NORTH QUEENSLAND WASTE AND RESOURCE RECOVERY STRATEGY 2020-2030

FINAL | OCTOBER 22, 2020

Foreword

The North Queensland Regional Organisation of Councils (NQROC) is a collaborative organisation that promotes cooperation and resource sharing between Councils and effectively advocates for regional priorities. This is achieved through on-going collaboration and advocacy and by working closely with regional partners and stakeholders.

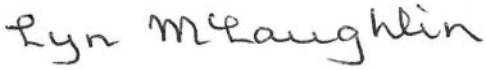
NQROC represents five member councils, these being Burdekin Shire Council, Charters Towers Regional Council, Hinchinbrook Shire Council, Palm Island Aboriginal Shire Council and Townsville City Council. It extends over 80,036 square kilometres with a population of approximately 236,000 (7.9% Indigenous). Our five member councils make up what is referred to as the North Queensland region.

Waste management and resource recovery are a significant priority for North Queensland as the impacts of waste create a risk to our communities, environment, and economy. Regional collaboration is critical to deliver a high-level assessment of waste management in the North Queensland region. The NQROC Regional Waste and Resource Recovery Strategy 2020-2030 will assist in determining the waste priorities for North Queensland as well as identify current and future infrastructure needs. It will enable the North Queensland region to reduce the environmental impact of waste and use resources more efficiently and effectively.

NQROC would like to acknowledge and pay respect to the First Nations peoples of the land on which we live and work, and to elders past, present, and future.

The five NQROC member councils are acknowledged for their valuable time and contributions into the NQROC Waste and Resource Recovery Strategy 2020-2030.

Yours sincerely,



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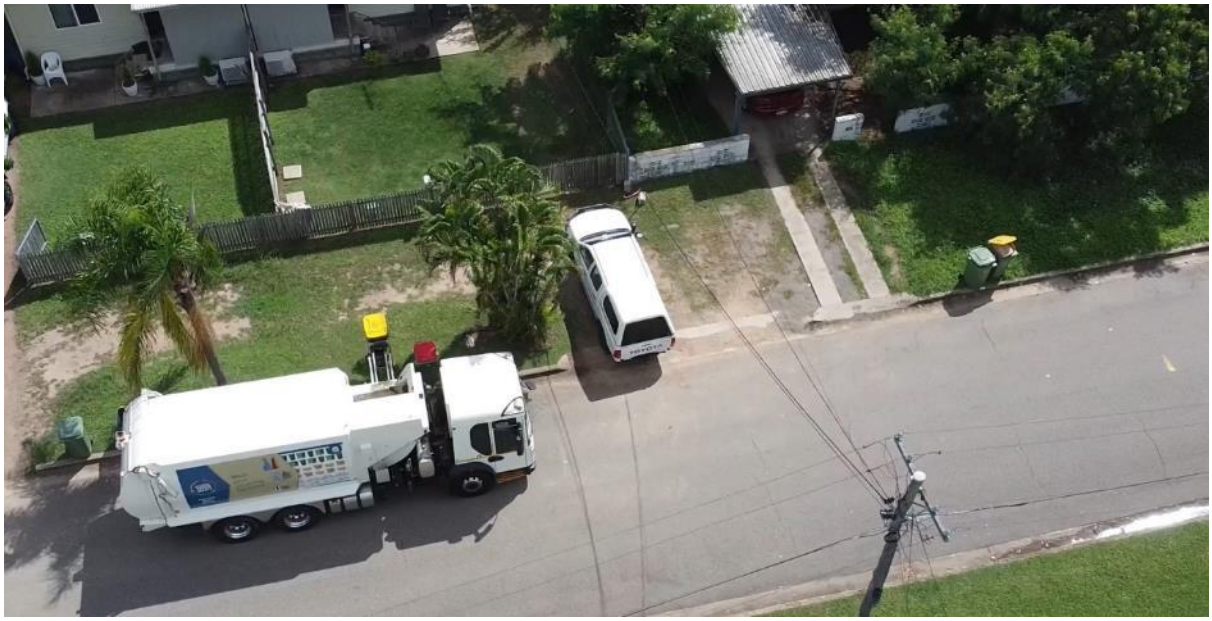
STRATEGY OVERVIEW



Kerbside collection in Townsville

Waste is a concept just as much as it is an end-of-life material to be removed and disposed. “Waste is merely raw material in the wrong place,” wrote Frederick Talbot exactly 100 years ago in his book ’Millions From Waste’. While the 20th century economy was centred on cost efficient mass production, in the 21st century there is increasing focus on value, on returning to Talbot’s view of waste as a resource to be optimised across multiple lives and uses.

The North Queensland Waste and Resource Recovery Strategy 2020-2030 is built around the idea that we need a more rigorous view of each of our ‘waste’ streams and the opportunities they present to reduce, reuse, repair, recycle and otherwise recover. It supports development of a circular economy that creates jobs, reduces pressure on landfill and the environment, and works towards the Queensland Government’s 2050 waste targets.

A region-wide focus presents opportunities to develop a Strategy that is more than the sum of its five individual councils. Combined volumes of waste can attract investment in more ambitious recovery infrastructure. Mobile processing equipment that can be shared between councils makes affordable the infrastructure that a single council could not fund on its own. Pooled resources and collective thinking can generate innovative programs that then benefit from consistency across the region.

There are also unique challenges in bringing together the disparate local government areas of the NQROC region. The solutions must be tailored to fit, whether across the full region or targeted at specific clusters of councils.

The region generated 344,000 tonnes of municipal (MSW), Commercial & Industrial (C&I) and Construction & Demolition (C&D) waste in 2018/19 and recovered 48% of it, marginally above the 45% state average. Council-owned facilities manage much of that material.

Local government has specific responsibility for municipal solid waste (MSW). MSW across the NQROC region reached 125,000 tonnes in 2018/19 and is projected to increase 30% by 2040 to more than 160,000 tonnes. At the current disposal rate, the region collectively has around 10 years of secured landfill life remaining, with longer horizons for some small sites and a growing reliance on Townsville’s Stuart Landfill.

Expanding landfill capacity will need to be considered, however this Strategy charts a path to delay that decision by diverting an increasing volume of materials away from landfill into productive reuse.

There is a hierarchy of alternatives to landfill. The preferred option is to avoid creating waste, which will be a key focus of the regional action on single use plastics (SUP).

With 23% of materials in the region’s general waste bins being misplaced recyclables, and considerable cross-contamination in recovery

streams, there will also be a key focus on improving community waste practices.

The single biggest decision over the 10-year life of the Strategy is how to extract more value from the residual waste in the general waste bins. The key options are introducing a separate collection for organic materials (to turn it into clean compost) and recovering energy from the mixed waste stream through an energy-from-waste facility.

Preliminary analysis for the Strategy has identified viable pathways for both options, including in tandem, although detailed investigations are required.

The opportunities go beyond kerbside waste to expanding the region's capacity to recycle a wide range of products and materials that currently go to landfill.

The key challenges to developing new recycling programs and facilities in the NQROC region are the limited volume of tonnes, long transport distances both within and outside the region, and the need for secure end markets for the recovered materials.

The Strategy identifies a suite of actions to address these challenges and unlock investment in new infrastructure and equipment for target recovery streams.

Improving waste outcomes is a whole of community exercise, encompassing residents and community groups, businesses and social enterprises, local government and members of the waste sector. This Strategy established the framework to harness and focus those collective efforts to deliver a secure, suitable and sustainable materials management system.

Key Strategy actions

- Explore separate collection and processing of kerbside organics
- Consider the long-term role of energy-from-waste technology
- Use regional scale to facilitate investment in targeted recycling capacity, such as soft plastics, polystyrene and mattresses
- Develop regional education campaigns for recycling and illegal dumping
- Regional action on single use plastics
- Implement procurement and practical guidance around locally sourced recycled materials, to develop end market demand
- Assess shared mobile recycling equipment able to process building and timber waste into specified products
- Leverage the existing successful product stewardship schemes (like Containers for Change) to collect other recyclable products through community recycling centres.
- Review whether variable waste charges or other measures could be used to influence waste practices
- Consider closer regional collaboration in disaster planning and response

WHY DO WE NEED A REGIONAL WASTE STRATEGY?

The region in profile

The NQROC region consists of five local governments, Townsville City Council, Burdekin Shire Council, Hinchinbrook Shire Council, Charters Towers Regional Council and Palm Island Aboriginal Shire Council.

Together they make up a vibrant regional hub with strong links to the state's resource, agricultural and tourism sectors and close proximity to Asia-Pacific economies. This has provided North Queensland with sustained economic growth over the last 25 years and has led to significant increases in population and new infrastructure. In 2019 the gross regional product (GRP) was approximately $17.6 billion, contributing around 5% to the overall Queensland economy.

The NQROC region has a total land area of 80,036 km^2 and a total population of approximately 240,000. Of the region's 92,000 dwellings, 83% of are separate houses, 8.6% are semi-detached and 7.1% are multi-unit townhouses and high rise.

Around 80% of residents are concentrated in the city of Townsville, which is the main commercial hub and key administrative and service centre for the broader northern half of Queensland.

The Port of Townsville is Australia's third largest multi-cargo port, handling up to 800 vessels per year, and has major road and rail links to the rest of the state in all directions.

Outside of Townsville, the economy has a slightly different focus, with agriculture playing a major role including sugar, beef and horticultural products.

The regional population growth rate over the last decade averaged 1.1% a year, led by Townsville and Palm Island. The population is forecast to grow more than 50% by 2050 to around 364,000 people, with most growth in Townsville. Charters Towers and Palm Island are forecast to experience modest growth, with minor declines in Burdekin and Hinchinbrook over the long term.

More than 7% of the North Queensland region's population identify as Aboriginal and Torres Strait Islander peoples, compared with 4% of the overall Queensland population. While the waste management needs of Queensland's Indigenous communities are being addressed through a separate strategy being developed by the Department of Environment and Science (DES), there is acknowledgement that as a part of NQROC, Palm Island Council shares an important relationship with the other Councils.

