Regional summaries

This section provides more detail on the waste generation and infrastructure needs of each region in Western Australia. Each summary includes a snapshot of the region's industries, demographics and economy, painting a picture of how the region's activities have influenced waste generation in 2020. The 2020 waste generation and demographic data is then used to estimate 2030 waste generation.

The 2020 resource recovery infrastructure capacity is based on licensed capacity which was obtained through the *State Waste Infrastructure Register*. Gaps in existing infrastructure capacity are identified when comparing 2020 infrastructure capacity and 2030 waste generation data. Projections of needed waste infrastructure are developed using the methodology described in previous sections. Existing and planned infrastructure by region is compared to projected waste volumes to determine need, based on the concept of critical mass presented in this plan and the need for expansion of existing or development of new facilities.

Each regional summary includes waste generation by source, including MSW, C&D and C&I, to provide more insight and guide decision-making at the regional level. Each regional summary includes:

- an assessment of the social, economic and environmental indicators of the region
- a summary of waste generation, treatment and movements in 2020
- a summary of waste generation and treatment in 2030
- infrastructure capacity needs in 2030, including assessment of opportunities to provide or access capacity in neighbouring regions
- breakdown of the waste by facility type and source (MSW, C&I or C&D) in 2030
- breakdown of the material generation and recovery in 2030
- analysis of landfills by type and identified capacity risk
- an assessment of the principles and priorities for the region.

A desktop assessment of facilities' licences has been employed to understand infrastructure capacity and, as such, may not accurately reflect the specific activities conducted on site. This is one of the key limitations of with the *State Waste Infrastructure Needs Analysis* methodology for assessment, particularly in relation to FOGO recovery facility capacity needs and organics recovery facility capacity needs.

The infrastructure plan focuses on identifying infrastructure needs in alignment with meeting the waste strategy targets. Targets specifically relating to FOGO are currently limited to the Perth and Peel regions. In regions outside of Perth and Peel, FOGO waste is collectively categorised as 'organics'. Stakeholder feedback highlighted this gap in the 2030 needs assessment as several major regional centre municipalities, such as the South West and Great Southern, are considering or implementing FOGO recovery as a means to achieve their MSW recovery targets.

While there appears to be sufficient licensed capacity for organics recovery to meet regional demands until 2030, the specific availability of FOGO recovery capacity remains uncertain. In addition, there is potential for barriers to arise in regions outside of Perth and Peel depending on regional approaches on kerbside FOGO recovery. Some facilities, despite being licensed for FOGO waste, either do not accept it or handle quantities below their licensed capacity. This is discussed in more detail in the Considerations and limitations section.

Further, more detailed exploration of FOGO capacity needs outside Perth and Peel is required as an area of future work.

The infrastructure plan includes a summary for each region outlined in Figure 22:

- Perth
- Peel
- Pilbara
- Kimberley
- South West
- Great Southern
- Mid West
- Gascoyne
- Wheatbelt
- Goldfields-Esperance.

Major regional centres as defined by the waste strategy are also included in assessments:

- Albany (Great Southern region)
- Bunbury (South West region)
- Busselton (South West region)
- Greater Geraldton (Mid West region)
- Kalgoorlie-Boulder (Goldfields-Esperance region).

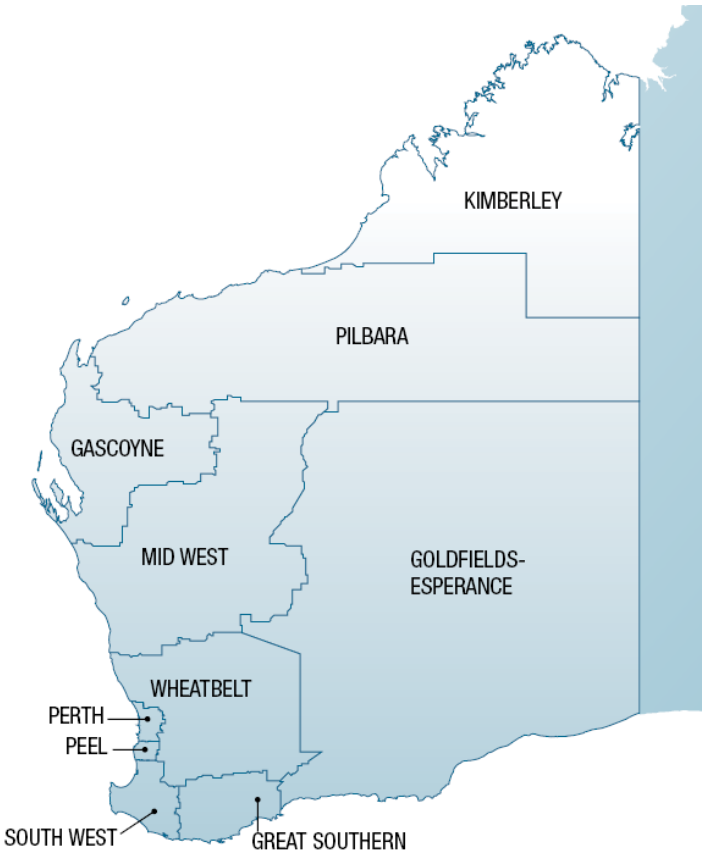


Figure 22 Regions used for the infrastructure plan

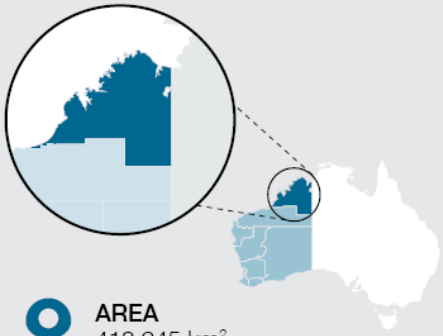
Kimberley region

Waste profile in 2020

The Kimberley region is the northern-most region in Western Australia and is one of the smallest generators of waste. The region generated 68,000 tonnes of waste in 2020, consisting of about 50 per cent MSW, 37 per cent C&I waste, and 13 per cent C&D waste. The region treated 61,000 tonnes in 2020 with 8,000 tonnes (13 per cent) being recovered and 53,000 (87 per cent) being landfilled. Key waste profile data for the Kimberley waste and resource recovery in 2020 is presented below.

