NSW GOVERNMENT

Department of Planning, Industry and Environment

NSW Waste and Sustainable Materials Strategy

A guide to future infrastructure needs

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Introduction

This guide to future infrastructure needs supplements the *NSW Waste and Sustainable Materials Strategy 2041*, which sets out the long-term vision for managing waste, planning for infrastructure, reducing carbon emissions, creating jobs, and refocusing the way NSW produces, consumes and recycles products and materials.

The strategy updates NSW's priorities for waste and resource recovery to reflect the *NSW Circular Economy Policy Statement*, the *Net Zero Plan Stage 1:2020–2030* and the *National Waste Policy Action Plan*.

A key focus of our strategy is ensuring we have the right infrastructure to process the material we expect to enter the waste stream over the next two decades.

The NSW Government has prepared this guide to help strategically plan for the state's waste and circular economy infrastructure and leverage private sector and government investment.

This guide outlines the emerging needs in our waste and circular economy infrastructure network. The guide is based on extensive analysis of expected material flows, current and planned capacity and the changes in policy proposed in the strategy.

The needs are grouped by material type, with a focus on materials commonly found in the municipal solid waste (MSW) and commercial and industrial (C&I) waste streams. These materials have been the most affected by changing market conditions, including the Australian ban on the export of unprocessed glass, plastic, tyres and paper/cardboard. There are already significant gaps for reprocessing some of these materials and a pipeline of infrastructure investment is required to reprocess them domestically.

Construction and demolition waste, which is the largest single waste stream, has not been included in this initial version of the guide. The relatively high commerciality of construction and demolition waste processing, driven by the waste levy and the value of the outputs, has led to high recycling rates and strong investment in the sector. This stream will continue to be monitored and may be included in a future version of this guide.

Who this guide is for

Local government: Local governments are responsible for household waste services. Their contracts often underpin investment in future infrastructure. This guide will help local governments make informed decisions about how their service needs align with infrastructure investment.

State government: The NSW Government provides funding for waste and circular economy infrastructure. The NSW Government will use this guide to plan for new developments and precincts, and to better target its future investments.

Investors: This guide will help investors and proponents to align their projects with the government's strategic infrastructure priorities.

What the emerging infrastructure needs are

The focus for waste and circular economy investment attraction in NSW over the next decade will be on securing our critical infrastructure needs and stimulating innovation.

Based on an assessment of our waste and circular economy infrastructure needs over the next decade and beyond, our three key areas of focus are:

- **Residual waste** – At our current rate of waste generation and recycling, putrescible landfills servicing Greater Sydney are likely to reach capacity by 2036 and non-putrescible landfills by 2028. While we will implement strategies to reduce the volume of waste we generate and increase the amount we re-use, repair and recycle, we need to make sure we have enough capacity to safely dispose of the material we can't recycle.
- **Organics** – By 2030, NSW will transition to source-separated collection of food and garden organics from households and, by 2025, source-separated collection of food organics from select businesses. This will significantly increase the volume of clean organics entering the recycling system. We must ensure we have capacity to reprocess this material.
- **Plastics** – With low recycling rates, plastic often ends up littered, causing significant harm to our natural environment. The NSW Government has committed to tripling the recycling rate of plastics by 2030, supported by the export ban on unprocessed plastics. This means we will need processing infrastructure to support the increased quantity of plastics destined for recycling over the next few years.

Infrastructure needs are different throughout the state, and are shown throughout this document for the metropolitan levy area (MLA), the regional levy area (RLA) and the non-levied area (NLA). Further information about these regions is available on the NSW Environment Protection Authority (EPA) website.

How the NSW Government will provide support

The NSW Government will support a pipeline of waste and circular economy infrastructure by:

- **facilitating** waste and circular economy infrastructure by targeting investment attraction, funding, environmental licensing and planning activities to the highest priority areas of need
- **investing** in high priority projects, including through our $35 million Remanufacture NSW fund, which will be topped up with an additional $24 million over five years, and our $65 million organics support package
- **strategically planning** for infrastructure by working with local communities and proponents to identify precincts where investment can be supported
- **aligning** policy and regulation with the *Waste and Sustainable Materials Strategy 2041*, including progressively reflecting circular economy principles and best-practice waste management in our planning system.

How this guide was developed

The NSW waste tracking and data collection requirements are the most comprehensive of any state, covering all licensed waste facilities and designed to provide the intelligence to underpin enforcement and target policy interventions.

The following findings are drawn from the *Baseline Infrastructure Capacity and Waste Flows in New South Wales* and *NSW Waste Infrastructure Needs Assessment*, prepared by Arcadis. The reports rely on self-reported facility throughput information reported to the NSW Environment Protection Authority for the 2018–19 period, and available facility capacity information (other than for tyres, which was based on findings in other reports).

The findings also rely on a waste forecast model prepared by the Department of Planning, Industry and Environment and various market reports. Unless expressly stated, the guide only addresses infrastructure needs and capacity/throughput for MSW and C&I material flows.

As a result, this guide is indicative only and proponents of new infrastructure should rely on their own enquiries before making any investment decisions.

Updates

This guide will be updated at regular intervals to reflect new capacity, new data or changes to market conditions and policy.

NSW Waste and circular economy infrastructure needs

Plastics processing

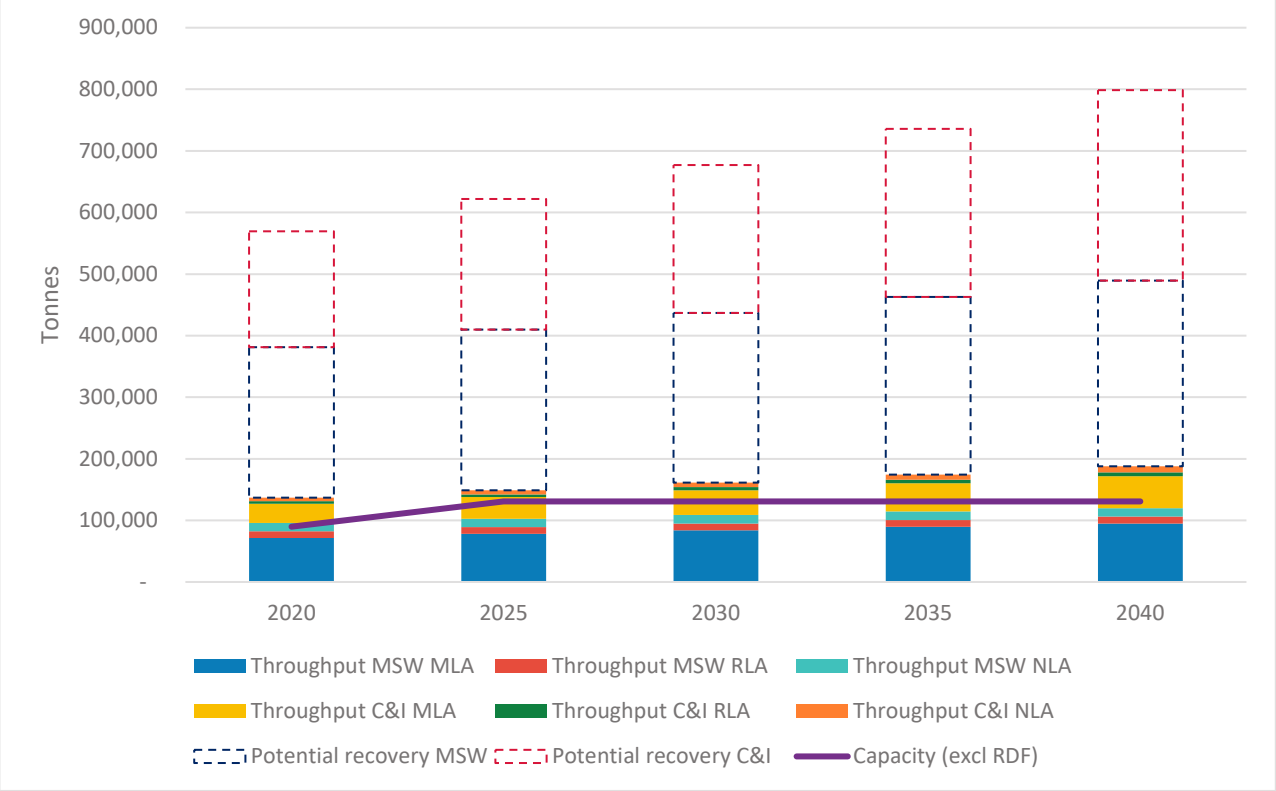

Figure 1. Estimated NSW plastics processing throughput and potential additional recovery (through improved capture from residual waste) versus business as usual recycling capacity[i]

