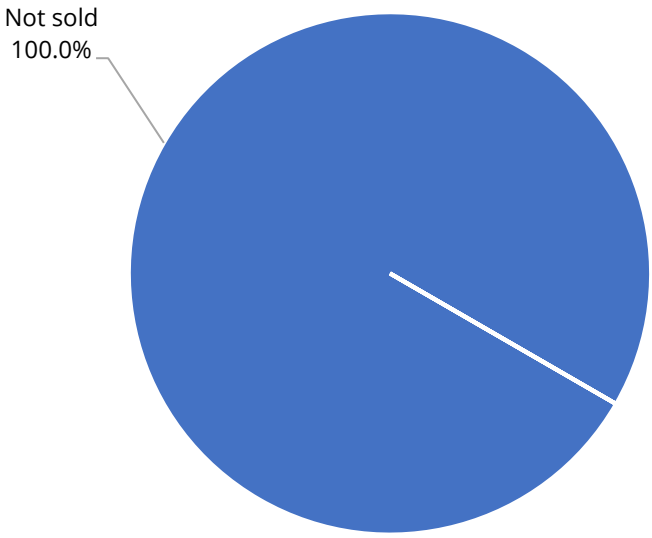

Figure 4-71 Biosolids Product Branding (Dry Mass Basis), TAS 2025

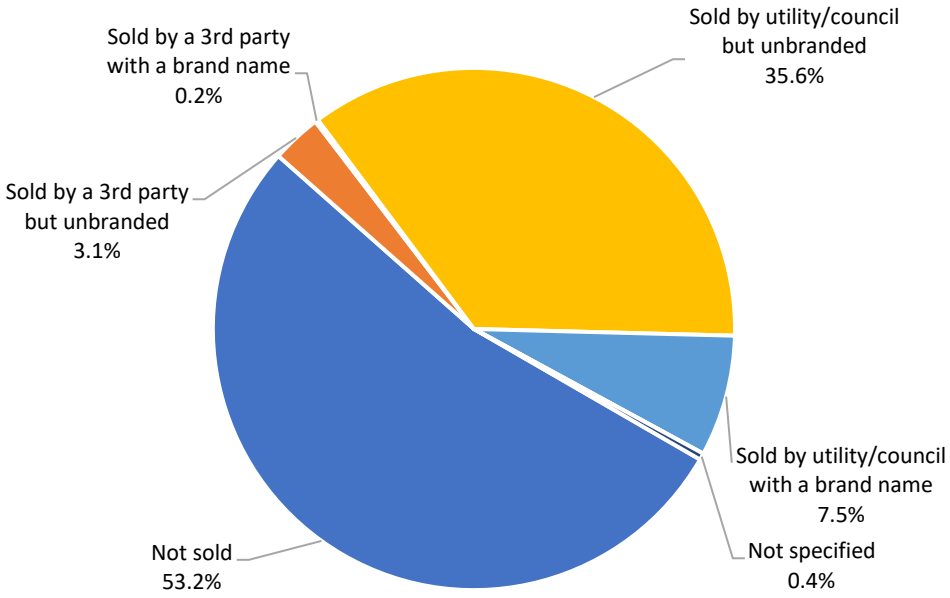

Figure 4-72 Biosolids Product Branding (Dry Mass Basis), VIC 2025

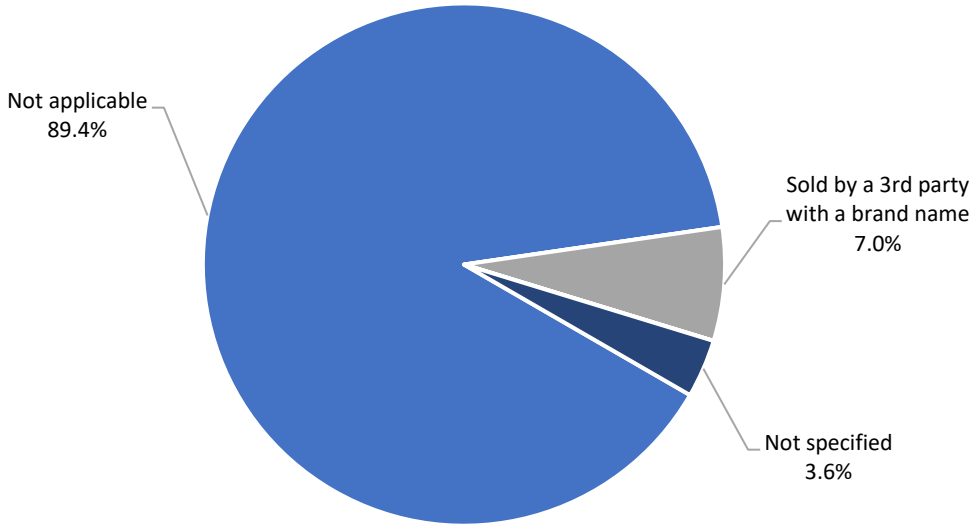

Figure 4-73 Biosolids Product Branding (Dry Mass Basis), WA & NT 2025

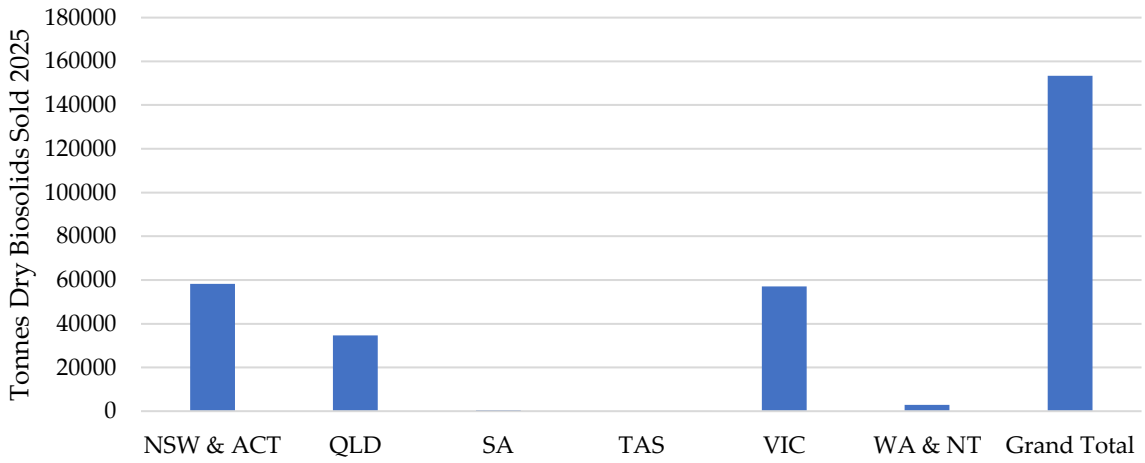

Figure 4-74 Dry Mass Biosolids Sold, Directly or Indirectly, Total and by State, Australia 2025

4.8 INDUSTRY RISKS & OPPORTUNITIES

Participants were asked to share their views on industry risks and opportunities. Thirty-nine (39) utilities responded with risks and 45 utilities responded with opportunities. Producers were given the opportunity to select from the categories from last year as listed in section 0 or insert their own response. Up to two responses were allowed although. To present this data and give an indication of where producers sentiment lies, the analysis was carried out as follows:

- Only responses from the 2025 survey were included, previous year's data was discarded;
- Risks and opportunities which were not selected from the pre-provided categories were either allocated to a category or put as 'Other' to allow analysis; and
- Where a producer listed multiple risks and opportunities usually for every site not just for their business, duplicates were removed.

4.8.1 Risks

Figure 4-75 shows the industry risks as ranked by producers. Emerging contaminants and changing regulations remain highest perceived risks. Also notable is the doubling of the proportion of those concerned about cost risk.