Residents in the Kimberley	1 per cent of Western Australia's population resides in the Kimberley region.
	Population density of 0.09 people per km^2.
	Just over one-third of the regions population (39 per cent) reside in Broome.
Local governments in the region	Shire of Broome, Shire of Derby-West Kimberley, Shire of Halls Creek, and Shire of Wyndham-East Kimberley.
Generating waste	The Kimberley generates 1 per cent of the waste generated in Western Australia.
Transporting waste	Limited road network and no rail transportation, although markets can be accessed through four commercial ports.
Treating waste	The Kimberley treats 1 per cent of the waste treated in Western Australia.
	The Kimberley recovers less than 1 per cent of the waste recovered in Western Australia.
	The Kimberley landfills 2 per cent of the waste landfilled in Western Australia.

KIMBERLEY
REGIONAL SUMMARY



AREA
418,945 km²

GROSS REGIONAL PRODUCT (2019–20)
$3.07B/CAP

NUMBER OF BUSINESSES (2019–20)
2,165

TOP 5 EMPLOYMENT BY INDUSTRY

19.83%	Construction
10.84%	Rental, hiring and real estate services
9.78%	Agriculture, forestry and fishing
9.22%	Wholesale trade
7.69%	Professional, scientific and tech services

The mining industry sector makes the greatest contribution to economic output in the region, which at $1.6B accounts for 24.61% of total output. With 1,164 jobs representing 7.44% of total employment, it is the construction industry sector that is the region's largest employer.

2020
- POPULATION 36,561
- WASTE GENERATED 68,000 TONNES
- WASTE GENERATION PER CAPITA 1.85 TONNES

2030
- POPULATION 39,306 (▲8%)
- WASTE GENERATED 67,000 TONNES
- WASTE GENERATION PER CAPITA 1.70 TONNES

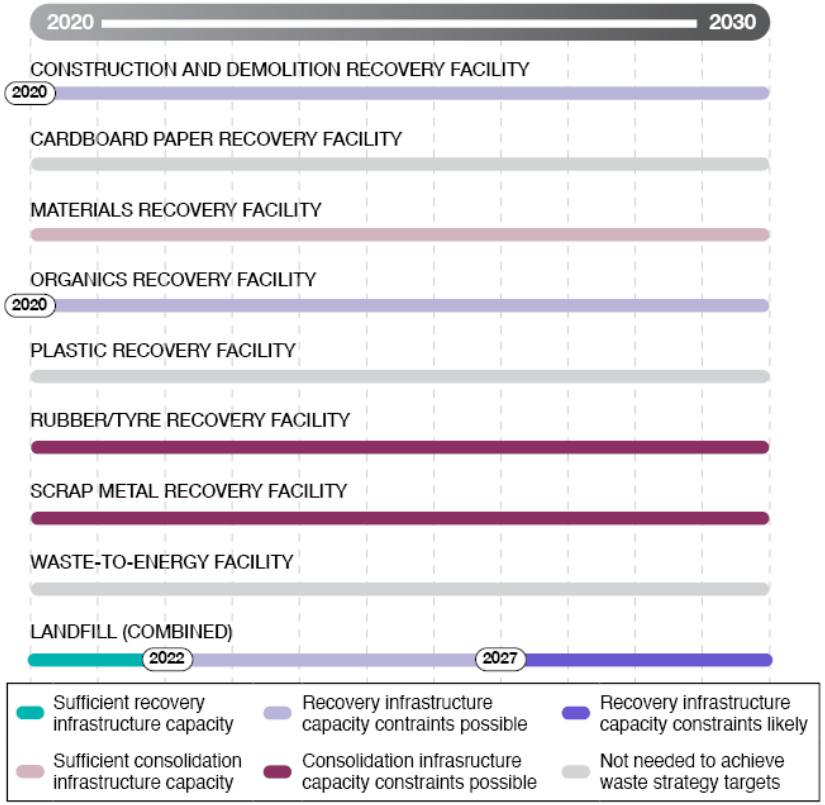
PROJECTIONS TO 2030 BASED ON ACHIEVING WASTE STRATEGY TARGETS

2030 INFRASTRUCTURE CAPACITY NEED
1. Organics | 13,500 tonnes
2. Scrap metal | 3,000 tonnes
3. Construction and demolition | 1,000 tonnes

TOP PRIORITIES
1. Review options to facilitate lifetime and capacity expansion of existing organics recovery facilities.
2. Investigate and facilitate upgrade of existing garden organics facilities to accept food organics and garden organics.
3. Assess waste generation and infrastructure needs in remote Aboriginal communities to ensure adequate access to services.
4. Investigate a rural landfill risk assessment of unlicensed landfill and REMS landfills.
5. Facilitate land use planning and approvals frameworks for development of a landfill in the Kimberley region.

INFRASTRUCTURE NEED BETWEEN 2020 AND 2030

Projections for capacity constraints compare current, approved and planned capacity against the infrastructure needs by 2030 to meet the waste strategy targets.