Table 1. Plastics market summary, processing capacity, throughput and future needs, opportunities and challenges across NSW

Market summary	In 2018–19, 760,000 tonnes of plastic from MSW and C&I sources entered the waste management system, of which 19% was recovered through processing into new products and refuse-derived fuel. The domestic plastic recycling sector is characterised by a fragmented industry, with commodity price risks creating barriers to entry in the absence of vertical integration or long-term contracts. Compared to mixed baled plastic, plastic materials sorted separately into polymer types are of greater value and have greater market access. Enabling efficient separation by polymer types for export or local markets improves economic viability and ensures adherence to current and pending regulatory requirements. Material losses from sorting processes can be substantial, and intervention higher up the management stream (including better packaging, and waste collection measures) creates higher value recyclate. On the other hand, local reprocessing, and manufacturing using the mixed plastic stream, might be expanded to ensure recovery rates for plastics do not fall.
Existing capacity (2018–19)	**90,000 tpa** plastic recycling capacity across 18 facilities in NSW. Some capacity is limited to one or two stages of secondary processing (e.g. sorting/washing and drying different polymer types and not pelletising).

	Capacity is broken down to include: • Polypropylene (PP): 2,000+ tpa • High-density polyethylene (HDPE): 15,000 tpa–20,000 tpa • Polyethylene terephthalate (PET): 20,000+ tpa • Low-density polyethylene (LDPE): 5,500+ tpa In addition, there is at least 57,000 tpa of energy recovery throughput capacity for plastic refuse-derived fuel (RDF).
Existing throughput (2018–19)	• **760,000 tonnes** of plastic from MSW and C&I sources entered the waste management system • **80,000 tonnes** was recycled into new plastic products (although a significant proportion was recycled overseas) • **62,000 tonnes** was recovered as a refuse-derived fuel • Over **424,000 tonnes** of potentially recyclable plastics was disposed.
Capacity gap (2018–19)	The incoming export ban is estimated to impact over 80,000 tpa of unprocessed mixed and other plastic. These materials will need to be processed in a way that meets the conditions of this legislative change.
Pipeline facilities	Pipeline facilities will provide at least another **41,000 tpa** plastics processing capacity by 2025, including: • Suez's planned Chullora Materials Recovery Facility (MRF), with 16,000 tpa mixed plastic beneficiation capacity • Cleanaway/PACT/Asahi joint venture and Plastic Forests.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	Under business as usual (BAU): **−47,000 tpa** (capacity deficit)
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	Under BAU: **−20,000 tpa** (capacity deficit)*
Suitable locations	High-value plastic is very light, so once it is baled, the transport costs are less of a barrier because the value-add of processing can be significant. This is supported by the fact that flakes and in particular recycled pellets are a globally-traded commodity. It is not highly critical where a plastic processing facility is located. It is more important that each facility achieves critical throughput, due to the relatively high capital requirements. Locations will be primarily driven by scale factors rather than transport costs, given the costs to transfer baled plastics are outweighed by economies of scale as the market matures in response to the export ban.
Challenges	The export ban on mixed plastic creates pressure to develop new capacity to produce high-value, export-ready polymers and to develop domestic

	markets. It appears likely that, at least initially, export will be the main option for primary (and secondary) processed plastics due to the immaturity of local markets. Most plastic products and packaging are imported, with only one producer of plastic resins that solely supplies domestic plastic manufacturers, with some other producers also providing some domestic supply.
Opportunities and priorities	A mix of facilities is needed to handle increasing volumes of plastics across NSW. This will include commercially viable secondary processing (flaking and pelletising). There is a large potential domestic market for plastic products, however as plastics are currently largely imported, local plastic manufacturing would need to increase to support this. The most likely polymers to be recycled are HDPE, LDPE, PP and PET, primarily from consumer and C&I packaging streams, which have a significant share of these polymers and are typically served by established collection systems. The polymers least likely to be recycled are those that only represent small quantities, due to inefficiency of scale, and those that are of unknown or compound polymers. Source separated streams increase end market quality and opportunities compared with mixed plastics streams, but the likely increased costs of collection should be considered.
2030 Needs (assumes all existing pipeline facilities are brought online)	Minimum new infrastructure to address export ban requirements (under BAU): • 2 x small secondary processing plants (8,000 tpa per site), potentially aligned to MRF expansions, including regional focus • 2 x medium secondary processing plants (16,000 tpa per site) (likely beneficiation given lower capex, but could include chemical processing). To meet the NSW Plastics Action Plan target of tripling the plastics recycling rate, the following additional infrastructure is required: • 4 x small (8,000 tpa per site) secondary processing facilities (including mixed and PP, some via MRF expansions/regional) • 2 x medium (16,000 tpa per site) secondary processing facilities • 3 x large (32,000 tpa per site) secondary processing facilities (primarily PET and HDPE).
2040 Needs (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	Minimum new capability required for mixed plastic under BAU: • 1 x medium secondary processing (16,000 tpa) (beneficiation or chemical processing). Minimum new capability required for mixed plastics to the triple the plastics recycling rate: • 2 x medium (16,000 tpa per site) secondary processing facilities • 1 x large (32,000 tpa) secondary processing facility.