Opportunities

Tourism contributes almost $1.3 billion and 2.5 million visitors a year.

Townsville's intensive transport connections support its role as a major waste hub.

Recycled organics in agriculture can reduce runoff impact on the Great Barrier Reef.

Challenges

Developing new landfills due to impacts within the Reef catchment.

Natural disasters, such as the 2019 floods sending 27,000 tonnes of waste to landfill in Townsville.

Policy context and guiding principles

Government Level	Responsibility
Federal / Commonwealth	Implementation of the National Waste Policy 2018, with support from states/territories Monitoring and reporting on movements and management of hazardous wastes in accordance with international conventions (e.g. Basel Convention) Regulating and overseeing national product stewardship schemes (e.g. designated electronic products, oils and the Australian Packaging Covenant) Collating and reporting waste data at the national level Research and projects to support collaboration between states National Packaging Targets 2025 National Food Waste Strategy Export ban, which will apply to waste plastic, paper, glass and tyres that have not been processed into value-added materials
State	Enforcement of the *Environmental Protection Act 1994* Enforcement of the *Waste Reduction and Recycling Act 2011* Delivery of the Waste Management and Resource Recovery Strategy 2018-2050, including 2050 targets of: - 25% reduction in household waste - 90% of waste is recovered and does not go to landfill - 75% recycling rates across all waste types. Resource Recovery Industries 10-year Roadmap and Action Plan Grant allocation through the Resource Recovery Industry Development Program Queensland Energy from Waste Policy Biofutures Roadmap Indigenous Waste Management Strategy Plastic Pollution Reduction Plan Topic-specific action plans (to be developed as part of the Strategy), including C&D, food and agricultural waste, plastics, glass, paper/cardboard, tyres and textiles Containers for Change Scheme Queensland's Zero Net Emissions Future and Renewable Energy Targets NQ Regional Waste Infrastructure Plans
Regional	North Queensland Regional Plan 2020, 25-year vision for the region Local governments may be members of Regional Organisations of Councils (ROCs) or Voluntary Waste Management Groups (VWMGs) such as LAWMAC.
Local	Local governments are responsible for collection, treatment and disposal of municipal waste, either through council operations or contracted private sector operators Councils are encouraged to meet state Strategy targets (with some funding for waste programs contingent upon pursuing these objectives) Advocacy about best practice to other levels of government. Local Corporate and Performance Plans that identify council issues and priorities

Trends and directions

The rising national waste agenda

The effective closure of the China trade for mixed recyclables has created pressure for the Commonwealth to provide national leadership. The 2019 federal election for the first time ever saw Liberal and Labor make commitments around waste, including the $167 million Australian Recycling Investment plan by the re-elected government.

The largely mothballed 2009 National Waste Policy was redrafted and National Packaging Targets were unveiled with ambitious 2025 goals for recycling and recycled content, while the recent National Food Waste Strategy is the response to the UN Sustainable Development Goal to halve food waste by 2030.

It promises a more harmonised approach to waste issues and the promoting of circular economy thinking.

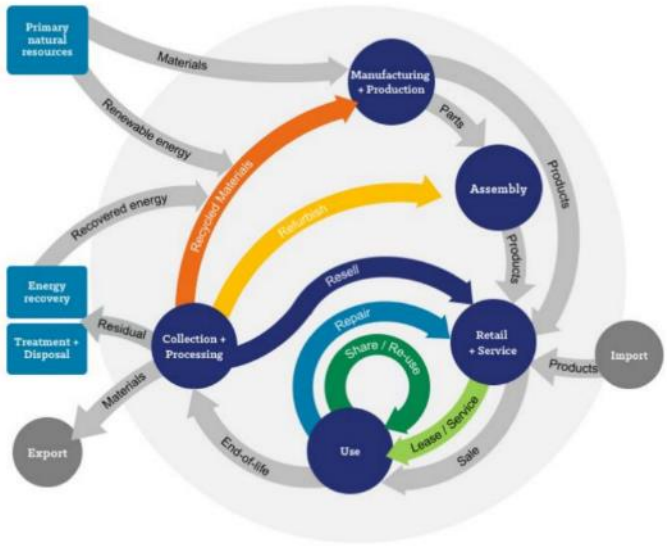
Circular economy

The circular economy model illustrates the actions and relationships that deliver the outcomes under the waste hierarchy.

It conceives the supply chain as a network of pathways designed to circulate materials within their highest order uses, minimising waste and environmental impact.

In general, the earlier in the circle the more effective the intervention, with 90% of the lifecycle impact of many products determined at the design stage.

- Manufacturers can design for disassembly and use virgin and secondary materials
- Retailers are open to sell second hand and refashioned items, or adopt different business models
- Consumers, including businesses and Council, buy recycled and select the optimal recovery pathway for unwanted items
- Council optimises resource and energy recovery at its waste facilities.



Material flows in the circular economy

Waste hierarchy

The waste hierarchy is applied globally as the core conceptual framework that underpins waste policy and strategy. It establishes the priorities in waste management based on environmental impact and broader sustainability principles, promoting efficient use of resources and reduction of disposal of waste to landfill.

These hierarchy combines with the circular economy concept to guide development of actions within this strategy.

The waste hierarchy

WHERE ARE WE NOW?

Mosman St, Charters Towers

Waste services and infrastructure

Collection services

Collection of waste and recyclables from households is a core local government responsibility. The bin configurations and waste services differ between each council, and in some cases between urban and rural locations within a local government area.

Household and commercial waste collection services in each council area

Council	Residual Waste	Recycling	Garden Organics (green waste)	Bulky Waste
Townsville City Council	Weekly, 240L (optional 140L)	Fortnightly, 240L (optional 360L)	None	1 x collection per year
Charters Towers Regional Council	Weekly, 240L	None	None	1 x collection per year for pensioners and Hervey Range
Burdekin Shire Council	Weekly, 140L (optional 240L) Rural: Weekly, 240L	Fortnightly, 240L	Fortnightly, 240L (urban areas)	No kerbside service, transfer station drop-off
Hinchinbrook Shire Council	Weekly, 240L	Fortnightly, 240L	None	1 x collection per year (infirm residents only) 1x bulk bin per year (pre-wet season) in identified rural areas
Palm Island Aboriginal Shire Council	Weekly, 240L	None	None	None

Other services

All council transfer stations offer self-haul drop-off for residual waste, recyclables and garden organics.

Warrens Hill Resource Recovery Centre, Hinchinbrook

Residual waste drop-off incurs a fee, with the exception of one free dump weekend each year in Townsville and Burdekin, four free vouchers per house in Hinchinbrook and two free vouchers per house in Charters Towers and surrounds. Burdekin also offers free sorted domestic general waste drop-off for residents only. Drop-off of recyclables and garden waste is offered free of charge, with some exceptions such as Hinchinbrook.

The councils also provide the following commercial services to businesses:

- Townsville – Provides businesses with 140L / 240L waste bins, 240L / 360L recycling bins, bulk bins and skip containers for commercial waste, as well as specialised services for hazardous or heavy industrial waste.
- Burdekin – Provides businesses with a 2-bin system (general waste and recycling) and optional garden organics service.
- Hinchinbrook – No collection, but accepts business and building wastes, clean concrete and garden organics at the Warrens Hill Landfill and Resource Recovery Centre.
- Charters Towers – Provides general waste collection, serving more than 300 commercial properties.
- Palm Island – Charges commercial waste based on the quantity.

A critical council waste function is to deliver educational programs to school, work and community groups that, while not a conventional service, are key to avoiding waste and optimising recovery. For example, the ‘Rub out Rubbish’ campaign developed in Townsville provides clear, simple messages to increase household recycling and reduce recyclable contamination, while Burdekin offers recycling and waste education presentations in schools, in addition to advice on DIY composting and worm tubes.

Existing infrastructure

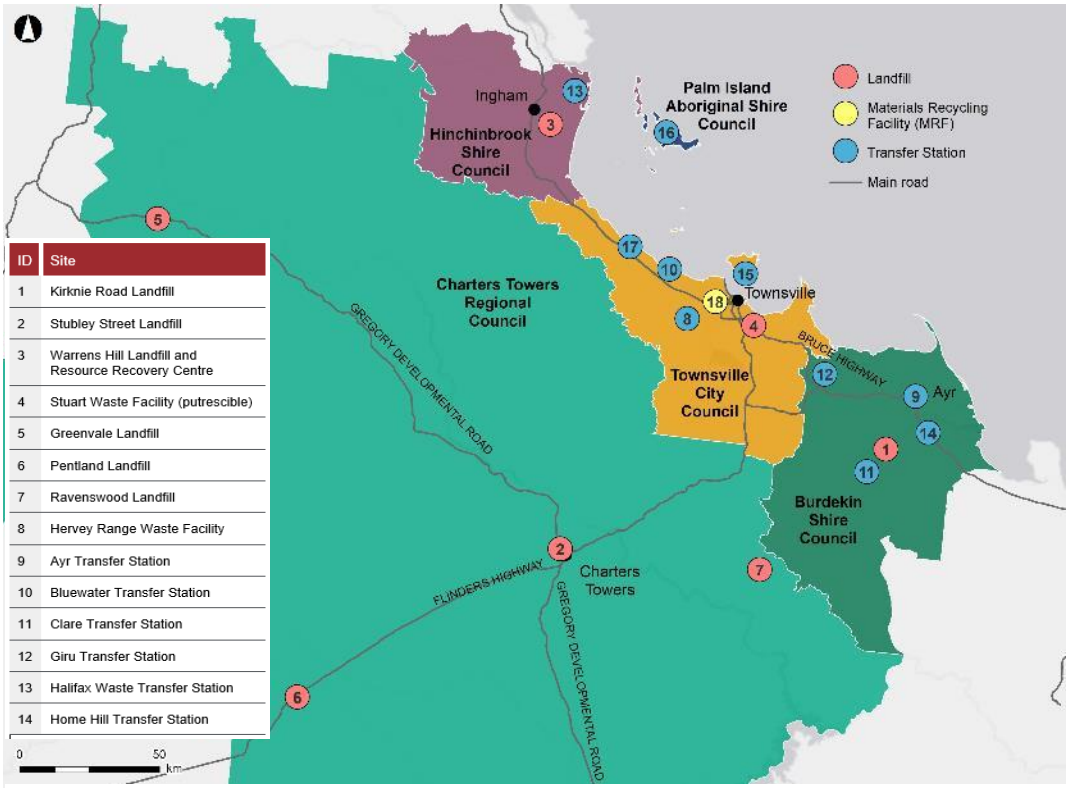
The NQROC region is home to nine active landfills, including one privately owned facility that receive relatively small inputs of building waste. Each LGA has a principal landfill, while Charters Towers also operates three small rural landfills.