WASTE IN KIMBERLEY 2020 AND 2030

Waste projections to 2030 based on meeting the waste strategy targets

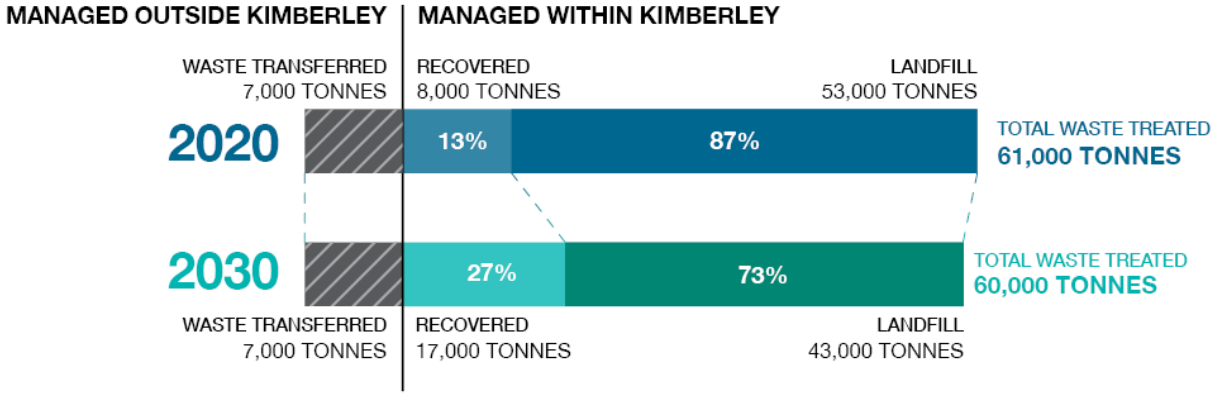


Figure 46 Waste in the Kimberley: statistics and projections

Waste and resource recovery in 2020

The small and isolated nature of regional communities in the Kimberley acts as a barrier to increasing material recovery from mixed waste streams. Although MSW forms the largest waste stream in the Kimberley, only 4 per cent was recovered. The top four materials processed in the region in 2020 include:

1. mixed putrescible waste – domestic (household)
2. metals – ferrous steel – non-packaging
3. commingled recycling
4. mixed C&D waste

Eight putrescible landfills (Category 89 and 64) treat 87 per cent of the region's waste. There are also 85 REMS-managed landfills. Landfill disposal is supplemented by resource recovery facilities that include one C&D recovery facility, one MRF and two organics recovery facilities.

Geography and transport infrastructure is a barrier to improving resource recovery in the Kimberley. Small populations spread across a large region decreases the economic viability of transporting material to recovery facilities. The Great Northern Highway connection between Broome and Perth facilitates regional transfers for processing and access to wider markets. The largest transfer from the Kimberley (predominantly to Perth) is ferrous steel. In 2020 no material was received into the region. Proximity to the Pilbara region creates opportunities for planning to consider consolidation of both regions' generation and capacity, potentially resulting in increased resource recovery for both regions.

Key aspects of waste and resource recovery system in the Kimberley in 2020, considered by the infrastructure plan, include:

- MSW formed the largest waste material source in the Kimberley region, consisting of about 33,000 tonnes, of which 4 per cent was recovered.
- Nearly all (98 per cent) of waste transferred out of region from the Kimberley was transported to Perth for further treatment and recovery.
- Mixed ferrous steel was the second largest material type generated in the Kimberley and was the largest category of material transferred out of region.
- Development of more local capacity for scrap metal recovery could improve recovery and transfer of metal out of the Kimberley.

The location of current and planned recovery infrastructure in the Kimberley in 2030 is shown in Figure 49 (see Facility lists in the Appendix for a full list of facilities). Facilities granted work approvals since 2020 by the department in the Kimberley region are listed below in Table 29. These facilities have not been included in the modelling for the infrastructure plan and may alleviate some of the region's capacity needs.

Table 29 Facilities granted licences or works approvals since 2020 in the Kimberley

Facility type	Facility name	Location
Landfill (Category 63)	GoGo Station Inert Landfill	Kimberley
Landfill (Category 63) and consolidation centre including used trye storage	Broome Regional Resource Recovery Park	Kimberley

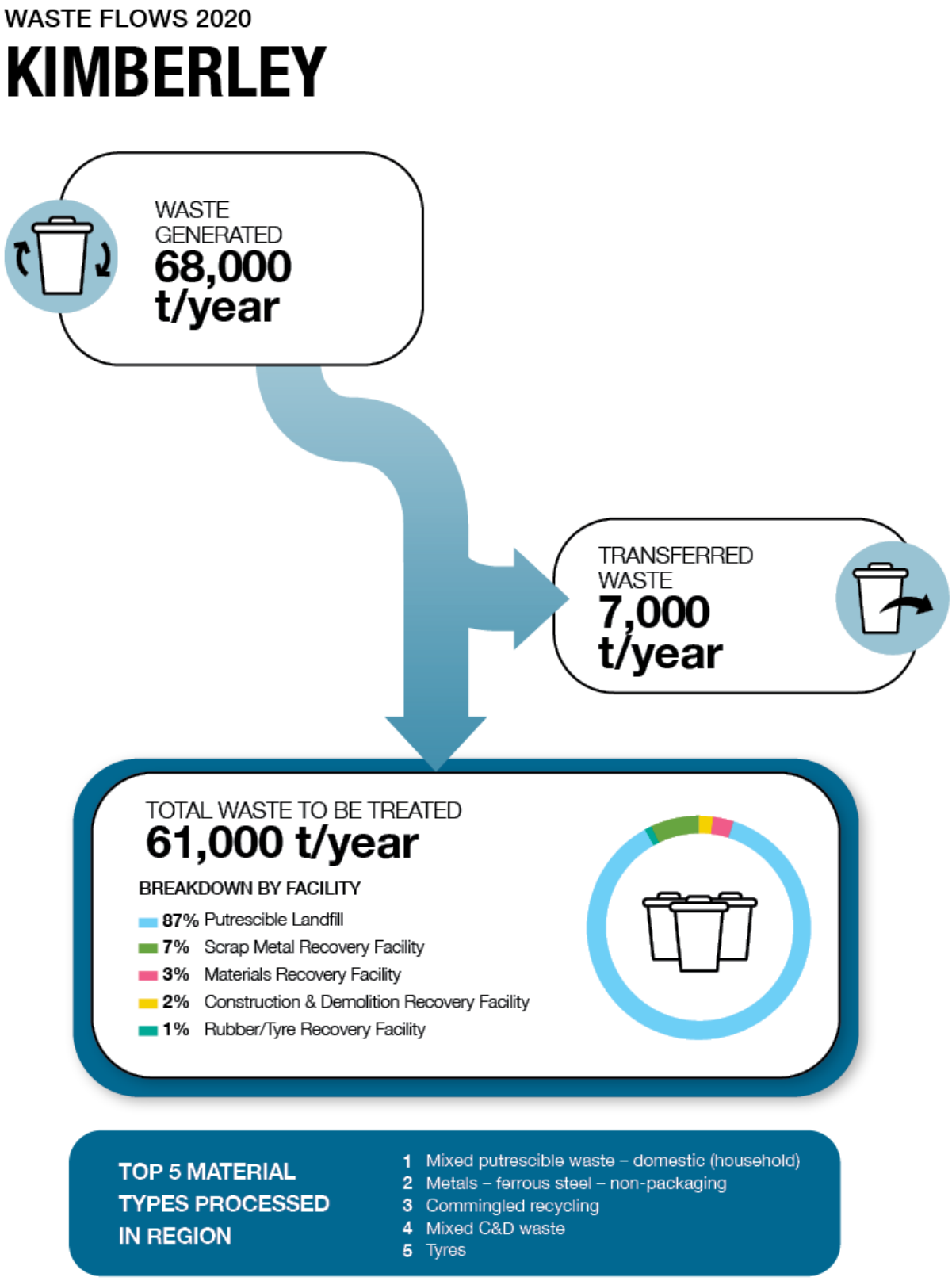


Figure 47 Waste generated, received, transferred and treated in the Kimberley region in 2020