Organics processing

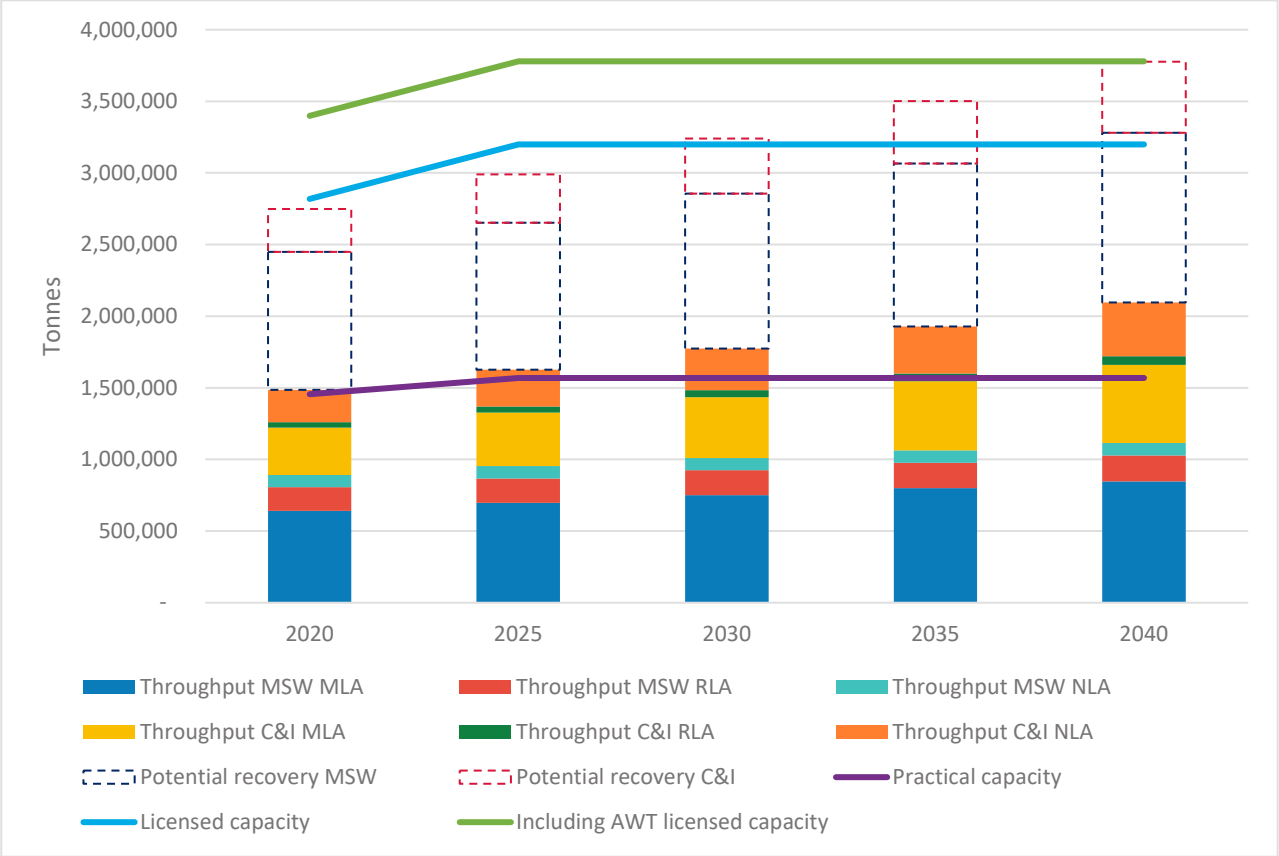

Figure 2. Estimated NSW organics processing throughput and potential additional recovery (through improved capture from residual waste) versus business as usual capacity[ii]

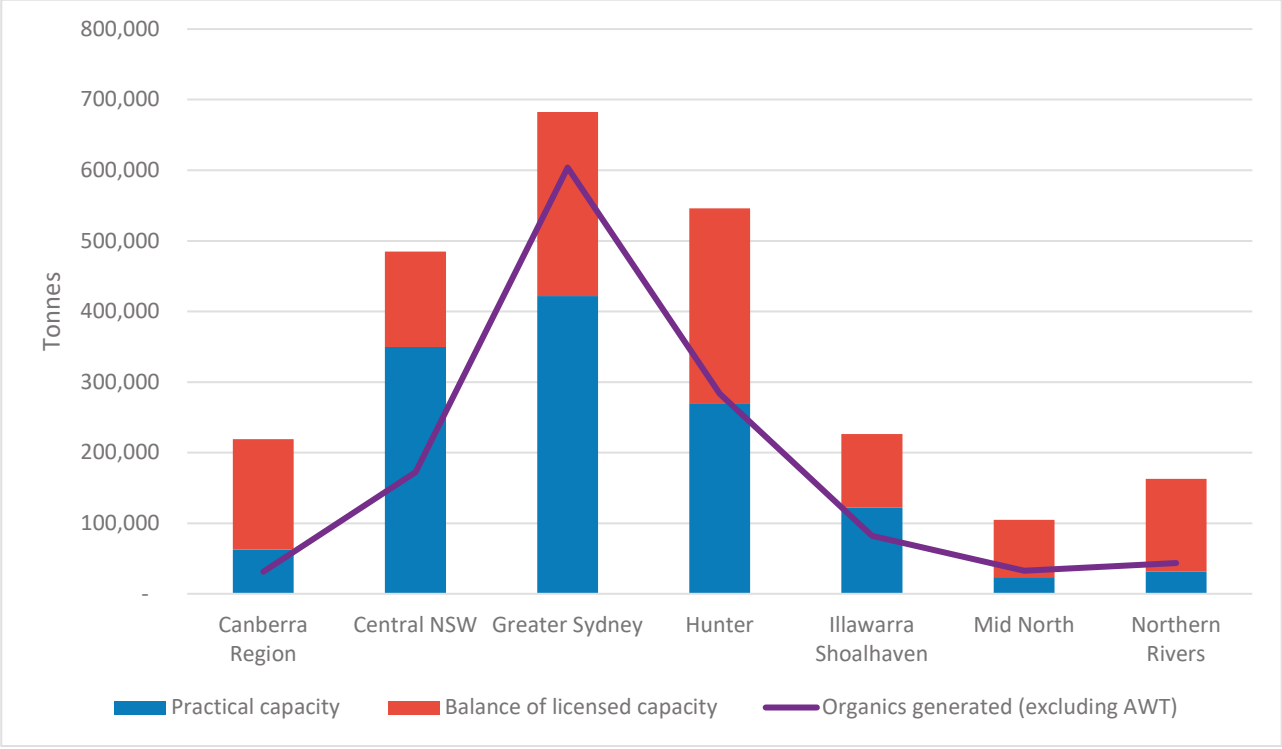

Figure 3. Organics generated (excluding AWT organics) and processing capacity, by region, in 2018–19[iii]

Table 2. Organics market summary, processing capacity, throughput and future needs, opportunities and challenges across NSW

Market summary	High levels of government infrastructure investment and residential construction have driven growth in demand for processed organics products. However, despite strong demand, the use of gate fees is still considered critical in funding processing costs and keeping the cost of outputs down, so that products are often sold for well below processing costs. The urban amenity market is the largest market for processed organic material. It demands high-quality products with low levels of contamination. Better source separation and processing outcomes could support positive market outcomes. NSW Government funding is supporting market growth and development. Funding has resulted in new and expanded processing facilities, better food and organic waste separation as well as research and development for mixed-waste streams.
Existing capacity (2018–19)	**1,455,000 tpa** practical capacity* for source-separated organics (excluding alternative waste treatment): • Garden organics – 809,000 tpa • Food and garden organics (FOGO) – 155,000 tpa • Other organics – 460,000 tpa In October 2018, the NSW EPA revoked the resource recovery order and exemption for the application of mixed waste organic outputs (MWOO) to land due to risks associated with chemical and physical contaminants. A transition package for the alternative waste treatment (AWT) industry, which was producing MWOO, was introduced to ensure kerbside collection services would not be disrupted. An estimated additional **176,000 tpa** in AWT capacity (which separates the organics fraction of residual waste) will need to be reconfigured as a result of the MWOO ban, potentially to FOGO/FO processing. *Licence approval for organics processing facilities is often on a threshold basis that is connected to the amount of fees they pay. The maximum may significantly overstate a facility's practical capacity based on technical, site or organisational constraints. The practical capacity estimate has been derived by selecting the maximum actual annual throughput within licensed facilities in the last three years, and for non-licensed facilities the maximum they can process before requiring a licence and therefore being captured in the data system.
Existing throughput received at facilities (2018–19)	• **1,375,000 tonnes** of source separated organics (excluding AWT facilities) • Additional **176,000 tonnes** residual organics processed in AWT up to November 2018–19 • Over **1.26 million tonnes** of potentially recyclable organics was sent to landfill

Capacity gap (2018–19)	**+80,000 tpa** excess capacity, for currently collected source-separated organics. Within the MLA, only four Greater Sydney councils have adopted FOGO services or run trials. Randwick introduced a FOGO service in March 2021. There is higher uptake in the Hunter and Illawarra–Shoalhaven, including commitments by the large councils of Central Coast and Wollongong. However, the **1.26 million tonnes** of potentially recyclable organics within the residual waste stream presents a significant recovery opportunity.
Pipeline facilities	Pipeline projects for up to **266,000 tpa**
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	**1.1 million tpa** in FOGO/FO processing capacity required (capacity deficit) to service the MLA. May include new facilities as well as conversion of existing AWT and GO processing capacity. This estimate incorporates the assumption that it is mandatory for all councils to provide kerbside FOGO services to all households by 2030 and mandatory food waste collection for select businesses by 2025.
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	**−233,000 tpa** (capacity deficit*) *This is only to process source-separated organics.
Suitable locations	Organics processing is widely distributed across NSW. Most organics processing facilities are viable at smaller scales, while local markets for compost and soil amendment products are generally able to absorb the relatively small recovery volumes. More intensive processing may require regional feedstocks and markets but will still seek to minimise transport costs. Highly urbanised areas account for the majority of organics waste and the biggest demand for new infrastructure. However, in these areas high land value and community proximity to odour-generating waste facilities reduce the prospects of developing major new facilities. Instead, transfer stations are likely to be needed to bulk and transport organics to suitable locations for processing, with sites close to end markets likely to be preferred to minimise multiple handling. In regional areas, new organics facilities should be located close to feedstocks due to the cost and operational constraints to transport unprocessed organics, whether loose packed garden organics or high putrescible strength food and other organics. The ubiquity of end markets in rural and regional areas makes proximity to markets a secondary consideration.