A large, modern materials recovery facility (MRF) processes all domestic kerbside recyclables in the region, and the northern part of Whitsunday Regional Council, as well as receiving commercial recyclables and container exchange materials. The Townsville MRF, which opened in 2017, includes a glass reprocessing plant to produce high quality glass sand and aggregate for resale.

There are two commercial recycling facilities in the region, which primarily handle clean commercial recyclables such as source separated cardboard.

There are two private composting/mulching operations in the region, with the majority of garden waste recovered through simple mulching at the council landfill sites.

For building waste, the region has one dedicated recycler, which has significant capacity at its current site, and some council landfills crush significant volumes of clean concrete for reuse.



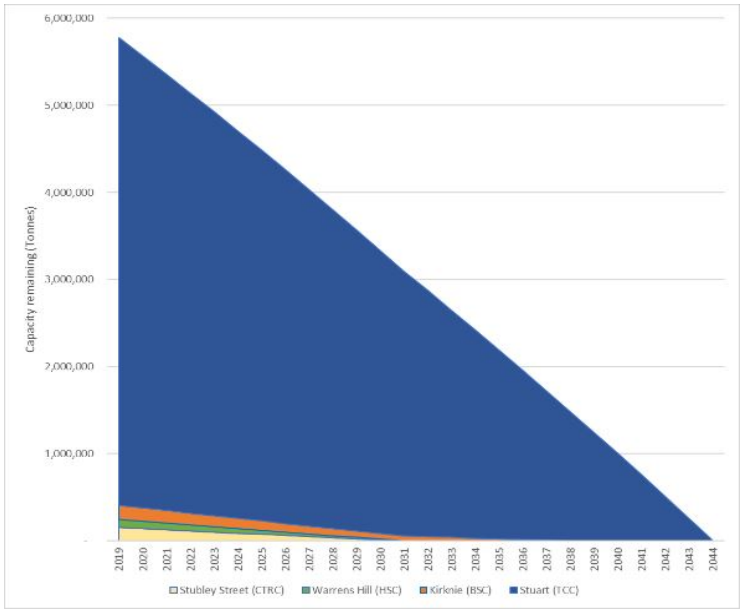
ID	Site
1	Kirknie Road Landfill
2	Stubley Street Landfill
3	Warrens Hill Landfill and Resource Recovery Centre
4	Stuart Waste Facility (putrescible)
5	Greenvale Landfill
6	Pentland Landfill
7	Ravenswood Landfill
8	Hervey Range Waste Facility
9	Ayr Transfer Station
10	Bluewater Transfer Station
11	Clare Transfer Station
12	Giru Transfer Station
13	Halifax Waste Transfer Station
14	Home Hill Transfer Station

Existing infrastructure, NQROC region

Landfill capacity and life

Stuart Landfill (TCC) is a regionally significant landfill that plays a major role in the regional waste management system across all waste streams.

It is also likely to receive C&I wastes from across the region that cannot be managed at smaller sites. It has an expected lifespan to 2044 based on developed capacity and approved expansion.



Existing capacity for putrescible waste

Kirknie Road Landfill (BSC) is a locally significant landfill that plays a key role receiving waste for the local community. It has sufficient long-term capacity for Burdekin's own needs, but insufficient to act as a regional landfill. Kirknie Rd has currently constructed capacity to 2037 and potential availability until 2080, subject to approval.

Stubley Street Landfill (CTRC) is locally significant and has an expected lifespan to 2030, when the site will either close or a new cell will be developed.

Charters Towers has two other very small and remote landfills (Greenvale Landfill, Pentland Landfill) with expected lifespans beyond 2100 under business as usual, while the small Ravenswood Landfill is being converted into a transfer station.

Warrens Hill Landfill and Resource Recovery Centre (HSC) is the only active landfill within Hinchinbrook Shire. Based on current operations and designs, it is expected reach capacity by 2030.

Regional waste flows

Across the region, around 370,000 tonnes of waste were reported as managed by councils and licensed private operators in 2018/19, excluding ash and tailings from minerals processing. Of this, almost 125,000tpa (36%) was household waste.

Annual kerbside waste generation of 230 kg/person is nearly 11% below the Queensland average of 258 kg/person.

However, the state outperforms the NQROC region in recovery, with just under half of the waste managed in the region (45%) diverted from landfill to recovery, in comparison to the state average of 49%.

While positive, the overall performance obscures significant variation between streams. The 76% recovery of construction and demolition (C&D) waste is much higher than the state-wide average of 58%.

Recovery of municipal waste in the NQROC region just topped the state average, 29% compared to the state's 28%.

However, commercial and industrial (C&I) waste recovery is low at 36%, falling well short of the 50% state performance.

Key Waste Statistics in the NQROC Region

MSW, C&I and C&D waste
370,000 tonnes*

Disposal to landfill **205,000 tonnes***


51% Municipal solid waste


35% Commercial & Industrial waste


14% Construction & Demolition waste

Management of waste

32% Private facilities

68% Council facilities

Self-hauled to waste facilities
45,000 tonnes

58% garden organics
32% general waste
10% other waste

Bin Services
- Kerbside bins in service **200,000**
- Households receiving services


97% of households have access to a general waste bin


91% Recycling bin


5% Garden organics bin

Annual Waste Generation Per Capita

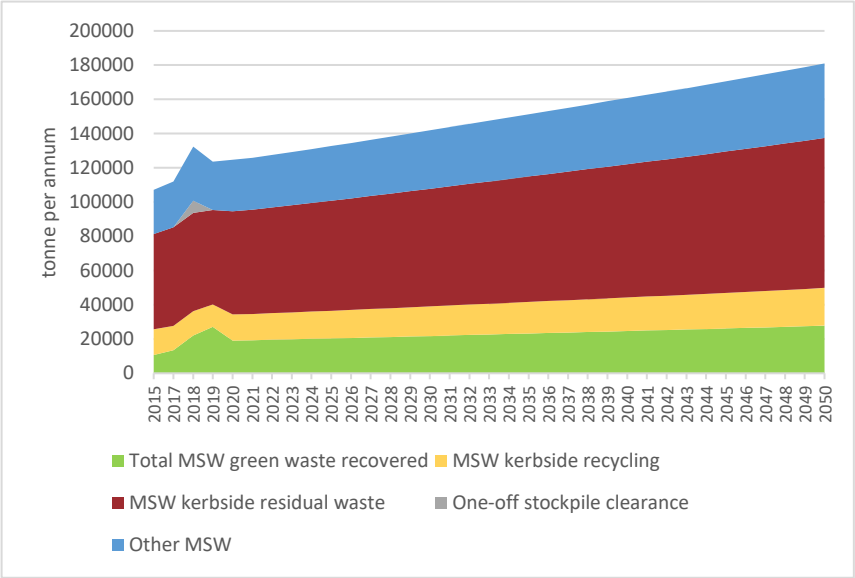
230kg	General waste to landfill	vs	Queensland average of **258kg** per person (estimated)
55kg	Kerbside recycling	vs	Queensland average of **66kg** per person (estimated)
114kg	Garden organics (including self-hauled)	vs	Queensland average of **91kg** per person (estimated)

*Inclusive of all three headline wastes and disaster waste. Does not include regulated waste.

Municipal solid waste

Of the almost 125,000 tonnes of municipal waste managed in 2018/19, excluding disaster waste, 45% was residual waste from the general waste bin (55,000 tonnes) and 11% was yellow bin recycling (13,000 tonnes).

A further 22% (27,000 tonnes) was garden organics, primarily self-hauled green waste but also household collection from Burdekin. Other MSW contributed 23% of the total MSW volume (28,000 tonnes), mostly household bulky waste and self-hauled dropped off to a council waste facility.



Forecast MSW generation, by major stream

Some 55% of the MSW stream was collected through regular kerbside bin services, which cover most households in the region, with the remainder being self-hauled.

MSW generation is projected to increase 30% by 2040 to more than 160,000 tonnes, rising to almost 181,000 tonnes by 2050, a 47% overall increase. The majority will arise in the Townsville LGA, which has the highest forecast population growth.

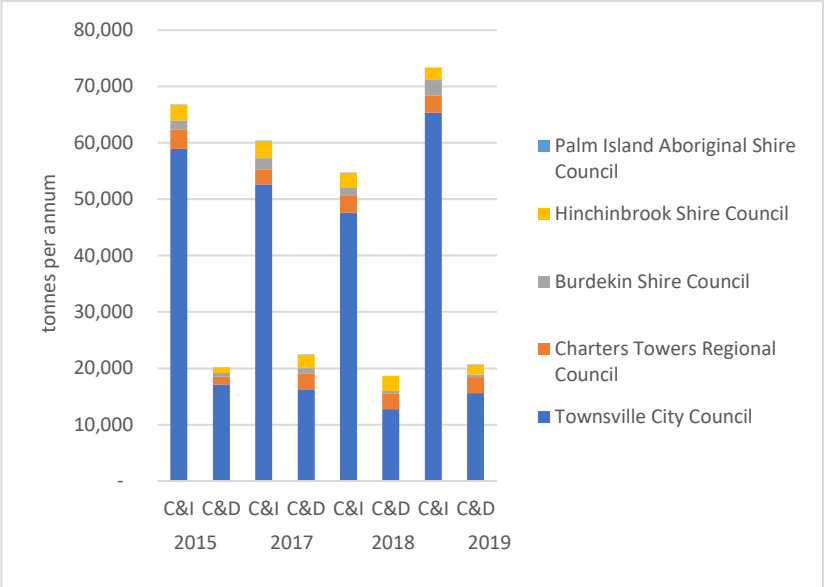
Recent bin audits in the region have found each bin contains a large volume of misplaced material. Recyclables are the single biggest component of the general waste bin, food and garden organics are appearing in yellow bins and Burdekin's green bin has a high proportion on non-compostable material, in particular textiles.