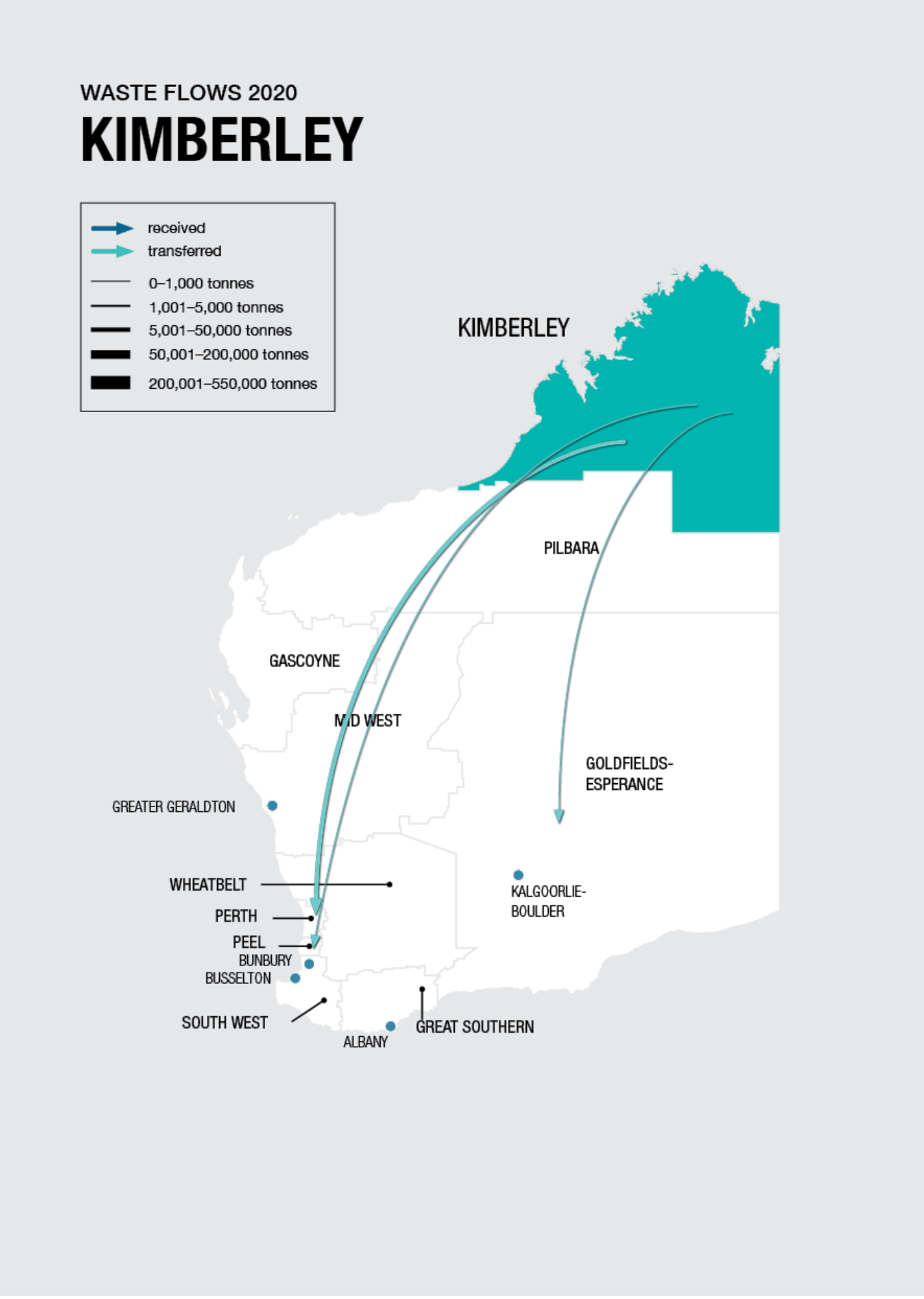


Figure 48 Waste flows in the Kimberley region in 2020

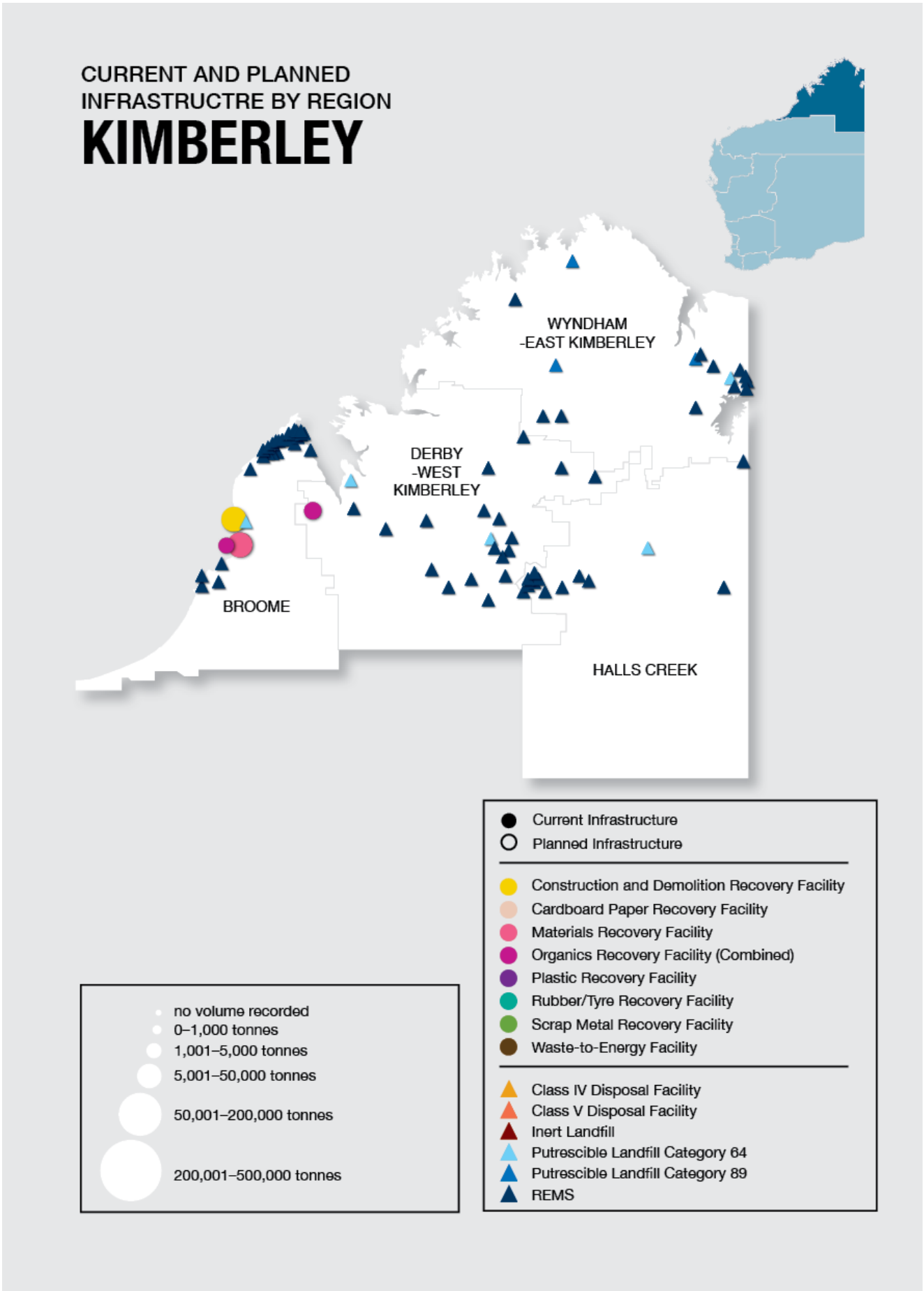


Figure 49 Current and planned infrastructure locations in the Kimberley region in 2020

Waste and resource recovery in 2030

Modelling to achieve all waste strategy targets in 2030 found the Kimberley region would generate 67,000 tonnes and transfer 7,000 tonnes out of the region, similar to 2020 quantities.

Additional infrastructure planning and waste strategy initiatives will increase the Kimberley's materials recovery rate from 13 per cent to 27 per cent.

Figure 50 shows the distribution of feedstock materials used by each recovery facility type in the Kimberley, indicating which waste streams are most significant and where the resource recovery efforts should be concentrated. This is also reflected in the Kimberley region Principles and priorities section.

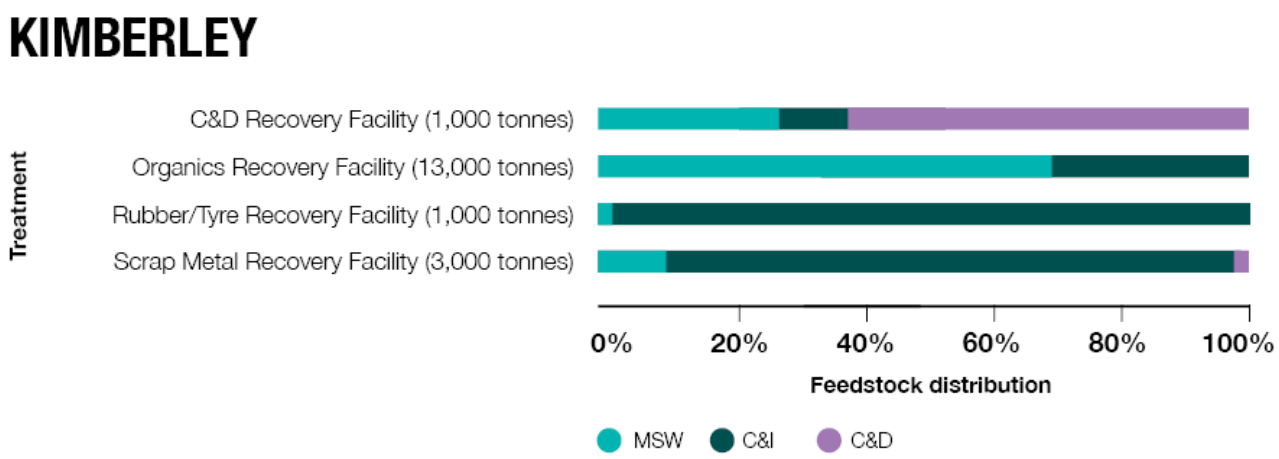


Figure 50 Feedstock distribution of treatments in the Kimberley region in 2030

The model uses licensed capacity for facilities and can result in an overestimation of actual capacity. Stakeholder feedback indicates that only a fraction of the region's licensed capacity of 7,000 tonnes of Category 67A capacity is actually available for the processing of FOGO. The Infrastructure priorities section describes the need to investigate further to confirm actual FOGO processing capacity.

Infrastructure capacity needs in 2030

Based on current, planned and approved infrastructure in 2020, the Kimberley requires the following additional capacities to meet the waste strategy targets in 2030:

- 13,500 tonnes of additional recovery capacity is needed for organics recovery, which is sufficient volume to allow for development of a new organics recovery facility but not enough for a FOGO recovery facility. As demonstrated in Figure 50, a high percentage (69 per cent) of the organics feedstock is predicted to consist of MSW, indicating that there may also be a need for a FOGO recovery in the region. This may be achieved through the extension or expansion of existing organics facilities to be able to accept FOGO.
- 3,000 tonnes of additional consolidation capacity is needed for scrap metal.
- 1,000 tonnes of additional recovery capacity is needed for C&D waste, which may require consolidation and transfer out of the region if recovery infrastructure capacity increase is not viable.
- Minimal consolidation capacity may be needed for rubber tyre material, with less than 1,000 tonnes of feedstock projected.