Challenges	The MLA has the biggest need for new infrastructure, particularly for FOGO/FO processing under the sensitivity tests given the limited current adoption of FOGO/FO services in the metropolitan levy area. Approximately 200,000 tpa of organics generated in Sydney are currently transferred to Central West and Illawarra–Shoalhaven for processing. This is largely due to the large footprint required for facilities, particularly composting, and odour. If this trend continues, significant transfer infrastructure will be required across Greater Sydney so material can be bulked and transported.
Opportunities and priorities	A mix of facilities is needed to process differing feedstock types, site characteristics available in each region and the desired output products. This will include in-vessel composting (IVC), anaerobic digestion (AD) at various scales and small-scale on-site processing in businesses and households to re-use organics on-site. Greater uptake of FOGO across NSW will likely require substantial new investment in FO/FOGO infrastructure, repurposing existing GO and AWT infrastructure and establishing new transfer stations in the MLA.

2030 Needs
 	
(assumes all existing pipeline facilities are brought online and new strategy organics policies are implemented)
	• To service **Greater Sydney**:
	  o 2 x medium IVC (FOGO, minor FO) (20,000 tpa to 70,000 tpa per site)
	  o 6 x large IVC (FOGO, minor FO) (70,000 tpa to 100,000 tpa per site) or 12 x large outdoor aerated composting (>50,000 tpa per site)
	  o 2 x medium AD (FO) (30,000 tpa)
	  o 4 x large AD (FO) (50,000 tpa per site)
	  o Potentially up to 250,000 tpa of transfer stations to transfer Sydney organics to regional processing
	• **Hunter**:
	  o 1 x small IVC (20,000 tpa) or 1 x medium outdoor aerated compost (FOGO, minor FO) (10,000 tpa to 50,000 tpa)
	  o 2 x medium IVC (20,000 tpa to 70,000 tpa per site) or 2 x large outdoor aerated compost (FOGO, minor FO) (>50,000 tpa per site)
	  o 2 x medium AD (FO) (30,000 tpa per site)
	• **Illawarra–Shoalhaven**:
	  o 1 x small AD (FO) (10,000 tpa)
	• **NLA**: Small or medium-sized outdoor aerated composting (10,000tpa to 50,000tpa) supported by a network of bulking points
	• **Statewide:** Additional small-scale on-site solutions across all regions, focused on population and industry centres for sufficient scale.

2040 Needs
 	
(assumes all infrastructure needs to meet capacity gap 2030 are brought online)
	• To service **Greater Sydney**:
	  o 2 x medium outdoor composting for C&I non-food organics (10,000 tpa to 50,000 tpa per site)
	  o 1 x medium IVC (20,000 tpa to 70,000 tpa) or 1 outdoor aerated compost (FOGO, minor FO) (10,000 tpa to 50,000 tpa)
	  o 1 x large IVC (70,000 tpa to 100,000 tpa) or 2 x large outdoor aerated compost (FOGO, minor FO) (>50,000 tpa)
	  o 1 x large AD (FO) (50,000 tpa)
	• **Hunter**: None. Throughput increase only to manage additional 50,000 tpa, divided between three organics streams
	• **Illawarra–Shoalhaven**: None. Throughput increase only to manage additional 12,000 tpa, divided between three organics streams
	• **NLA**: 1 or 2 small outdoor aerated compost sites (10,000tpa)
	• **RLA**: None
	• **Statewide:** Additional small-scale on-site solutions across all regions, focused on population and industry centres for sufficient scale.

Glass processing

Figure 4. Estimated NSW glass processing throughput and potential additional recovery (through improved capture from residual waste) versus business as usual processing capacity[iv]

Table 3. Glass market summary, processing capacity, throughput and future needs, opportunities and challenges across NSW

Market summary	In 2018–19, an estimated 365,000 tonnes of glass from MSW and C&I sources entered the waste management system, of which 63% was recycled. The key markets for recycled glass are to replace virgin material in the manufacture of new bottles and to replace virgin sand for civil construction purposes. Minor markets include filtration media and insulation. While approximately 60,000 tonnes were exported to other states for recycling in 2018–19, only a very small quantity (about 1,000 tonnes) was exported. Export of recycled glass is limited by its weight and associated costs and is not considered a significant market. While demand for recycled glass has been low in recent years, the market is picking up through investments in glass processing capabilities and growing support for the use of recycled crushed glass as a sand substitute. Demand is anticipated to continue to grow, given the announcement by Visy (which runs NSW's only glass bottle manufacturing facility), that it would aim to increase the recycled content of its glass bottles from one-third to two-thirds.

Existing capacity (beneficiation and crushing) (2018–19)	**260,000 tpa**
Existing throughput (2018–19)	**173,000 tonnes** was processed through NSW recycling facilities. Approximately **60,000** tonnes was recycled in other jurisdictions and over **90,000** additional tonnes of potentially recyclable glass was landfilled.
Capacity gap (2018–19)	**+87,000 tpa** surplus licensed capacity
Pipeline facilities	Several facilities are in the pipeline to process recycled crushed glass (RCG) or upgrade RCG processing in NSW, including: • IQ Renew 'Virtual Quarry', which opened in September 2019 and will eventually be capable of processing 110,000 tpa of washed and crushed recycled glass • New Shoalhaven local government area (LGA) glass crushing and cleaning facility with a capacity of 36,000 tpa of Transport for NSW-compliant RCG • Improvements at the Lismore LGA MRF to reduce the cross-contamination of recyclables and improve recycled glass quality • Manco Engineering's recycling facility in Western Sydney which will process lower grade glass cullet and beneficiation plant rejects into fit-for-purpose products for use in engineering applications • Suez Recycling and Recovery's recently-opened recovered glass processing plant at its Spring Farm MRF, which crushes and cleans kerbside recycling glass. These facilities will likely increase glass processing capacity by **140,000 tpa** by 2025.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	**+147,000 tpa** excess beneficiation and crushing capacity Note: This estimate assumes that all glass is processed intrastate
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	**+128,000 tpa** excess capacity (if pipeline glass facilities come online)
Suitable locations	Glass is heavier than other commingled recyclables and is therefore more likely to be managed locally. Overseas export of glass has only occurred for small quantities, on an intermittent basis.
Challenges	The MLA has a surplus in licensed capacity for glass beneficiation into bottling, although practical capacity will depend on limits including the quality

	of feedstocks. There is also excess capacity for RCG processing following recent increases in capacity, such as Suez's Spring Farm glass processing plant, with a pipeline of additional capacity to come. There are limited regional recycling options, with three facilities in the RLA and a collection of small facilities in the NLA processing minor quantities. A challenge is to improve the quality of RCG to meet specifications for use in regional areas. This includes the ability to produce consistent grades (sizes), low contamination and, ideally, to wash the glass to remove contaminants. Glass beneficiation associated with strategically located MRFs could service a significant catchment. The up-front capital costs for glass processing infrastructure are high, and upgrades are required at existing processing facilities to address current limitations.
Opportunities and priorities	RCG for use as a sand substitute, particularly in road construction and maintenance, could create significant demand for recycled glass in NSW. It has the potential to capture most of the recycled glass generated in NSW. The value of RCG in displacing virgin sand is recognised, and its use in civil works is gaining traction. Transport for NSW (TfNSW) has updated specifications and released guides to support the use of RCG in asphalt and is considering its use in concrete. Downer EDI, Boral Asphalt, Newpave, and Fulton Hogan have asphalt design mixes approved by TfNSW, that include RCG. Local government is also leveraging opportunities to use RCG in civil works. The Southern Sydney Regional Organisation of Councils (SSROC) has launched an initiative to create a market for over 20,000 tonnes of glass per year. 'Paving the Way' will create a local market for approximately one-third of kerbside recycled glass, across 16 Sydney metropolitan councils. The NSW Government has also awarded multiple grants and subsidies to asphalt producers to extend their plants and the use of RCG in road construction. If pipeline facilities proceed, the MLA will have surplus glass processing capacity and may be able to absorb significant volumes from other regions. Some additional capacity in regional areas may be required, including to support the processing of glass dropped at Container Deposit Scheme (CDS) sites that are contracted to be managed by regional MRFs. This would allow local councils and others to re-use glass within local construction, for which appetite is expected to grow as the market matures.
2030 Needs	• If pipeline facilities proceed, no need for new large-scale facilities statewide. • Priorities will be quality improvement upgrades (see *Opportunities and priorities*). • Targeted small-scale glass crushing may be needed in the NLA/RLA.
2040 Needs	• If pipeline facilities proceed, no need for new large-scale facilities statewide. • Priorities will be quality improvement upgrades (see *Opportunities and priorities*) • Targeted small-scale glass crushing may be needed in the NLA/RLA