This composition picture indicates significant potential to improve recovery rates by reallocating material flows to the correct bins and reducing the contamination of the target streams. Education is key to improvement.

Commercial and construction waste

The region managed almost 111,000 tonnes of commercial and industrial (C&I) waste in 2018/19, of which 36% was recovered, mostly mineral oils, regulated (hazardous) wastes and green organics.

Councils transfer stations and landfills managed just over 78,000 tonnes of C&I waste, mostly mixed waste and green organics. Recovery of organics and a small volume of recyclables totalled 6%.



Total business and building waste to landfill, 2018/19

Some 108,500 tonnes of construction and demolition (C&D) was managed overall, of which 76% (83,000 tonnes) was recovered. Council sites received 42,000 tonnes and recovered more than half of that, mostly crushed concrete, asphalt and scrap metal. Private sector facilities recovered 61,000 tonnes and landfilled 8,000 tonnes.

Key waste streams are outlined below, while other items being recovered at the Resource Recovery Centres include tip shop items, metals, cardboard, fluorescent light bulbs, gas bottles and fire extinguishers.

Other waste streams

A further 37,000 tonnes of regulated waste was received at landfills, primarily contaminated soils (30,000 tonnes) and asbestos (6,000 tonnes).

Other streams and destinations

	Townsville	Charters Towers	Burdekin	Hinchinbrook
E-waste	Endeavour Foundation and E-waste Recycling Australia	Partially processed on-site	Managed by E-Waste Recycling Australia	Managed by E-Waste Recycling Australia
Tyres	TSA accredited recyclers	Landfill or managed by Tyre Cycle	Managed by Tyre Cycle	Managed by Tyre Cycle
Mineral oil	Recycled at the Veolia facility in Bohle	Managed by NQ Resource Recovery (NQRR) in Bohle	Managed by NQRR in Bohle	Managed by Cleanaway
Chemicals	Managed by NQRR, including paint under Paintback scheme	Not accepted, support for ChemClear	Not accepted, support for ChemClear	Managed by ChemClear, pick up twice a year
Lead acid batteries	Action Metal Recyclers	OneSteel Recycling, Ellsley's Metal Recycling	Enirgi Power Storage, Ellsley's Metal Recycling	Donated to not-for-profit charities

WHERE DO WE WANT TO GET TO?

Ingham, Hinchinbrook Shire

Strategic Objectives

Waste and resource recovery solutions must be grounded in the local context. What works in Brisbane or Europe or anywhere else may not be fit for purpose in NQROC. This is in part due to the basic factors of size, location and cost, but solutions are also a reflection of the aspirations of the community.

The following key strategic priorities have been formulated to reflect the common priorities of each council and community. They have guided the selection and development of solutions.

Objective 1: Reduce waste to landfill

The Councils within NQROC support the State Government objective to reduce the impact of waste on the environment. The greatest environmental benefits will come from a critical focus on reducing disposal to landfill in order to minimise the impact of landfill sites on land and water resources, mitigate greenhouse gas emissions from decomposing organic matter and avoid the negative community impacts of landfill.

In addition, several councils face looming landfill capacity challenges in the medium term, so extending the life of existing assets as much as reasonably practicable is common sense.

Waste reduction and avoidance measures will be important as they slow the tidal pull of virgin materials through the supply chain, but the greatest reduction in tonnes to landfill will come through new and improved resource recovery programs and projects, supported by enhanced waste education.

Diverting organics and deploying alternative treatment technologies for the residual waste stream are likely to have the greatest volume impact, but smaller improvements in recycling and diversion of other materials will also benefit. This includes support for options to reduce the landfilling of C&I and C&D waste.

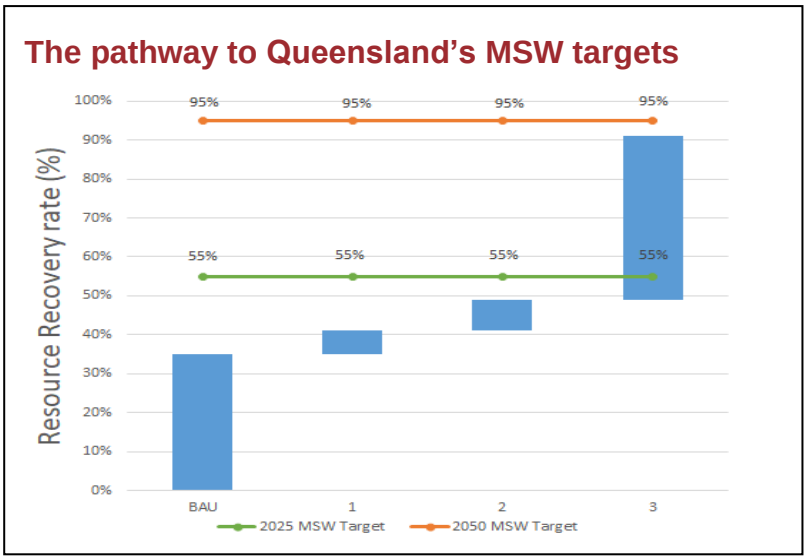
Objective 2: Financially sustainable and responsible waste management

Councils are mindful of the need to be prudent in spending ratepayer funds and securing value for money in new initiatives.

This does not equate to reflexively backing the cheapest option, which may not tick all the boxes or may run contrary to other strategic priorities, such as reducing waste to landfill. Rather, the focus should be on overall value for the community as defined through a prism of longer-term costs and benefits.

For each option, the key factors that impact financial viability and sustainability should be well understood. These may change over time, such as the scheduled increases to the levy on disposal to landfill, with long-term analysis able to determine the most appropriate time in the future to introduce a particular change.

Where new infrastructure is needed, the Strategy and the underlying analysis should present a compelling case for investment by councils, state government or companies.



Objective 3: Regional market development and circular economy

Councils acknowledge the need to develop new and more diverse markets within the region for resources recovered from waste.

Recovery facilities are not end points in themselves but key links in the chain to the next life for a recovered product or material. They serve the community but also require commercially viable end markets, with local markets particularly important for streams that cannot be cost-effectively transported to external markets.

Strong local markets also keep recovered resources within the regional economy, which supports local industry and economic development and aligns with the state goal to develop economic opportunities from waste.

Councils also support a broader transition to a circular economy in Queensland, in line with circular economy principles and the overarching state waste strategy. However, local government has limited influence over the early arcs in the circular economy of production, distribution and consumption of goods. Their most powerful interventions are at the end of linear supply chains through the control of waste services, which are key pivot points for the flow and fate of consumed materials, and through procurement of recycled material.

The Strategy provides a particular focus on adding value to recovered resources to access higher value and more diverse markets. This includes leading by example by promoting the use of recovered materials within Council projects and operations, and working with industry and business to support remanufacturing and circular resource loops.

Objective 4: Bring the community along on the journey

Councils recognise there is growing community interest in waste issues and that community expectations around resource recovery are changing. The Strategy must be mindful of the role of the community in all aspects of the waste management system and consider how best to engage people and inform appropriate behaviour change.

The successful implementation of new resource recovery initiatives requires the support of the community and, in most cases, their active participation.

This is particularly important regarding development of new waste infrastructure with the potential to impact the community, which will only achieve success by fostering a social license to operate through clear communication and genuine engagement.

The Strategy provides a coordinated regional approach to improve community engagement and education.

The Strategic Framework

VISION STATEMENT

Less waste in the North and more resources together

OBJECTIVE 1	OBJECTIVE 2	OBJECTIVE 3	OBJECTIVE 4
Reduce waste to landfill	Financially sustainable and responsible waste management	Regional market development and circular economy	Bring the community on the journey
EXPECTED OUTCOMES	**EXPECTED OUTCOMES**	**EXPECTED OUTCOMES**	**EXPECTED OUTCOMES**
1. Reducing waste to landfill to meet state government targets, minimise the impacts of waste on the environment and community, and avoid the loss of resources from the economy	6. Actions under the Strategy are financially viable and represent responsible spending of ratepayer funds, delivering value to the community (broadly defined rather than just cheapest option)	9 Strong local markets support sustainable resource recovery programs, while providing local economic development and employment benefits	13. The community supports and helps deliver the Strategy, which is well communicated and aligned with community expectations
2. Maximised lifespan of existing assets as some councils are facing landfill capacity challenges over coming decades	7. Investment is supported by detailed business cases, with a clear assessment of financial viability, feasibility, key risk factors and optimal ownership model (councils, state government or private sector)	10 Value-added recovered resources develop more stable and diverse market opportunities	14. Community engagement, including appropriate education programs, are harnessed to support implementation
3. Waste avoidance is prioritised and resource recovery improved	8. Programs are funded and supported to ensure their longevity, with options to be considered as needed	11 Local reuse and remanufacturing opportunities are supported, where viable, by collaborating with local industry and Council leadership in procurement of recycled content materials where at the appropriate standard	15. There is a secure social license to develop new waste infrastructure through meaningful engagement
4. There are step-changes in organics and residual waste processing, supported by incremental improvements in recycling and other streams		12 Circular economy principles are appropriately acknowledged, accepting Councils only impact part of the ‘circle’	
5. Opportunities for councils to influence diversion of C&I and C&D waste from council landfills are considered			

HOW DO WE GET THERE?

Forrest Beach, Hinchinbrook

Options considered

There is a clear need and ambition to improve the recovery rate across the region in order to reduce environmental impact, optimise the life of the landfills, manage cost pressures and support ongoing development of a local circular economy.

For each priority objective, there are a range of delivery options. The key is to determine the pathway that best fits NQROC. Each option was evaluated against a suite of criteria developed by the councils (below) and were assigned a weighting that reflects its agreed significance in the region.