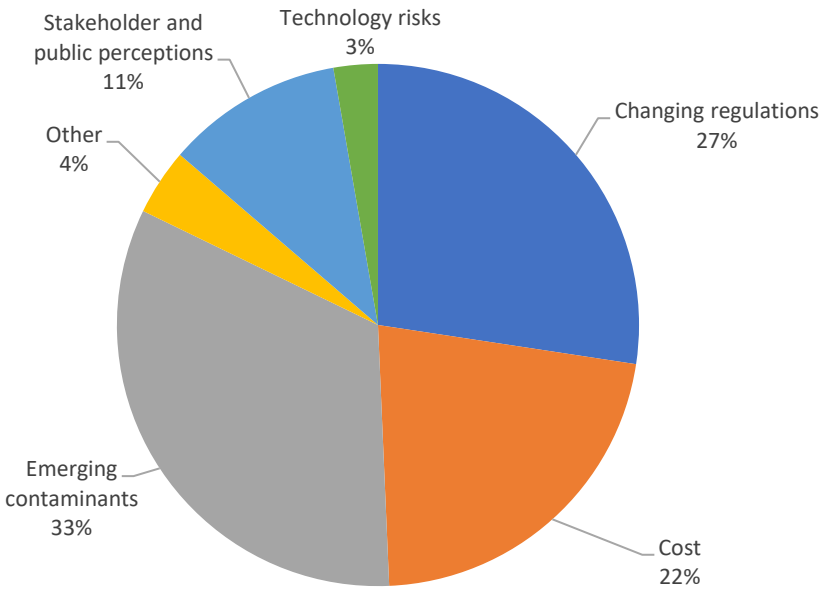

Figure 4-75 Biosolids Industry Risk (Count Basis), Australia 2025

In the category of risk - Other, producers noted:

- *"Urban encroachment and community standards for odour and amenity";*
- *"High concentration of contaminants"; and*
- *"Costs associated with the disposal [of biosolids]".*

Some risk related comments of note are:

- *"NSW EPA need to implement a reasonable transition period for implementation of The Biosolids exemption 2025 and The Biosolids order 2025* [sic]*. We have found poor laboratory turnaround of test results, delaying grading and classification. This is set to get worse with the new biosolids exemption and order."* [1]
- *"Regulations will change making it difficult and costly to use [biosolids] beneficially. Emerging contaminants will drive regulatory change.";*
- *"Emerging contaminants are informing 'changing regulations' and 'stakeholder and public perceptions' (mostly end users).";*
- *"If [the Australian Standard] for composting changes, [this] could impact viability and usage."; and*

[1] Note that the documents referred to are the Biosolids Resource Recovery Order and Exemption 2025 and at the time of data collection are in draft form.

- *"Regulatory changes are causing the disposal costs to increase unsustainably, with too few options left for disposal. Land use is not viable due to decreased application rate and landholder interest."*

4.8.2 Opportunities

Figure 4-76 shows the industry opportunities as ranked by producers. Emerging technologies, and end use markets remain highest noted areas of opportunity.