Paper and cardboard processing

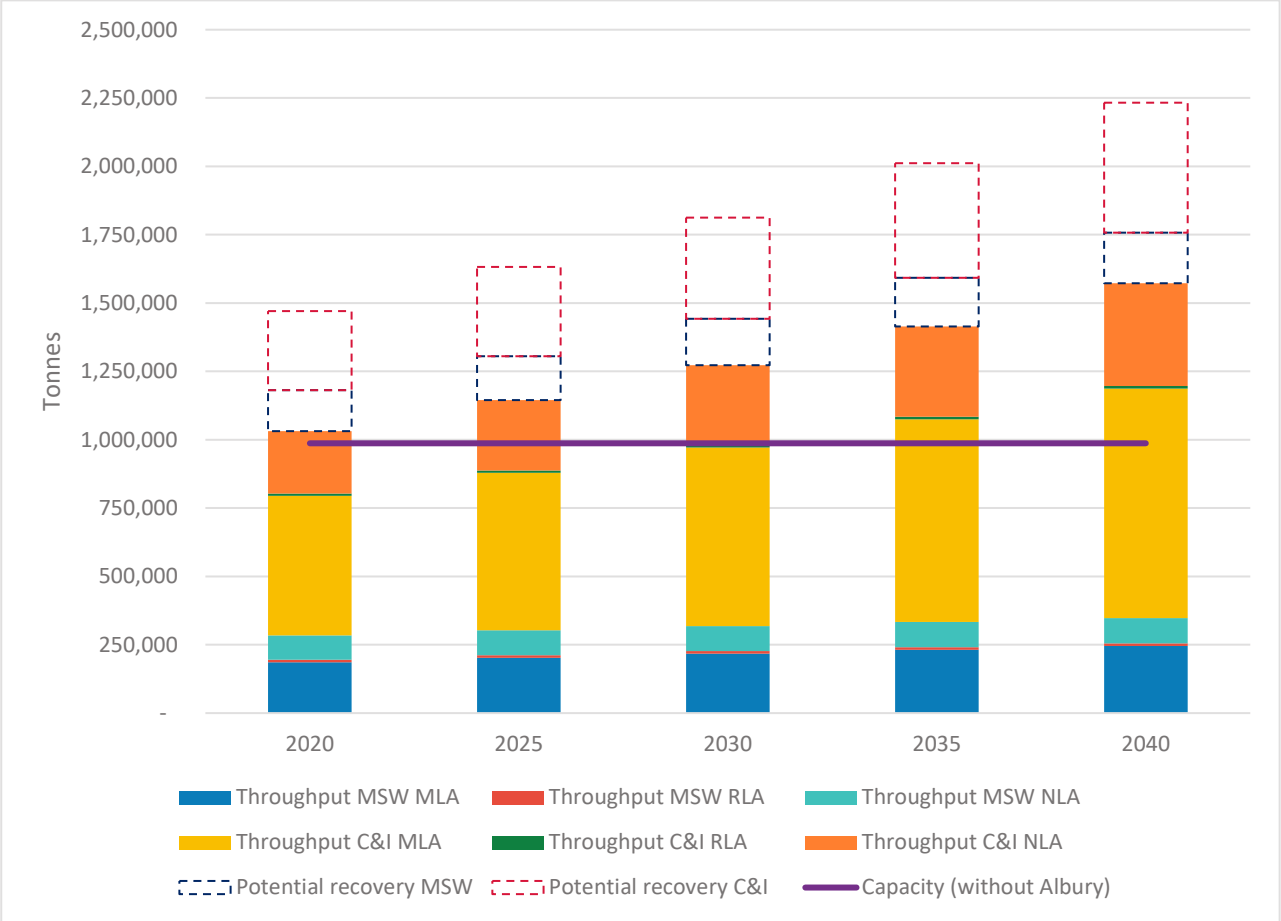

Figure 5. Estimated NSW recycled paper/cardboard processing throughput and potential additional recovery (through improved capture from residual waste) versus business as usual processing capacity[v]

Table 4. Paper and cardboard market summary, processing capacity, throughput and future needs, opportunities and challenges across NSW

Market summary	Approximately 1.9 million tonnes of paper and cardboard waste entered the waste management system from MSW and C&I sources, of which 60% was recycled. Of the material recycled, 87% was recycled through mills in NSW and 12% was exported for recovery from MRFs and paper recyclers, with the remainder transported interstate. Markets for recycled paper/cardboard include corrugated packaging materials, carton board, office paper and smaller emerging markets such as moulded fibre products and pet litter. There are currently two key manufacturers of recycled paper and card in NSW; Visy Industries and Orora (Nippon Paper). Barriers to establishing new paper/cardboard facilities in NSW include high establishment costs, a relatively small domestic market for finished products and commodity price and exchange rate risks.

Existing capacity (2018–19)	**1.14 million tpa** capacity (including the Albury mill, which has been mothballed since 2018–19). Beneficiation is not included in capacity.
Existing throughput (2018–19)	• **1.09 million tonnes** were processed in 2018–19. • **753,000 tonnes** of MSW and C&I paper/cardboard was sent to landfill. Of this, **420,000 tonnes** was potentially recyclable paper/cardboard.
Capacity gap (2018–19)	**+50,000 tpa** (excess capacity). This includes the 100,000 tpa Albury mill which has subsequently been mothballed but is assumed to reopen following acquisition by Visy in 2020. The export ban on mixed paper from July 2024 will require immediate demand for additional beneficiation processing. Capacity to value-add approximately 75,000 tpa of paper/cardboard is required, based on the quantity exported from NSW MRFs in 2018–19 (135,000 tpa).
Pipeline facilities	One MRF with a dedicated paper and card beneficiation capacity of between 40,000 tpa to 50,000 tpa in the next 5 years.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	**−83,000 tpa** (capacity deficit), assuming the Albury mill is re-commissioned
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	**−302,000 tpa** (capacity deficit), assuming the Albury mill is re-commissioned
Suitable locations	The location of paper recycling capacity varies across the supply chain: • Primary sorting for mixed paper and cardboard is distributed across NSW in line with MRF capacity, which may include dedicated paper and cardboard processing facilities. • Paper manufacturing occurs in the Riverina and Murray, Greater Sydney and Canberra regions. Larger, strategically located paper beneficiation processing capacity in MRFs could provide paper beneficiation services to a significant regional catchment.
Challenges	Recycling mixed paper grades is a challenge due to fluctuating global prices and relatively limited Australian demand, with domestic markets for recovered fibre approaching saturation. The Albury mill was purchased by Visy from Norske Skog in 2020 and is currently mothballed, which is affecting existing capacity. There is limited capacity at the existing mills to process additional feedstock and additional material arising from future growth will likely need to be exported. COAG bans that come into place from July 2024 may make processing facilities more viable (with approximately 75,000 tonnes of

	paper/cardboard affected). Paper product manufacturing of recycled fibres is the primary end market, but the high capital cost of new mills and the concentration of providers make it challenging for new entrants.
Opportunities	The National Packaging Target for 100% recyclable packaging by 2025 is expected to drive some substitution of plastic packaging with paper and cardboard, increasing total volumes. There is a need to increase the quantity of higher-grade paper available for recycling. This can be achieved through additional fibre beneficiation capacity, either within MRFs or in stand-alone facilities and is a key option to support investment in local end markets or to access the export market. There is opportunity for more infrastructure for on-site equipment at generator sites (bins/cages and compactors) and transfer capacity. This predominantly C&I stream is commercially viable, even in the disrupted global paper market. Further paper beneficiation may be undertaken in dedicated facilities or through additional processing circuits within MRFs. However, there is little stand-alone paper beneficiation in Australia as local and offshore mills have historically absorbed mixed paper, while some MRFs have introduced optical sorting to directly achieve export-quality grades.