Bringing the community on the journey (Priority 4) is considered a cross-cutting objective integrated into and flowing from each of the other priorities. Factors such as cost, environmental benefits and economic development all contribute to acceptance.

In addition, regulatory compliance and regional suitability were considered but ultimately viewed as a 'must have' for all options rather than a differentiating factor.

The alignment of each potential solution with these criteria is indicated in the following option summaries.

The agreed evaluation criteria and weightings

Criteria	Link to Strategic Priorities
Environmental impact (e.g. landfill diversion)	Supports a reduction in waste to landfill (SP1, SP4)
Financial impact (cost to ratepayers)	Supports a financially sustainable and responsible waste system (SP2)
Economic (jobs, investment)	Supports regional market development and circular economy (SP3, SP4)
Low risk profile	Supports a financially sustainable and responsible waste system (SP2)

Key waste service solutions

Improved recycling performance

Collecting more recyclables

With 26% of materials in the region's general waste bins being misplaced recyclable materials, the need for commitment to long-term education to improve capture of recyclables from this stream is clear. However, the opportunities go beyond kerbside recycling.

One option is to leverage existing product stewardship schemes include the Containers for Change container refund scheme (CRS) by establishing community recycling centres that consolidate collection of all the materials. Remote and rural communities without access to recycling could support this by tasking community groups and schools to collect additional items and subsidising the CRS operator to accept additional material.

Recycling at events is often poor due to the temporary nature of the infrastructure. Councils can influence waste performance at public events through mandatory measures in their event approvals process and, in particular, where they own the venue. This needs to be balanced with the cost impact of more bins and transport to recycling facility.

Next steps: Regional councils to approach the Containers for Change scheme operator and local groups to consider feasibility of leveraging the CRS. Engage council event teams to explore inserting recycling clauses in approvals, prioritising larger, urban events.

Transfer station, Townsville

Adding value to recyclables

There are real drivers and opportunities in 2020 to extract more value from the recyclables to increase local resilience, stimulate the regional economy and reduce reliance on exports.

For example, recovered plastics are currently exported or sent to Brisbane for reprocessing. The high domestic and global demand for some clean streams of rigid plastic packaging creates an opportunity for a reprocessing facility to 'flake' and wash targeted single stream plastics sourced from across the region and Far North Queensland.

Soft plastics and expanded polystyrene (EPS) go to landfill (or litter) as their light weight and high volume create challenges in collection and separation. Local facilities to process these plastics from municipal, commercial and agricultural sectors could be supported through EPS compactors and drop-off points for plastic films.

Local glass reprocessing is well served through the Townsville MRF, but remote areas may be suitable for micro-scale glass crushing options to produce recycled glass sand for local projects, such as in road base.

While the Townsville MRF only opened in 2017, subsequent disruptions to recycling markets is driving transition to a greater focus on material quality rather than just cost and quantity. One option is to encourage investment in refining equipment to make sorted materials 'product-ready'.

This also requires confidence in end markets for recycled materials. Councils have a key role in linking local manufacturers with recycled material providers, and supporting new manufacturing industries.

Next steps: Councils to investigate the feasibility of plastic reprocessing and advocate for government support for new onshore paper pulping and production. Smaller councils to consider micro-scale glass crushing.

Fantastic plastic project

In early 2020, new company QPlas unveiled a facility in Townsville to make durable composite building materials from waste hardwood and agricultural plastic.

The first of its kind in Queensland, it aims to annually recycle 7,000 tonnes of agricultural film, which is widely used in the production of fruit, vegetables and small crops, and 3,000 tonnes of pre-harvest residues from African mahogany plantations in the region.

The composite material is suited to products including pallet boards, fencing, decking, bollards, oyster beds, sound walls and heavy duty fluming.

Diverting organics from landfill

Organic waste collection

The largest fraction of the residual waste bin is organic material, which across the region accounts for 38% of this disposal stream. Each year that equates to around 12,000 tonnes of food scraps and 9,000 tonnes of garden clippings sent to landfill.

Burdekin Council's garden organics collection

Recovering organics would:

- Deliver the biggest landfill reduction
- Target the biodegradable material that generates the most greenhouse gases in landfill and leachate
- Create a reliable flow of material able to supply a local market for high quality, clean compost.

Once organics get into the residual waste bin they cannot be recovered. The key to kerbside organics is dedicated collection of source separated materials.

Burdekin Council runs the region's only Council-run garden organics (GO) kerbside service, a fortnightly collection in urban areas that is very effective at capturing garden organics, which make up only 1.5% of Burdekin general waste bins compared to a NQROC average of 16%.

Another option is to simultaneously capture food organics and garden organics, known as a FOGO service. This is a bigger change to household practice as it involves segregation of food scraps in the kitchen and addition of a FOGO bin and weekly service.

Variations include allowing households to opt-in to the FOGO service, or only targeting food organics rather than full FOGO.

Any new service comes at a cost, although this is partially offset by avoiding the high cost of landfill, depending on the collection option and future levy rates.

Next steps: Further investigation of the overall viability of organics recovery in the region, and specific study to determine the optimal organics collection model and timing for the NQROC region. To be led by urban councils due to the highest potential for a kerbside organics service.

Case study: FOGO in NSW

The latest NSW local government dataset (2017-18) suggests Queensland's MSW recycling target of 60% by 2030 is achievable with a well run FOGO system and kerbside recycling.

- Lismore (popn 43,000) – Overall MSW recovery of 74%, with around 23% of that due to kerbside FOGO and a similar proportion from self-haul GO.
- Kiama (popn 22,000) – Achieving 76.8% overall MSW recovery, of which kerbside FOGO contributes about 41% of the recovery.
- Tweed Shire (popn 90,000) – Achieving 56% overall MSW recovery, with 25% of that from FOGO, noting it is optional for rural areas and multi-unit dwellings.
- Richmond Valley (popn 23,000) – A rural council, it is achieving 59% overall MSW recovery, of which FOGO contributes 28%.
- Moree Plains (popn 13,000) – A smaller, rural council in north-west NSW, it is achieving 45% MSW recovery overall, with its FOGO system contributing 18%.

Processing organic waste

Garden waste collected through Burdekin's kerbside service, together with self-haul green waste, is currently mulched. Only minimal amounts are used on streetscapes, parks and gardens. This is a relatively low value product, which limits the range and scale of applications and the associated revenue opportunity.

More intensive conversion into compost would deliver a product with broader application and appeal, including to agricultural markets where it could replace chemical fertilisers, improve soil quality and reduce the impact of run-off on the Great Barrier Reef. Price competition would need to be carefully considered.

There is only one small composter in the region, so additional organics processing capacity would be required to fully capture the opportunity. More advanced composting could deliver economies of scale and support hospitality businesses to embrace compostable products and packaging.

Additionally, economies of scale could be achieved by including a further 4,500 tonnes a year of commercial organics, such as food waste, and even agricultural residues.

The optimal solution needs to be considered in tandem with the household organics collection service, which will determine the scale and nature of the organics to be processed. The primary options are:

- Open windrow composting
- More intensive in-vessel composting
- Anaerobic digestion into energy (domestic and commercial food waste, biosolids and abattoir waste)
- Mobile shredding (garden organics only).

A more ambitious option could be to develop a central 'bio-hub' that uses multiple processes to recover a variety of organics streams.

Location also plays a role in technology selection. An urban facility for FOGO may need to use in-vessel composting to reduce odours, but it may be more cost-effective to transport to a rural area and use cheaper open windrow processing.

If a sophisticated regional facility is not required to match the feedstock, rural councils are likely to best served running their own small open windrow operations or even sharing mobile shredding equipment to service each of them on a campaign basis.

Next steps: Investigate the optimal organics processing technologies for the NQROC region, including in tandem with consideration of organics collection options in each council.

Managing residual waste

Alternative treatment options

Improved recycling and recovery of organics will address major components of residual waste, but this leaves a significant volume still going to landfill. An alternative – or complementary – approach is to process the residual stream directly to recover specific value and reduce disposal volume.

It is critical to select technologies with a track record processing similar wastes and at a scale suitable to the NQROC region. An initial review of key technologies and their local potential is in the following table.

The most suitable are combustion and gasification, which recover the inherent energy in waste. While often developed with capacities of more than 250,000 tonnes a year, there are many international examples at the 90,000 tonnes a year scale likely to be suitable for the region.

A major advantage of energy-from-waste (EfW) technologies is that they offer the greatest extension of landfill life. If the bottom ash left from combustion can be processed into bricks or other stable construction products, as little as 3% requires disposal.

Two key scenarios were assessed to understand the cost and diversion impacts: sending all domestic general waste bin waste to EfW; and a more ambitious scenario in line with the Queensland EfW Policy supporting the waste hierarchy that combines improved recycling, a FOGO system capturing organics and the residual to EfW. Under the first, all five councils would supply an estimated 92,000 tonnes of residual waste in 2030.

Residual waste in the second scenario drops to 72,000 tonnes in 2030. That is short of the technologies' minimum scale, but top-up tonnes from commercial waste generators are common in these projects and should be accessible given the current limited competition for C&I waste in the region.

The financial analysis also tested different ownership models for an EfW facility. The typical approach of contracting the private sector to develop and own the EfW facility and sell power to the grid is unlikely to be viable given expected investment returns.

Peterborough ERF, UK

- 85,000 tpa combustion of MSW,
- 30-year contract
- 7.25MW output (15,000 homes)
- £72M capex (~$145M), funded by Council
- Completed late 2015 (2.5-year construction)
- 28 operational jobs

An alternative is for councils to own the facility, funded through low interest state government finance. While design, construction and operation would be outsourced to the private sector to minimise exposure, the risk profile needs to be fully explored. Preliminary assessment suggests an EfW facility under this model would be cheaper than landfill.

Processing of residual waste is likely to take up to a decade to allow for investigation, consultation, procurement, planning approval and construction.

Securing a long-term option for residual waste in the region is important, but there is time to get it right. The rising landfill levy will make EfW more attractive over time. Optimisation opportunities should be explored, including co-location at an industrial facility that could buy the fossil fuel-free electricity and heat on a secure, long-term arrangement.