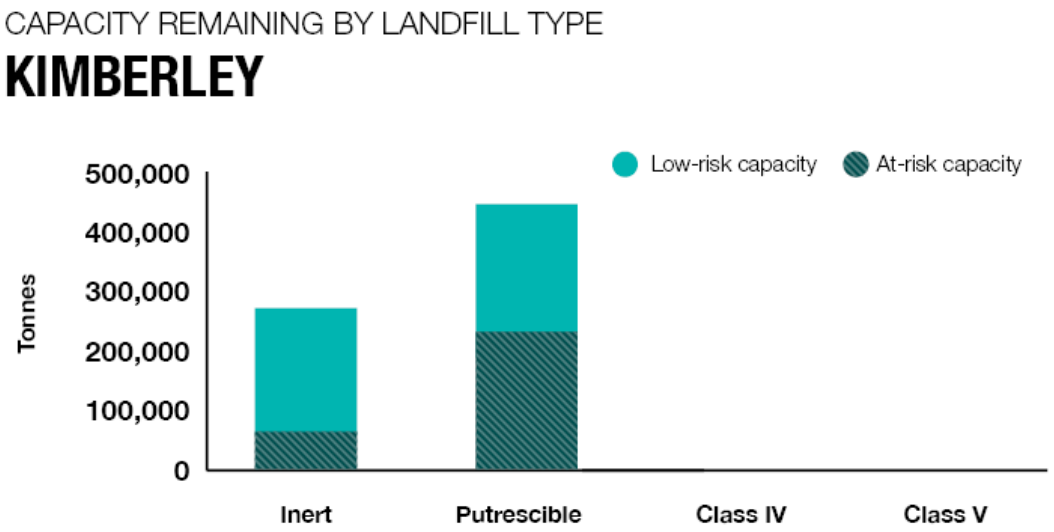


Figure 51 Capacity remaining by landfill type in the Kimberley region, including an assessment of low-risk and at-risk capacity

Total remaining capacity by landfill type is presented in . This figure also indicates the proportion of that capacity that is at risk (see section on Landfill capacity lifetime assessment to 2030 and 2050).

Under the low-risk scenario, half of the total landfill capacity of 301,000 tonnes was identified as potentially at risk, of which inert landfills make up 47 per cent and putrescible landfills 53 per cent. *State Waste Infrastructure Needs Analysis* modelling predicts 28,000 tonnes of residual waste will be disposed of in landfill each year. Feedstock lifetime remaining for landfills is shown in Figure 19 .

Details of the infrastructure needed to achieve waste strategy targets are outlined in Figure 52, including the expected facilities, capacities, and capacity needs in 2030.

CURRENT RECOVERY INFRASTRUCTURE PIPELINE

KIMBERLEY

This overview includes a comparison of projected generation and capacities to determine the infrastructure need in 2030.
It includes planned and approved facilities, as well as closures between 2020 and 2030.