2030 Needs
 	
(assumes all existing pipeline facilities are brought online)
	• **MLA**:
	  o 3 x source separated paper management facilities (10,000 tpa to 20,000 tpa per site)
	  o 1 x medium beneficiation* facility with capacity to address up to 50,000 tpa in paper beneficiation for export
	• **RLA/NLA**:
	  o 4 x MRF upgrades (preferably in regional areas to service significant regional catchment) to address up to 50,000 tpa in paper beneficiation for export
	
	*Beneficiation means additional ‘polishing’ of primary sorted paper into specific grades with very low contamination. May occur at a MRF or at a stand-alone facility.

2040 Needs
 	
(assumes all infrastructure needs to meet capacity gap 2030 are brought online)
	The following indicative mix, in addition to 2030 needs:
	
	• **MLA**:
	  o 4 x source separated paper management facilities (10,000 tpa to 20,000 tpa per site)
	  o 1 x large beneficiation facility with capacity to address up to 30,000 tpa in paper beneficiation for export

Tyres processing

This information is not based on EPA facility data and is derived from a range of sources. It is therefore indicative only.

Table 5. Tyre market summary, processing capacity, opportunities and challenges across NSW

Market summary	In 2018−19, approximately 135,000 tonnes of end-of-life tyres (or 16.9 million standard passenger car tyres) were generated in NSW. About 65% of end-of-life tyres were recycled. About 13% of waste tyres generated were re-processed domestically. Recycled tyres are used for tyre-derived fuels, for use in road construction and other civil works, including surface coverings. The market for end-of-life tyres is supported by the national Tyre Product Stewardship Scheme, which is funded by the tyre industry, paid for by consumers. The scheme provides some insulation for the commercial cost of recycling, and undertakes research and development into new tyre derived products. The use of tyres in higher value applications has historically been constrained by high competition from lower cost, readily available alternatives, and low or immature demand.
Existing capacity (2018–19)	**30,000 tpa** to **35,000 tpa** processing capacity (although over 100,000 tpa of licensed combined storage and processing capacity)
Existing throughput (2018–19)	**135,000 tonnes** of waste tyres reached end-of-life in 2018–19, with approximately 16,000 tonnes locally processed and 71,000 tonnes exported.
Capacity gap (2018–19)	**−85,000 tpa to −105,000 tpa** (capacity deficit to process all tyres generated in NSW)
Pipeline facilities	Proposed pipeline tyre processing capacity in Sydney and north-western NSW for an additional 45,000 tpa to 65,000 tpa for creating tyre crumb and tyre-derived fuel.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	**−100,000 tpa** processing capacity deficit (if pipeline tyre processing facilities come on line)
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	**−50,000 tpa** processing capacity deficit (if pipeline tyre processing facilities come on line and infrastructure needed to fill capacity gap 2030 comes online)
Suitable locations	Processing facilities for tyres are best located close to feedstocks. Processing near to source increases transport efficiency by removing non-valuable materials and baling the product for shipping.

	Facilities are industrial in nature and typically moderate in size and throughput, so relatively easy to develop in light industry estates or within a dedicated circular economy hub.
Challenges	Domestic recycling of end-of-life tyres has been limited by a lack of local markets for tyre-derived products due to lower cost, readily-available substitutes, in tandem with high international demand for tyre-derived fuel. Many existing end-of-life tyre facilities merely bale whole tyres and send overseas for processing. From December 2021, this option will no longer be available under the export ban. However, tyre-derived fuel and tyre crumbs, buffings, granules or shreds, and bus, truck and aviation tyres meeting re-tread specifications will still be able to be exported.
Opportunities and priorities	With the export ban prohibiting baling and exporting of whole used tyres, there will be opportunities to address NSW's significant tyre processing capacity deficit, by developing new and existing local applications to avoid whole tyres going to landfill. New capacity will likely need to align with the export-approved categories. This would include higher grade tyre crumbing, tyre-derived fuel, and exploring processing tyre-derived polymers (TDP), although existing demand is immature.

Residual management facilities

The following are the estimated calendar year dates that landfill airspace will expire in the waste levy paying area in NSW, assuming new strategy organics policies come into effect.

Construction and demolition (C&D) disposal quantities are considered in non-putrescible landfill volumes, as facility throughput/capacity data cannot be disaggregated for C&I and C&D.

Table 6. Estimated dates for landfill airspace expiry

Region	Combined regional landfill airspace expiry
Greater Sydney	Putrescible: 2038 Non-putrescible: 2028
Hunter	2040
Illawarra–Shoalhaven	Past 2040
Mid-north Coast	Past 2040
Northern Rivers	Past 2040

Some locally managed landfills in regional NSW, including some Northern Rivers councils and Coffs Harbour, are nearing capacity within the next 2 to 15 years**.**

There is insufficient information on remaining landfill airspace in the non-levied area of NSW.

Landfills account for around 2% of NSW's net greenhouse gas emissions.[vi] These emissions also linger in our environment; legacy methane emissions from organics in landfill can continue for 25 years or more.

To ensure we protect our environment and improve air quality, expanded or new landfills will require gas capture infrastructure. Landfills over a certain size will also require gas capture facilities, with some exceptions. The NSW Government will provide $7.5 million in financial assistance to support this roll out.

Table 7. Residual waste throughput, suitable locations and residual management needs in NSW

Residual throughput	4.6 million tonnes of residual MSW and C&I waste was disposed to landfill in 2018–19. Approximately 80,000 tonnes was sent to EfW as refuse-derived fuel (local/overseas) from the plastics and dry mixed streams (timber, metals, plastics, textiles, paper and cardboard that are not contaminated with food or other organics). Residual waste is forecast to increase to 5 million tonnes of MSW and C&I by 2030, and 6 million tonnes by 2040. (assumes new organics diversion policies have come into effect)
Suitable locations	There is high community sensitivity to development of new landfills or thermal energy from waste. Residual waste is usually managed within the region in which it is generated. However, when there is insufficient viable and affordable land for landfilling, residual waste is compacted and transported to other

	destinations. This is the case for Greater Sydney, where many councils have contracts to dispose or process residual putrescible waste at the Woodlawn waste facility, within the Canberra region. There are alternative non-putrescible site options beyond the Sydney basin. Benefits of exploring other regions include faster approval and development for new facilities, compared to putrescible landfills. Further distances to residents, environmental impacts and engineering requirements mean existing sites such as closed quarries could be converted. Putrescible landfills are associated with greater environmental risk and higher engineering controls, which correlate to significantly higher costs and therefore will need to be larger scale to justify the investment. They are also more challenging to get planning approval for in urban areas, introducing risks to any development timetable and likely requiring transport outside Greater Sydney.

Needs 2030	The indicative mix of facilities will be needed to service the following areas:
	
	• **Greater Sydney**:
	  o Additional non-putrescible landfill capacity to accept >3 million tpa
	  o Additional putrescible landfill capacity to accept >500,000 tpa
	  o At least one large-scale regional energy recovery facility and medium-scale 'dirty MRF' would be required to reduce the need for additional landfill capacity in this decade.
	• **Hunter**: None
	• **Northern Rivers**: Additional landfill capacity (to accept up to 100ktpa) or an equivalent medium-scale energy recovery facility
	• **Coffs Harbour**: Additional landfill capacity to accept up to 25ktpa
	
	In addition, if significant residual capacity is needed outside of Sydney/Hunter to service Sydney/Hunter residual waste, a network of transfer stations would be required.