Time also provides opportunity to consult the community on EfW, which is acknowledged as a sensitive issue requiring extensive engagement and education.

Next steps: Councils to develop a business case including investigation of energy from waste technologies and reference facilities, ownership models and governance arrangements.

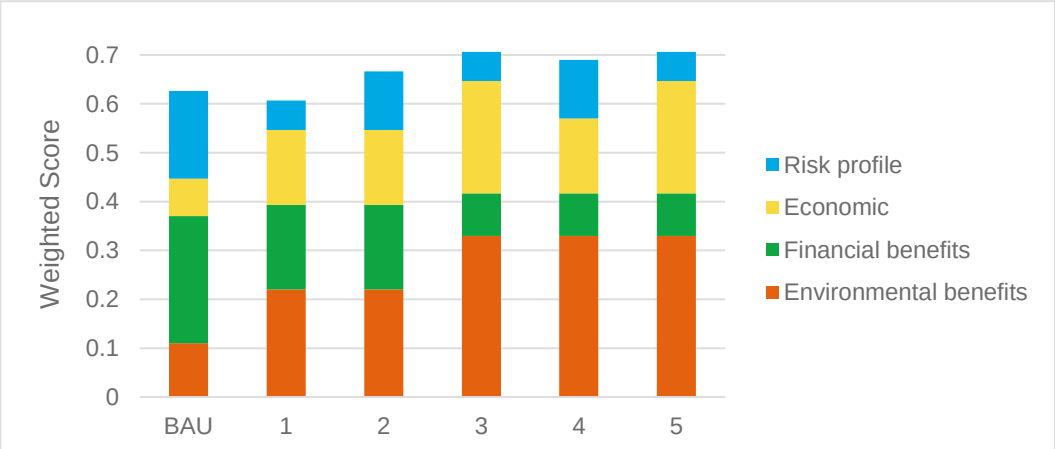
Potential processing technologies for mixed residual waste

Technology	Description	Suitability Rating
Mechanical Biological Treatment	Mechanical sorting of the residual waste followed by biological treatment of the organics to recover compost. Well established domestically, including Cairns, but NSW has recently stopped the mixed organics outputs going to land application and this risk is likely to prevent new MBT in Australia.	
Mechanical Heat Treatment / Autoclaving	Mechanical separation with thermal treatment in high pressure vessels to sanitise and stabilise the waste, for conversion into building and potentially energy products. Limited track record globally, one domestic facility.	
Combustion	Waste materials are burned in a carefully controlled furnace to produce electricity and heat. More than 2000 globally, including Europe, Japan and elsewhere, with the first Australian plant for mixed waste under construction in Perth and others in various stages of planning.	
Gasification	Partially burns (oxidises) waste in a low oxygen environment to produce a clean syngas product, either for immediate combustion to produce electricity/heat or a mix of energy and outputs including gaseous fuels (e.g. hydrogen), liquid fuels and chemicals. Over 200 facilities globally.	
Plasma Gasification	A variation of gasification that uses a plasma torch to generate ultra-high temperatures (up to 10,000˚C) to break waste down into simple compounds in a very clean syngas. Not yet proven commercially.	

Comparing organics and energy recovery

To compare the options for a step change in resource recovery, seven organics and two EfW scenarios were assessed against the council criteria. The high potential scenarios are:

1. Mandatory garden organics service (fortnightly) to open windrow composting
2. Opt-in FOGO service (fortnightly) to more intensive composting
3. Mandatory FOGO service (fortnightly) to more intensive composting
4. Full residual waste stream to EfW (combustion)
5. Residual waste, minus organics and recycling, to EfW, plus commercial waste.



Waste scenario performance under NQROC council priorities

A mandatory FOGO system and the two EfW options are best aligned with the four strategic priority objectives for waste services in the NQROC region.

Disposal and transfer

Tipping at Kirknie Road Landfill, Burdekin

The region as a whole has an estimated 10 years of current disposal capacity, although some smaller sites have long-run capacity for local needs and other sites have potential to expand.

An aggregated assessment of regional landfill capacity and needs indicates a growing reliance on the Stuart Landfill.

Under this eventuality, or the alternative energy recovery and in-vessel composting scenarios, the smaller councils will need to transport waste to a large regional facility, in all cases almost certainly located near Townsville. Some councils may opt to close their landfills to regular receival and transport waste to a central facility if the direct benefits are sufficient or to retain disposal capacity in case of natural disaster.

To support a regional facility, councils may consider whether to implement a cost subsidy arrangement to support smaller councils in transporting waste to the site.

Next steps: Assess the need, opportunities and timing of landfill capacity expansion in the region under business as usual and in light of this Strategy, and review waste transfer needs to support any region-wide solution(s).

Improve commercial and construction waste outcomes

While councils are not directly responsible for non-municipal waste, council landfills receive significant quantities of commercial and building waste. This may allow targeted recovery or help scale up MSW recovery actions. Key opportunities are listed below.

A mobile timber shredder could be shared by councils

- **Tyre reprocessing –** A tyre processing facility could service the entire North and Far North Queensland regions, including the mining industry, rather than disposal or haulage to South East Queensland for recycling**.**
- **Building waste processing** – Enhance recycling capacity to provide higher quality recycled products, such as crushed concrete or asphalt. This may be a fixed facility or mobile crushing plant that can support recycling and reuse in rural areas.
- **Timber processing –** Investigate whether mobile shredding plant is viable on a shared basis, including local markets such as animal bedding, mulch and fuel.
- **Paper & cardboard collection –** A separate paper and cardboard collection from commercial sources may be viable for mixed paper types to supply local markets such as kitty litter, animal bedding or in compost.

Next steps: Feasibility studies in line with state government NQ Waste Infrastructure Plan (to be finalised in 2020), including whether shared costs to purchase mobile plant would be offset by product revenue or lower material costs for council works projects.

Market development

Recyclers rely on the scale and certainty of end markets for recovered materials to underpin revenues. Joint regional procurement of recycled materials could provide the confidence for investment in recycling capacity and technologies able to produce materials to technical specifications.

- **Recycled content in civil works** – Regional procurement programs could increase use of recycled materials in council projects such as roads, footpaths and piping.
- **Promotion of compost benefits** – Councils can underpin initial demand for recycled organics through application on council lands and by supporting trials to prove the benefits in other markets.
- **Guidelines for sustainable procurement** – A guidance tool could help local councils with closed-loop procurement, providing information about more environmentally friendly products, including their technical specifications, and listing local suppliers. Council design standards and specifications need to be reviewed to allow the use of recycled content, drawing on existing State Government advice and collaborating with research institutes such as Central Queensland University and industry.
- **Strengthen supply chain partnerships** – Partnerships between businesses, industry bodies and other government agencies could promote product stewardship and circular economy initiatives

Next steps: Support council works teams to assess and promote specific opportunities to use organics and other recycled materials, including development of technical specifications for targets materials and identification of local products and providers.

Managing problem and hazardous waste

The region has variable systems and facilities for managing hazardous wastes, such as batteries and paint, and problem wastes such as mattresses and gas bottles. Options have been identified.

DrumMuster receival depot, Hinchinbrook

- **Collection centres and events** – A region-wide program could provide the scale to cost-effectively capture hazardous and chemical wastes. This could include regular free drop-off days at waste facilities and/or high traffic sites such as hardware stores. More ambitious is development of standardised collection centres and management contracts similar to the NSW Community Recycling Centre program.
- **Community awareness** – A standard suite of regional communications could also be developed to foster community understanding and behaviours around correct disposal of hazardous and problem wastes.
- **Mattress reprocessing** – Mattresses are bulky to collect and landfill, but full of materials that could be recovered through a local mattress recycling plant. Several social enterprise models operate in Australia to provide local training and employment for disadvantaged workers.
- **Emerging wastes –** Investigate solutions for emerging wastes such as solar panels, noting these may best be addressed through national or state product stewardship programs.

Next steps: Assess the potential of a consistent regional approach and messaging. Explore mattress recycling models, including collection options such as drop-off events / locations.

Reducing litter and illegal dumping

Illegal dumping and litter impact the environment and health and are expensive for councils to collect and dispose. Efforts at regional level would offer multiple benefits.

A community skip bin, Hinchinbrook

- **Improve access to services** – Options include expanding kerbside hard waste services, improving local drop-off infrastructure, promoting peer-to-peer exchange platforms and expanding networks for distributing reusable materials. For litter, do a regional audit of bin placement, design and collection frequency.
- **Improve building waste recovery** – Efforts in this Strategy to improve the availability of convenient, low-cost recycling for building materials would reduce the incentive for illegal dumping.
- **Regional compliance and communications programs** – A regional investigation and enforcement program or team could trace and deter large-scale incidents, particularly where moved between council regions. This could be supported with a region-wide education campaign promoting channels for public reporting of illegal dumping and littering and, more broadly, using consistent messages to improve recall.
- **Regional action on single use plastics (SUPs)** – As knowledge grows about the impact of SUP products and microplastics, so does pressure to address them, particularly in coastal settings. Action to address SUP consumption could complement the Queensland Plastic Pollution Reduction Plan and include Council policies such as restricting purchase of disposable plastic products and bans at public events, plus circular initiatives such as reusable cup and foodware schemes. Business opportunities include education programs (such as Plastic Free Places or Plastic Free Precincts) and partnerships with building managers to influence tenants.

Next steps: Councils to review current services and options at differing scales to encourage recycling and improved practices. Investigate the development of compliance and enforcement program, supported by consistent communications. Develop a SUP action plan.

Disaster planning

Disaster waste management planning is critical in tropical regions. Given the scale at which natural disasters can impact, a regional approach offers potential benefits.

- **Regional planning and response** – Consider opportunities to collaborate around planning, shared resources (including staff, trucks, bins, equipment, infrastructure etc.) and emergency response.
- **Review council Disaster Management Plans** – Consider reviewing the Disaster Management Plans of each individual council, with a focus on resource recovery opportunities, sharing resources and the merits of securing pre-approval for temporary sites for transfer and processing at each council's nominated locations.
- **Landfill capacity** – Investigate the need to retain long-term landfill capacity to cater for high volumes of residual waste generated in a natural disaster, or in an emergency situation such as unexpected closure of any organics or waste processing infrastructure developed in the region.