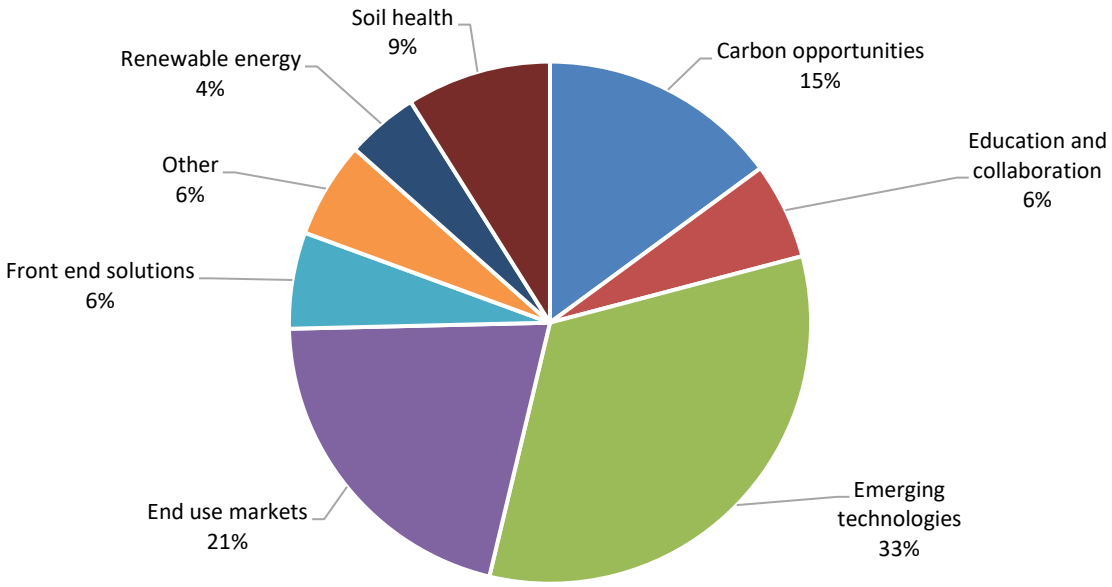

Figure 4-76 Biosolids Industry Opportunities (Count Basis), Australia 2025

In the category of opportunities - Other, producers noted:

- *"Composting and blending – Blend biosolids with green waste to create high-quality compost"; and*
- *"[An] opportunity is to diversify in our post biosolids treatments to produce contaminant free product(s) and open up alternative disposal options."*

Some opportunities related comments of note are:

- *"Biochar from biosolids technology is emerging from pilot /proving stages into full scale."*
- *"Diversification of end use markets [are an opportunity] in combination with emerging technologies."*

5 CONCLUSION

While management of biosolids has not fundamentally changed over the past few years, there are trends emerging and findings of interest to the biosolids management community.

The trend continues for movement of biosolids or sludge to centralised locations for processing. A central site can allow additional stabilisation, drying, or both to take place. The goal is to improve product quality and/or reduce quantity which can reduce cost and end use risk.

While centralised processing has benefits there are also risks. Planned and unplanned outages at a central site combined can cause significant changes to biosolids practices and costs year to year. Especially when the satellite sites have lots their biosolids handling capacity. This brings into focus the link between biosolids processing with all its risks and external factors such as supply chains, engineering and maintenance staff availability, regulatory change and cost drivers.

A better product gives a better chance of giving away or even selling a biosolids product. All the biosolids products which were sold were managed to produce a low odour, stable product. Most of these products can be stored for periods of time without significant degradation or can come onto the market as required by end users and are easy to use by different markets. Biosolids products sold or given away include biosolids which is thermally dried, incinerated (ash product), composted, solar and air dried, stockpiled for a year or more and anaerobically digested with thermal hydrolysis pre-preprocessing. A composted product is greater in volume than any of the others which highlights the value of a stabilised, low odour product.

Some utilities are reporting short term stockpiling of biosolids to buffer the impacts of lack of end use options at a particular time or to manage operational cost. While this hasn't necessarily been part of an overall biosolids business as usual approach, the need to have the ability to stockpile is becoming more apparent.

The impacts of tighter regulations around existing and emerging contaminants of concern are starting to become realised. Previously beneficially used biosolids are being stockpiled while waiting for further guidance or are being disposed of to landfill. Regulatory change or proposed change is starting to have cost and operational impacts on biosolids producers and their communities. Drivers towards better stabilisation continue, in some cases increasing contaminant concentrations, producing a clash between increasingly tight regulations and cost, environmental, and odour drivers.

5.1 ACKNOWLEDGEMENTS

Ekistica would like to acknowledge the ANZBP for their support and review, and all utilities who provided data, without which this work would not be possible.