Needs 2040
 	
(assumes all infrastructure needs to meet capacity gap 2030 are brought online)
	If 2030 infrastructure needs are met, then the following additional infrastructure (noting this is an indicative mix):
	
	• **Greater Sydney**:
	  o Additional non-putrescible landfill capacity to accept >1.2 million tpa
	  o Additional putrescible landfill capacity to accept >1.1 million tpa
	  o At least three large-scale regional energy recovery facilities and one medium-scale dirty MRF would be required to reduce the need for additional landfill capacity in this decade.
	• **Hunter**: Additional landfill capacity to accept >300ktpa or a medium-scale energy recovery facility

Materials recovery facilities (MRFs)

Figure 6. Estimated NSW MRF throughput versus business as usual capacity[vii]

Table 8. MRF processing capacity, throughput and future needs, opportunities and challenges across NSW

Existing capacity (2018–19)	**1,230,000 tpa licensed capacity** **1,008,000 tpa practical capacity*** ***Practical capacity is 82%** of **licensed capacity: The capacity discount for licensed facilities reflects a range of factors, including the headroom in approved annual capacity that MRF operators commonly seek to allow for growth over time, as well as operational issues such as planned downtime and the throughput impacts of the increasingly stringent quality standards for output products**
Existing throughput (2018–19)	**1,011,000 tonnes**
Capacity gap (2018–19)	At or slightly under practical capacity statewide, due to some recent closures of MRFs after enforcement of China's National Sword Policy. Some areas in the NLA do not have sufficient capacity to handle local volumes (e.g. New England/Namoi) – where scale, logistics and commercial feasibility are challenged by the necessity for large catchments and long-haul transport to most end markets.

Pipeline facilities	Significant proposed pipeline of three MRFs for Sydney and Shoalhaven to increase statewide capacity by over 168,000 tpa by 2025. This is the net increase reflective of recent closures, proposed pipeline facilities and the estimate practical capacity estimate.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	**+10,000 tpa** (excess capacity)
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	**-99,000 tpa** (capacity deficit)
Suitable locations	Commingled recycling is expensive to transport as compaction results in breakage and contamination of other recyclables with glass. It is commonly processed within the region of generation, with materials being sorted and prepared for transport, including various size reduction, compaction and baling. This facilitates improved transport efficiencies and targeted distribution to end markets, including potential local destinations. There is a minor flow of commingled recycling from the NLA to the MLA (the Central NSW region to Greater Sydney). It is likely that clean recycled materials from the MSW and C&I streams generated in the NLA will still be recovered within the Sydney basin (through MRFs/material reprocessors) to be close to end markets, including local reprocessing facilities and export in shipping containers through Port Botany.
Challenges	There are pressures on MRF capacity in some regions and a high reliance on a limited number of operators. This poses a risk to the resilience of the system. Demand for MRF enhancements including additional beneficiation will increase in response to the export ban and to achieve higher plastic recycling rates. In response to significantly disrupted commodity markets, MRFs need to prioritise production of tightly specified products that can find markets and attract viable offtake prices.
Opportunities and priorities	The main priority for MRFs is to improve the quality of output products, taking a whole of supply chain approach. At the MRF (if site constraints permit), the priority will be to improve quality of glass, plastic, paper/card and metals through primary sorting equipment and potentially additional beneficiation of sorted materials.

2030 Needs (assumes all existing pipeline facilities are brought online)	If the three pipeline facilities proceed, the following additional infrastructure is required: • **NLA**: 1 x medium MRF (50,000 tpa), in area such as Namoi/New England • **RLA**: Minor capacity enhancement required Priorities will be upgrades for enhanced beneficiation (see *Opportunities and priorities*).
2040 Needs (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	If the three pipeline facilities proceed and 2030 needs are met, the following additional infrastructure is required: • **MLA**: 1 x medium MRF (50,000 tpa) • **RLA**: 1 x small MRF (25,000 tpa) • **NLA**: 1 x small MRF (25,000 tpa) or transfer station.

Hazardous waste

The quantitative information presented below is based on an initial analysis of the current capacity and suitability of hazardous waste infrastructure in NSW. Any reported numbers are indicative only.

Table 9. Hazardous waste market summary, existing capacity, throughput and future needs, opportunities and challenges across NSW

Market summary	Hazardous waste management is a national market dealing with numerous waste types generated from a wide range of industrial processes. It is highly concentrated: four major waste companies receive about 80% of hazardous waste flows into their facilities, although these facilities account for just 30% of hazardous waste treatment, storage, and disposal infrastructure nationally. In 2019–20, NSW hazardous waste arisings were estimated to be 2,400,000 tonnes, 1,738,000 tonnes of which were contaminated soils and asbestos waste. All other waste types make up the remaining 662,000 tonnes. Certain hazardous wastes are also imported to or exported from NSW for treatment and disposal. Waste arisings included 105,000 tonnes in interstate imports and 77,000 tonnes in interstate exports. Mirroring the national market, the hazardous waste management sector in NSW is dominated by three companies by market volume. Excluding contaminated soils, these companies receive 60% of hazardous waste arisings but again account for only 30% of NSW hazardous waste facilities. This has resulted in an infrastructure network characterised by single point dependencies that are, in some cases, ageing and approaching capacity.
Existing capacity (2019–20)	Estimated existing total capacity in NSW hazardous waste infrastructure is **4,014,000 tpa** across all waste types. This includes: • **457,000 tpa** for recycling and energy recovery (including 101,000 tpa in oil re-refining facilities and 106,000 tpa in lead facilities) • **480,000 tpa** for waste treatment (including 403,000 tpa in chemical/physical treatment, or CPT, plants) • **3,051,000 tpa** for disposal (with only a small proportion of this capacity in hazardous waste landfill) • **25,000 tpa** in transfer facilities
Existing throughput (2019–20)	NSW hazardous waste arisings (defined here as the delivery of waste to processing, storage, treatment, or disposal infrastructure) for 2019–20 are estimated to be **2,400,000 tpa.** Excluding tyres, the highest volume waste types are: • asbestos (including asbestos contaminated soils): **900,000 tpa** • contaminated soils: **839,000 tpa** • lead and lead compounds: **100,000 tpa** • grease trap wastes: **87,000 tpa** • oils: **82,000 tpa**

	• waste oil/water mixtures: **58,000 tpa** • other putrescible/organic wastes: **44,000 tpa** • other soil/sludges: **38,000 tpa** • acids: **26,000 tpa** • alkalis: **19,000 tpa**
Capacity gap (2019–20)	NSW is facing the following immediate capacity deficits: • Clinical waste treatment and thermal destruction facilities (**−5,000 tpa**) • Hazardous waste landfill (**−97,000 tpa**) • Thermal destruction facilities for persistent organic pollutants (POPs), including per- and poly-fluoroalkyl substances (PFAS) (while data on these waste arisings is limited, there are currently no appropriate thermal destruction facilities in NSW; currently PFAS wastes are primarily exported to Queensland and Victoria) • Lead facilities, but only when considering national arisings of used lead acid batteries as NSW houses the only full recycling facility in Australia (**−76,000 tpa**). Pipeline facilities will go some way to filling this capacity gap. • Organic solvent waste facilities (as evidenced by current rates of exportation and a reliance on interstate treatment and disposal facilities)
Pipeline facilities	Planned expansions of existing facilities include: • ESPR Bomen, estimated ~2022 (+50,000 tpa in lead capacity) • Regain Spent Potlining Reprocessing Facility, Tomago, estimated ~2022 (+40,000 tpa in spent potlining capacity) Proposed new facilities include two battery recycling facilities introducing 78,000 tpa in lead processing capacity. A 50,000 tpa lead facility is also planned in Victoria.
Capacity gap 2030 (assumes all existing pipeline facilities are brought online)	It is estimated that hazardous waste arisings will exceed available capacity in: • soils treatment facilities by 2028 • chemical/physical treatment (CPT) plants by 2027 (based on highest range of projected arisings).
Capacity gap 2040 (assumes all infrastructure needs to meet capacity gap 2030 are brought online)	It is estimated that hazardous waste arisings will exceed available capacity in oil re-refining facilities by 2034. However, existing oil/water treatment capacity may absorb any oversupply to the re-refining market, lessening capacity pressure.
Challenges	Due to the human health and environmental risks inherently posed by hazardous wastes, it is critical that sufficient capacity is available to store, treat, and dispose or recycle these wastes safely. There is increasing pressure on critical hazardous waste infrastructure in