Next steps: Councils to consider a regional approach to disaster management, with consideration of improving resource recovery and finding efficiencies.

Waste avoidance and community education

Initiatives encouraging waste avoidance and product reuse lessen end-of-life volumes, while waste behaviours are key to many of the initiatives in the Strategy. Education has been integrated into specific action areas but can be supported by regional campaigns.

- **Recycling education programs and resources –** Build on existing regional programs such as RecycleRight through new shared resources and messages. Consider employing a regional waste education officer.
- **Funding for regional education resources** – New funding options for regional education programs include a local levy on waste to landfill (e.g. $1/tonne disposed) or proportional funding from each council based on population or municipal waste generation.
- **Regional food waste avoidance program** – Governments are increasingly adopting the 'Love Food Hate Waste' brand and building research about household food consumption and waste. These programs could be adapted to the NQROC context. Targeted resources and guidance for businesses and institutions could also support commercial food waste reduction.
- **Reuse centres and zero waste networks –** Investigate whether reuse centres can be optimised through co-location with council or other services, such as an eco-hub, repair businesses and charities.

- **Price signals for behaviour change** – Variable waste charges could be used to incentivise households to recycle and reduce waste to landfill. Options include:
  - Rate rebate for households that drop-off organics and/or other recyclables at waste facilities, or who home compost
  - A significant waste charge reduction for a smaller general waste bin or consistently using the recycling collection service correctly
  - Pay-as-you-throw (PAYT) charging for residual waste collections, either per lift or per kilogram, to encourage waste avoidance and sorting of organics.

Next steps: Investigate options for regional education and engagement programs on recycling, food waste and other priorities. Consult around reuse centre options and dynamics. Research other councils using price signals to incentivise preferred behaviours.

Improve waste data

Sharing data on waste volumes, composition and recovery will support stakeholder buy-in, investment and monitoring of the Strategy.

- Investigate streamlining of regional data capture and presentation, potentially via a digital platform such as the LGAQ Waste Detective dashboard.
- Increase reporting on council websites.
- Ensure data quality is suitable to inform regional waste decision-making, including periodic composition audits.
- Consider employing a data coordinator to increase consistency and assist regional data collection, verification and publishing.

Next steps: Investigate improvements to the waste data regimes within and across councils.

IMPLEMENTATION PLAN

Action		Years			Priorities
		1-3	4-6	7-10	
1	Investigate organics kerbside collections in the NQROC region, including viability, model and timing.				1, 2, 4
2	Investigate the optimal organics processing technologies aligned to the preferred organics collection option.				1, 2, 3
3	Develop a food waste avoidance strategy for the community and, potentially, businesses / institutions.				1, 4
4	Improve capture of emerging wastes as product stewardship or other recycling schemes arise.				1, 2, 3
5	Expand recycling at public events through council operations or via recycling clauses in approvals.				1, 2, 3
6	Investigate the potential for a regional tyre reprocessing facility and associated collection network.				1, 3
7	Consider joint procurement of mobile equipment for processing C&D waste and/or timber				1, 2, 3
8	Smaller councils to consider micro-scale glass crushing options at local facilities.				1, 3
9	Assess options for specific collection and reuse of clean paper and cardboard.				1, 2
10	Explore mattress recycling models, including collection options such as drop-off events / locations.				1, 3
11	Assess the potential for a regional reprocessing facility for target plastic(s), together with collection networks and end market support.				1, 2, 3
12	Analyse EfW suitability for the region, including industry and community engagement, tour of existing facilities and review of ownership options.				1, 2, 3, 4

13	Assess the need for additional long-term landfill capacity in the region and waste transfer needs to support any region-wide solutions.				2, 4
14	Evaluate regional options to improve capture of problem and hazardous wastes, including emerging wastes				1, 4
15	Review illegal dumping services and options to reduce dumping / litter, including a regional compliance and communications campaign.				1, 4
16	Revise council procurement processes and technical specifications to preference local suppliers of recycled materials, where suitable.				1, 3
17	Investigate the benefits of co-location reuse and repair centres with council or other services, such as an eco-hub and charities.				1, 3, 4
18	Develop a Single Use Plastics action plan to complement the Queensland Plastic Pollution Reduction Plan				1, 4
19	Investigate the use of variable pricing arrangements to incentivise improved kerbside recycling				1, 2, 4
20	Develop consistent regional education campaigns and material to improve community waste practices				1, 2, 3, 4
21	Develop a regional approach to disaster waste to coordinate responses, share equipment and improve resource recovery.				1, 2, 3
22	Investigate options to enhance the quality and transparency of council waste data, including the role of a regional waste data coordinator.				2, 4

Investigate	
Tendering and approval (if investigation is positive)	
Implement (if investigation is positive)	
Maintain	

WHAT DOES SUCCESS LOOK LIKE?

The Townsville skyline

The North Queensland Waste and Resource Recovery Strategy 2020-2030 sets a 10-year direction for the region in optimising resource use and recovery, evolving the waste facilities, managing the residual waste and continuing to facilitate a clean and healthy environment. This is captured in the Strategy's overarching vision:

Less waste in the North and more resources together

Over the life of the Strategy, we strive to deliver the following achievements:

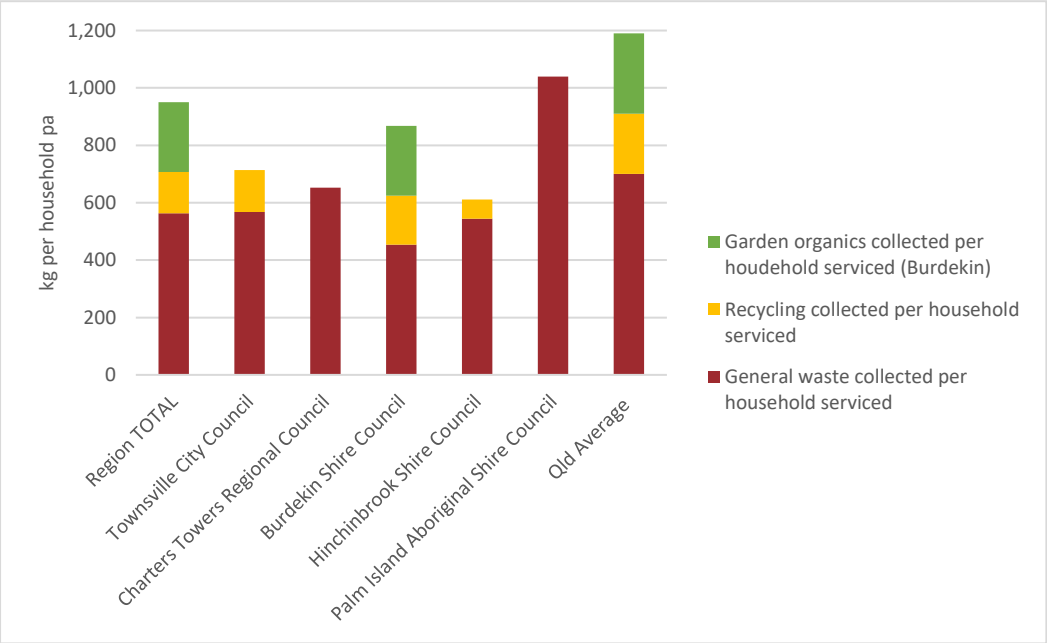
- Circular culture – Residents, businesses and councils recognise products and materials as valuable resources by making conscious choices about their consumption, use, recovery and end-of-life treatment
- Sustainable services – The waste management facilities and services are fit for purpose in terms of quality service offerings, recovery performance, reasonable cost, longevity and overall satisfaction
- Recycling revolution – Opportunities to reuse products and recycle materials are maximised, including development of facilities and end markets in the region that build local industry and support the resilience of Australian recycling
- Red bin recovery – We have secure solution to divert a significant portion of general waste from landfill to higher value use, in the process extending the useable life of existing landfills
- Liveable lifestyle – The region retains its status as a healthy, attractive and liveable region.
- Active leadership – Councils will continue to monitor, pursue and advocate for best practice in waste and resource management.

The Strategy aims to enhance regional collaboration in order to deliver solutions that could not be delivered by a single council. The five councils of the region have signed a joint agreement to collaborate on improving waste management, with delivery of actions under the Strategy managed through a Strategy Working Group of officers from each council.

A key action will be to investigate options to publish timely, useful and robust waste data and performance tracking to honour a commitment by the councils to improve transparency around waste and recycling performance in the region, including progress against the above broad objectives and the specific actions of the Strategy.