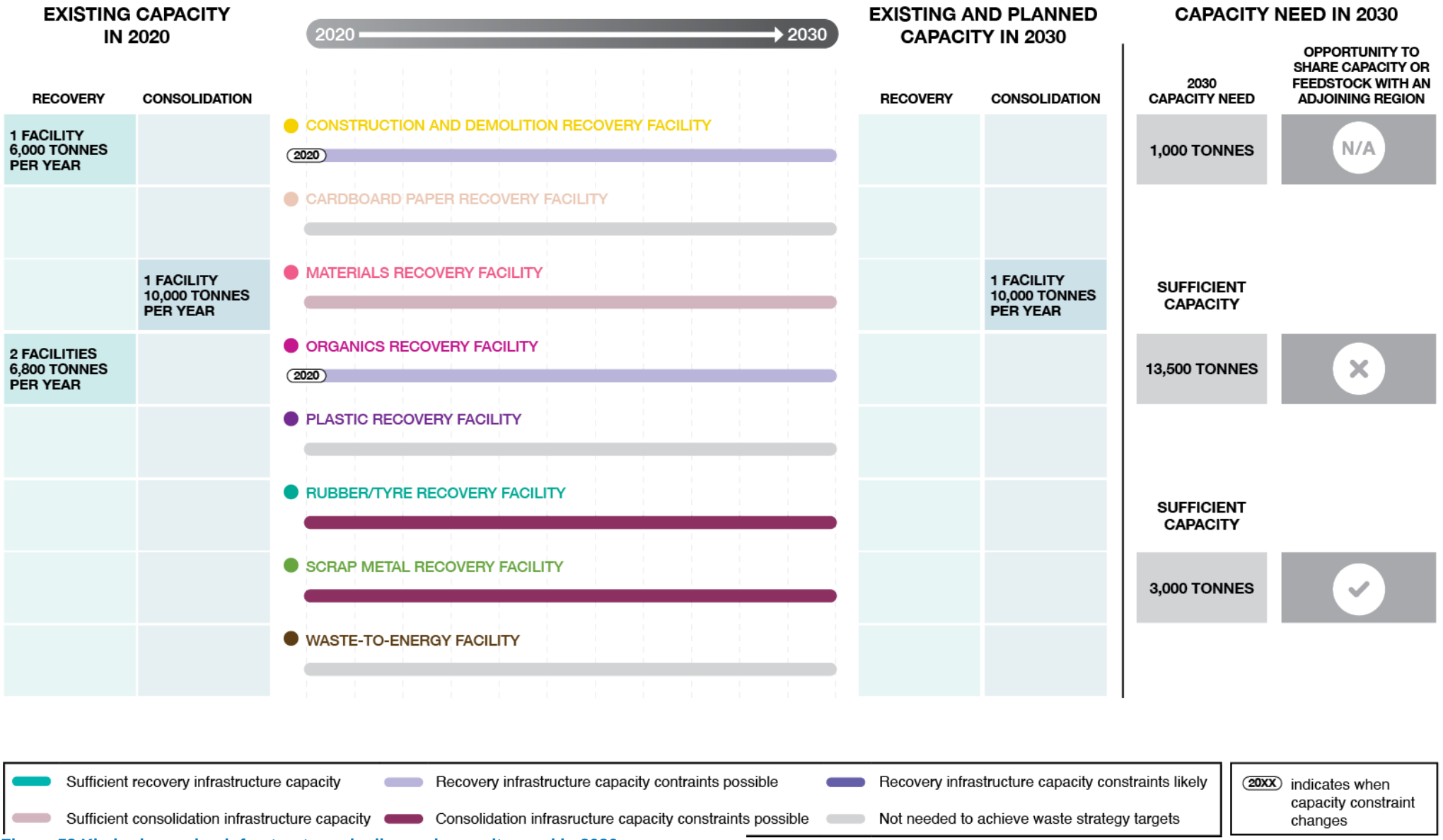


Figure 52 Kimberley region infrastructure pipeline and capacity need in 2030

Principles and priorities

The principles outlined in this plan have been used to identify priorities.

Priority areas that are projected to go beyond capacity need, based on the completed modelling for the region, arise when applying the principles.

Based on the analysis, the top priorities for the Kimberley region are:

- Review options to facilitate lifetime and capacity expansion of existing organics recovery facilities in the region.
- Investigate and facilitate upgrade of existing garden organics facilities to accept FOGO.
- Assess waste generation and infrastructure needs in remote Aboriginal communities to ensure adequate access to services.
- Investigate a rural landfill risk assessment of unlicensed landfills and REMS landfills.
- Facilitate land use planning and approvals frameworks for development of a landfill in the region.

These are discussed in detail in Table 30 below. The principles are outlined once more in Figure 2 for reference.

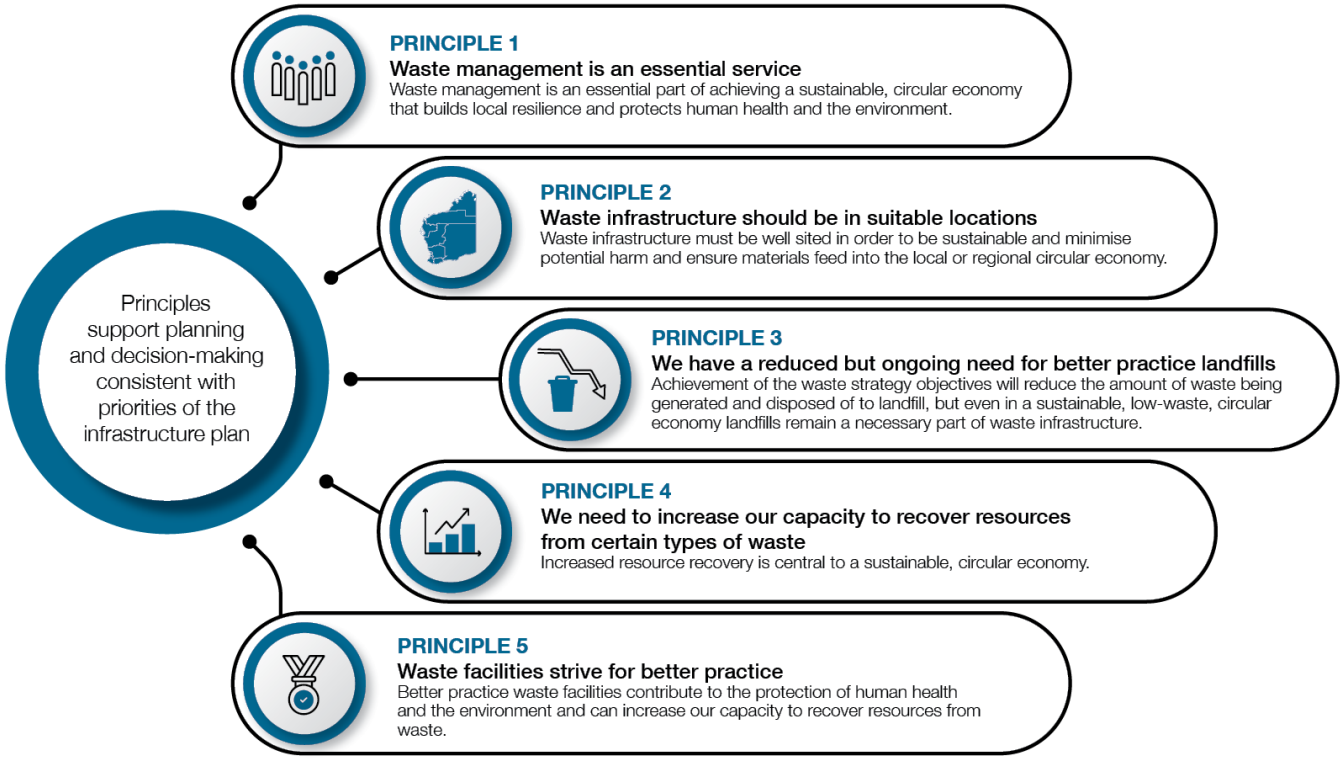


Figure 2 Principles of the *State waste infrastructure plan*

Table 30 Consideration of infrastructure plan principles and priorities in the Kimberley