	NSW, associated with growing waste quantities, key site closures, and the emergence of new waste streams. For example, expected reductions in NSW hazardous waste landfill and liquid waste treatment capacity will increase reliance on interstate facilities for the treatment and disposal of certain waste streams, including solvent wastes. This may expose NSW to hazardous waste management risks due to regulatory, political, economic, and strategic factors outside of NSW control. In the context of the COVID-19 pandemic, shortfalls in NSW clinical waste treatment and thermal destruction capacity are increasingly relevant. These shortfalls may be partially offset by pipeline and interstate facilities. The emergence of new forms of hazardous waste in increasing volumes also presents a risk. NSW has no POP thermal destruction facilities, and consequently exports all POP waste (principally PFAS contaminated soil and associated wastes) to Queensland and Victoria. However, the extent of this and other challenges is difficult to quantify, due to limited coverage of waste arising and capacity data. Despite the identified gaps, the market is expected to react and respond to fill the capacity gaps where it is profitable. The challenge here is to understand and determine when it is necessary for government to intervene and how it should intervene.
Opportunities and priorities	Under Stage 1 of the NSW Waste and Sustainable Materials Strategy 2041, the NSW Government will work to address the challenges facing hazardous waste storage, treatment, and disposal capacity in NSW. The NSW Government is leading the establishment of a nationally consistent hazardous waste tracking and data system. Improving the quality and coverage of data will enable better identification and management of future hazardous waste capacity vulnerabilities and shortfalls. Where critical capacity gaps are identified and it is appropriate to do so, the NSW Government may provide funding to support industry development of additional capacity or infrastructure. The NSW Government will also explore the development of a product stewardship scheme for high-risk hazardous wastes such as flammable solvents. This will present an opportunity to support improved treatment, disposal or recycling of these wastes. We will continue to engage with industry and other jurisdictions on how we can work together to best resolve these issues.

Appendix A: Glossary

Table 10. Glossary

Term	Meaning
AD	anaerobic digestion (small: 10,000 tpa; medium: 30,000 tpa; large: 50,000 tpa)
AWT	Advanced waste treatment, a range of activities that process mixed solid waste that would have gone to landfill into products such as MWOO, fuel or biogas, and increase recovery of resources including plastics, glass and metals.
BAU	business as usual (no major policy shift)
Beneficiation	Additional processing of a sorted recycling material to improve quality before sale. Processes vary by material type but may include sorting by colour or grade, cleaning, crushing and sizing.
CDS	Container Deposit Scheme. The Return and Earn scheme allows for eligible containers to be returned to an approved NSW collection point for a 10-cent refund.
C&I	commercial and industrial
Contamination	Materials and items within a recycling process that are not readily recycled by that process. Contaminants within this context include physical and non-biodegradable materials (such as metals, glass and plastics), chemical compounds and/or biological agents that can have a detrimental impact on the quality of any recycled products.
CPT	chemical and physical treatment (facility)
Dirty MRF	See ‘MRF’
EfW	Energy-from-waste, also interchangeably termed ‘waste to energy’. A collection of treatment processes and technologies used to generate a usable form of energy (for example, electricity, heat and fuels) from waste materials.
FO	food organics
FOGO	food and garden organics
GO	garden organics
HDPE	high-density polyethylene
IVC	In vessel composting (small: 20,000 tpa; medium: 20,000 tpa–70,000 tpa; large: 70,000 tpa–100,000 tpa)
LDPE	low-density polyethylene

Term	Meaning
MBT	Mechanical biological treatment – a waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. MBT plants are designed to process MSW and C&I wastes.
Mixed recyclables	Materials combined generally for the purposes of collection, mainly through municipal collection services. Includes plastic bottles, other plastics, paper, glass and metal containers. Commingled recyclable materials require sorting after collection before they can be recycled.
MLA	Metropolitan levy area
MRF	Materials recovery facility – a purely mechanical (and manual) processing system for waste. A clean MRF separates commingled dry recyclables into saleable material streams. A dirty MRF processes mixed residual wastes to extract recyclables, an organic fraction and/or a refuse derived fuel output.
MSW	Municipal solid waste, which is primarily the waste and recyclables generated by households and collected by councils, but may also include other wastes generated by councils.
MWOO	Mixed waste organic outputs made predominantly from the organic material in household general waste as a result of processing through an MBT.
NLA	non-levied area
Outdoor aerated composting	Open windrow: Aerobic decomposition of organic waste (small: <10,000 tpa; medium 10,000 tpa–50,000 tpa; large >50,000 tpa)
PET	polyethylene terephthalate
PFAS	poly-fluoroalkyl substances
Pipeline facilities	Facilities that have lodged proposals with the Department of Planning, Industry and Environment to seek development approval (which implies likelihood of development), or which have begun operations since the 2018–19 baseline year.
POP	persistent organic pollutant
PP	polypropylene
Putrescible waste	Putrescible waste is waste containing matter that readily decomposes such as food, garden waste and other organics. MSW from household collections and some C&I waste (if it contains organics) is typically considered putrescible.

Term	Meaning
RDF	Refuse-derived fuel, also called process-engineered fuel (PEF). RDF is a solid fuel produced after processing of waste (for example, in a dirty MRF or MBT plant) to increase the calorific value, homogenise the material, remove recyclable materials, remove inert materials, and remove hazardous contaminants. It is considered a residual waste management pathway rather than recycling.
Residual	Residual material that remains after any source separation or reprocessing activities of recyclable materials or organics. Waste that is left over after suitable materials have been recovered for re-use and recycling. This generally means the environmental or economic costs of further separating and cleaning the waste are greater than any potential benefit of doing so.
RLA	Regional levy area
Small-scale on-site solutions	Small, on-site solutions including composting and digestion (not sewer disposal)
tpa	Tonnes per annum, the most common measure of waste flows and capacity of a waste treatment facility.

[i] Excluding capacity to produce refuse-derived fuel (RDF). Source: Arcadis. *NSW Waste Infrastructure Needs Assessment*, 2020

[iiii] *Licence approval for organics processing facilities is often on a threshold basis that is connected to the amount of fees they pay. The maximum may significantly overstate a facility's practical capacity based on technical, site or organisational constraints. The practical capacity estimate has been derived by selecting the maximum actual annual throughput within licensed facilities in the last three years, and for non-licensed facilities the maximum they can process before requiring a licence and therefore being captured in the data system. Source: Arcadis. *NSW Waste Infrastructure Needs Assessment*, 2020

[iii] Source: Arcadis. *NSW Waste Infrastructure Assessment Needs Assessment*, 2020

[iv] ibid

[v] Includes the mothballed Albury paper mill. Source: Arcadis. *NSW Waste Infrastructure Needs Assessment*, 2020

[vi] Department of Industry. *State and Territory Greenhouse Gas Inventories: 2018*, 2020

[vii] Practical capacity is 82% of licensed capacity. The capacity discount for licensed facilities reflects a range of factors, including the headroom in approved annual capacity that MRF operators commonly seek to allow for growth over time, as well as operational issues such as planned downtime and the throughput impacts of the increasingly stringent quality standards for output products. Source: Arcadis. *NSW Waste Infrastructure Needs Assessment*, 2020

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