Capacity needs to achieve waste strategy targets 2030	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy 2030 target (with assigned priority ranking)
13,500 tonnes of additional capacity for organics recovery	**Principle 1: Waste management is an essential service** Consideration of principle 1 underlines the need for contingency planning for organics recovery in the Kimberley. The establishment of at least two consolidation facilities by 2030 or extending the lifetime and increasing the capacity of the two existing facilities should be considered to address this contingency risk. **Principle 2: Waste infrastructure should be in suitable locations** Consideration of principle 2 determines that extending the lifetime and increasing the capacity of existing facilities is preferred. Constraints for new developments near the regional centres of Broome and Derby justifies expansion of existing processing facilities, while remaining close to major generation sources. In addition, proximity to agricultural mining rehabilitation activities can de-risk recovered organics product offtake. **Principle 4: We need to increase our capacity to recover resources from certain types of waste** Consideration of principle 4 highlights an opportunity to increase recovery of food organics. Expansion of existing organics infrastructure to accept food organics can facilitate the introduction of new FOGO collection services to support the waste strategy statewide target of 75 per cent material recovery by 2030. **Principle 5: Waste facilities strive for better practice** A review of existing organics recovery facility compliance with the *Guideline: Better practice organics recycling* would facilitate an understanding of the capacity risk for this facility type.	**High** Lifetime and capacity expansions of existing organics recovery facilities in the Kimberley region will decrease the risk, capital costs and timeframes required to meet capacity needs. **High** Upgrading of existing organics facilities in the Kimberley to accept FOGO will support achievement of waste strategy Recover targets for 2030. **Low** Leveraging lithe mining rehabilitation markets will create opportunities for recovered organic products offtake in the Kimberley region.
3,000 tonnes of additional capacity for scrap metal recovery	**Principle 1: Waste management is an essential service** Scrap metal represents the second largest recovery opportunity in the Kimberley, with 3,000 tonnes of material available predominantly being ferrous metal. Consideration of principle 1 underlines the importance of consolidating this material, which can be moved to the nearest facilities in the Pilbara which have sufficient capacity. Consolidation infrastructure will de-risk waste transfer out of region to the Pilbara or Perth. **Principle 2: Waste infrastructure should be in suitable locations**	**Low** Better understanding of sub-regional gaps for scrap metal consolidation near transportation networks will improve infrastructure coverage in the Kimberley region.

Capacity needs to achieve waste strategy targets 2030	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy 2030 target (with assigned priority ranking)
	Principle 2 flags the negative impact of the transport of scrap metal from the Kimberley to the nearest facility in the Pilbara region; however, 3,000 tonnes of feedstock are far below the critical mass required to establish a facility in the Kimberley.	
1,000 tonnes of additional capacity for C&D recovery	**Principle 1: Waste management is an essential service** With an existing 6,000 tonnes per annum C&D recovery facility scheduled for closure by 2030, the development of a consolidation facility is needed when considering principle 1. C&D material is typically processed close to the source of material; however, under a consolidation scenario, the closest facility is in the Pilbara region. **Principle 4: We need to increase our capacity to recover resources from certain types of waste** Consideration of principle 4 highlights the negative impact of transporting material long distances to facilities in the Pilbara region. Considering the nature of C&D and the existing facility in the Kimberley region, extension of the lifetime of this facility could be considered. However, as it is far below the capacity of the facility, mobile C&D facilities with lower capacity limits could be considered.	**Medium** Lifetime and capacity expansions of existing C&D facilities and use of mobile facilities will decrease the risk, capital costs and timeframes required to meet capacity needs.
Used tyre storage	**Principle 3: We have a reduced but ongoing need for better practice landfills** Waste management of tyres in remote locations poses challenges. Existing landfills are being used for collection and consolidation of tyres and present a suitable centralised location for waste management in remote regions. About 5,000 tonnes per annum of rubber/tyre material is projected to be generated in the Kimberley and this will continue to be generated, highlighting better practice landfills as an important part of the Kimberley's waste management. **Principle 4: We need to increase our capacity to recover resources from certain types of waste** Tyres can be processed but infrastructure may only be available in Perth so the recovery of rubber/tyre materials in the Kimberley region is dependent on consolidation and transport to enable recovery. Consolidation and transport will remain the likely fate given the insufficient quantity to support regional processing. **Principle 5: Waste facilities strive for better practice** One class 64 putrescible landfill in the Kimberley is also licensed to store tyres. See the landfill capacity risk assessment below to further understand how the loss of this facility	**Medium** Two facilities are listed in the region for Category 57, with total capacity exceeding 5,000 tyres. These may be sending tyres to Perth. There is an opportunity to consolidate volumes and transport these tyres for reprocessing outside the region.

Capacity needs to achieve waste strategy targets 2030	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy 2030 target (with assigned priority ranking)
	may occur, noting that this may reduce the ability to consolidate rubber/tyre arising in the Kimberley.	
Landfill capacity risk assessment	**Principle 2: Waste infrastructure should be in suitable locations** Based on current, planned and approved landfill capacity, Broome will face landfill capacity constraints prior to 2030. These needs could potentially be addressed by transporting waste to other landfills in the region or the Pilbara. However, under a low-risk approach to landfill, many existing small, unlicensed landfills in both the Kimberley and Pilbara are at risk as they may face limited ability and increased challenges to comply with landfill better practice design, construction and operations. Planning for additional landfill capacity in the Broome area, near the region's major source of waste generation, should be undertaken, with consideration of local constraints: • environmentally sensitive areas • wetlands and water catchments • national and Aboriginal heritage lands. **Principle 3: We have a reduced but ongoing need for better practice landfills** Based on current, planned and approved landfill capacity, the Kimberley will not have sufficient capacity to meet the putrescible waste disposal needs by 2030. Diverting material to alternative landfills in the Pilbara carries risk of capacity constraints; therefore, consideration of principle 3 points to the need for development of landfill capacity within the Kimberley region. **Principle 5: Waste facilities strive for better practice** Consideration of principle 5 highlights 89 facilities with a total capacity of 273,000 tonnes potentially at risk of noncompliance with better practice in the Kimberley region. The Kimberley region is likely to face capacity constraints for landfill by 2024 under a low-risk approach to landfill. In addition, 95 per cent of landfills in the Kimberley also require post-closure planning, having not completed or updated a plan within the past 10 years.[4] Collaboration with the local mining industry will create opportunities to recover mining waste and improve better practice management of REMS landfills.	**High** Quantification waste generation and infrastructure needs in remote Aboriginal communities can improve access to adequate services in remote areas. **High** Updated rural landfill risk assessment methodology of unlicensed landfill and REMS landfills can be used to effectively assess the potential risk of environmental, human health and amenity impacts. **High** Quantification of waste generation and infrastructure needs for the local mining sector would decrease scope of infrastructure planning and could lead to complementary activities that support local communities. **High** New facility development in the Kimberley region can be facilitated through assisted land use planning and approvals frameworks to alleviate local capacity constraints

[4] Western Australia Waste Infrastructure Audit, ASK Waste Management Consultancy Services on behalf of the Department of Water and Environmental Regulation, (2021).