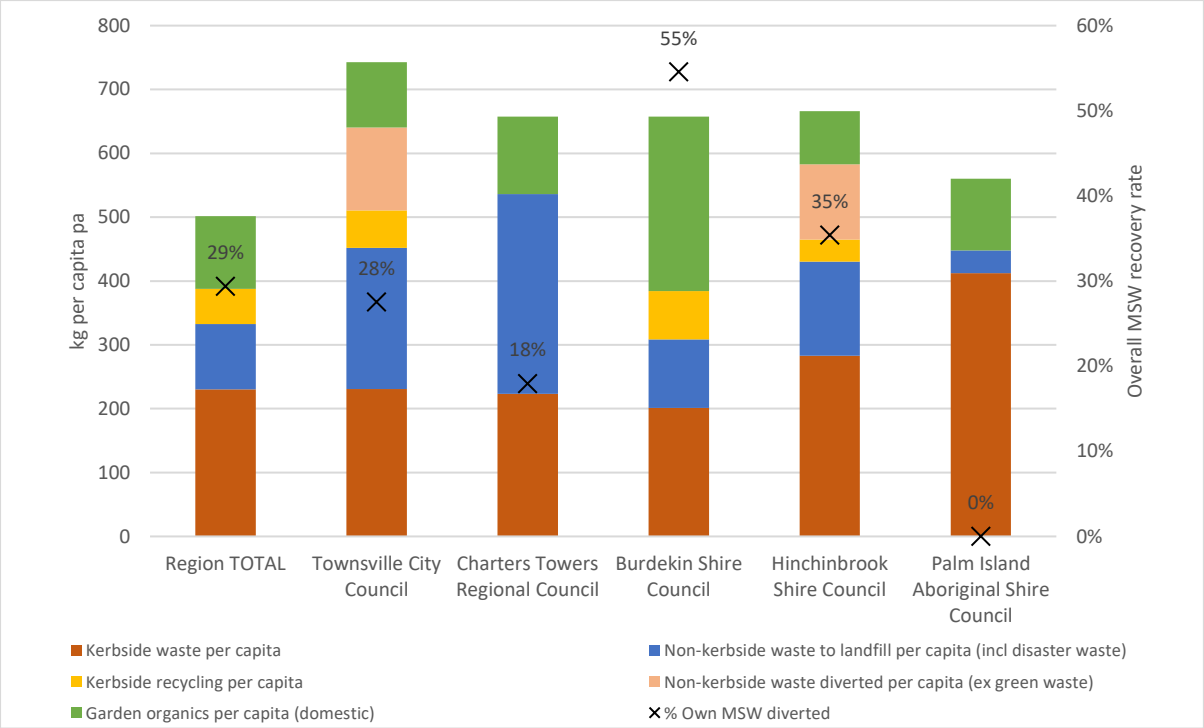
APPENDIX A WASTE DATA AND FACILITIES SUMMARY

Palm Island households are producing the most kerbside-collected general waste at over 1,000kg per household in 2018/19, although this can be attributed to more people per household in comparison to the other councils (five, versus two in other councils). Overall, Hinchinbrook had the lowest total kerbside MSW generation per household in the region. All councils were below Queensland's average waste generation per household.



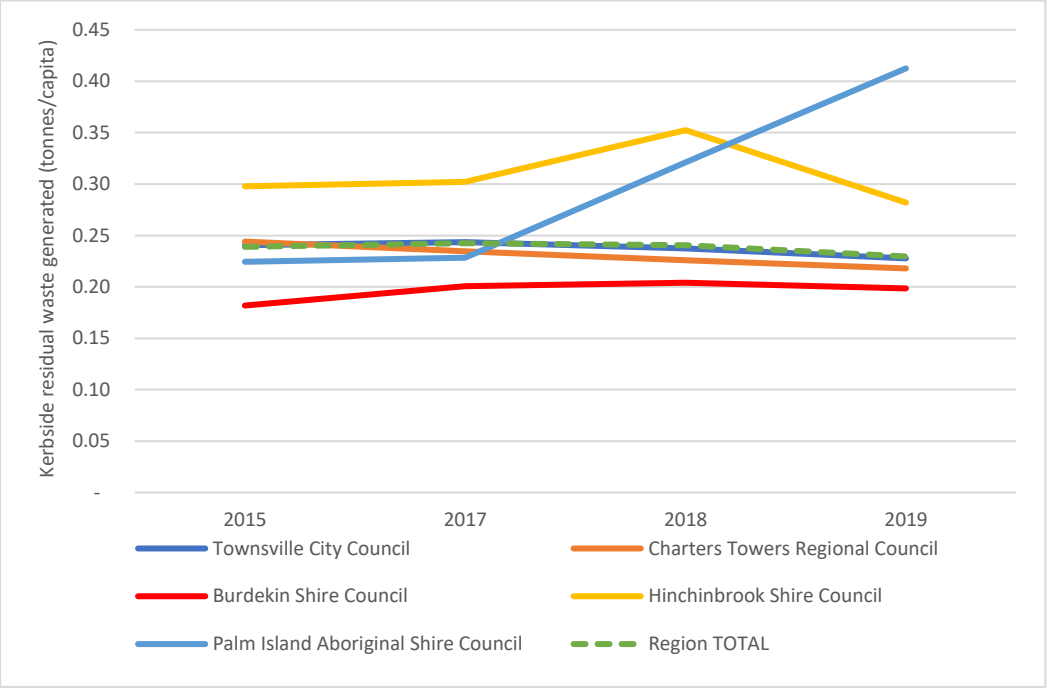
Summary of waste collected per household serviced (2018/19)

On a per capita basis, Palm Island has the lowest waste generation rate, with the other councils recording similar volumes. Charters Towers has a larger proportion of non-kerbside waste to landfill, likely due to its 1-bin system and heavier reliance on self-hauled waste. Burdekin has the highest green waste generation per capita, attributable to it being the only council with an organics kerbside collection service. The recovery rates varied between the councils, with only Burdekin having a much higher recovery rate than the rest of the region.



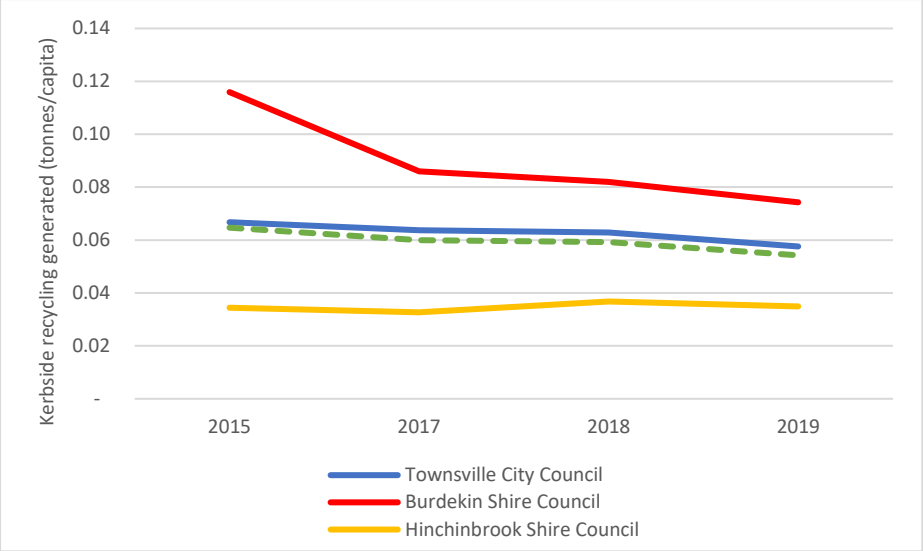
MSW generation rates per capita, by major streams, and the diversion rates (2018/19)

Average residual waste generation per capita in the region has remained reasonably steady over recent years, with a slight downward trend likely due to the regional economic downturn. There is variation between councils. Generation per capita in Palm Island has almost doubled in recent years, although it is not clear if this is due to data quality issues or reflects a fundamental change, while Hinchinbrook has fluctuated.



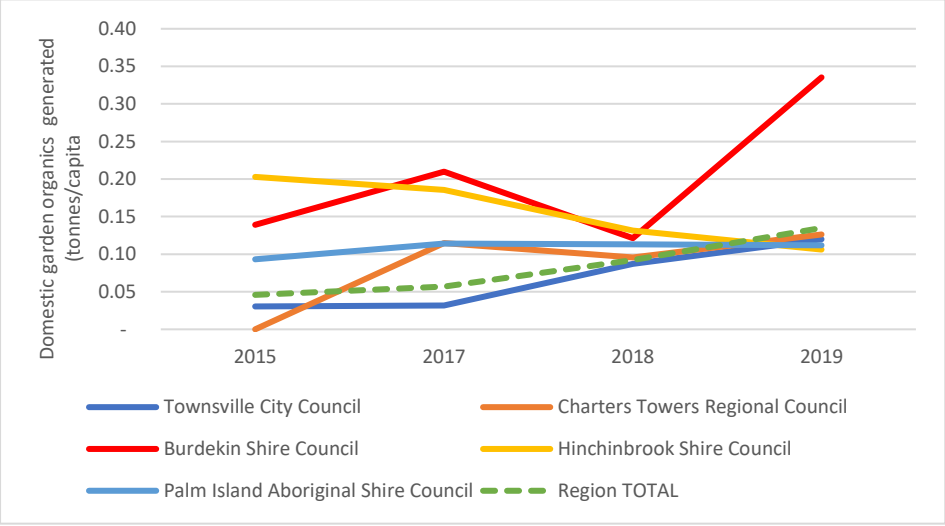
Total kerbside residual waste generated per capita

The chart below shows a decline in the volumes of kerbside recycling per capita among the three councils offering the service, in particular Burdekin. This is likely due to the local economic downturn and the impact of the Containers for Change container refund scheme.



Total kerbside recycling per capita

The below chart shows the trend in the capture of source separated garden organics which has increased dramatically in recent years, particularly in Burdekin and Townsville. There are several potential reasons, including prolonged dry seasons in the region over the previous period which may have reduced plant growth rates, followed by wet seasons and the recent switch to free garden organics drop-off at Townsville facilities.



Total domestic garden organics per capita

All Councils achieved the same or a higher recovery rate for MSW than the Queensland average, with the exception of Charters Towers and Palm Island, which do not offer kerbside recycling services. Without the inclusion of disaster waste, Townsville's recovery rate would increase from 28% to 35%. The recovery rate for C&I waste was much lower than the state average for all councils except Hinchinbrook, however the wide variation in the reported recovery rates suggests there may be some differences in the way councils categorise waste inputs to their facilities.

The recovery rate for C&D waste is much higher than the state average, due primarily to the volume of material recovered by private industry.

Overall recovery performance for MSW, C&I and C&D, including self-hauled and disaster waste (2018/19)

Council	Overall MSW recovery rate	Overall C&I recovery rate	Overall C&D recovery rate
Townsville City Council	28%	2%	55%
Charters Towers Regional Council	18%	14%	0%
Burdekin Shire Council	55%	29%	85%
Hinchinbrook Shire Council	35%	46%	6%
Palm Island Aboriginal Shire Council	0%	0%	0%
Recovery by Councils	**29%**	**6%**	**51%**
Overall Recovery	**29%**	**36%**	**76%**
Queensland Total	**28%**	**50%**	**58%**

MSW projections per council, based on population growth, show a significant increase in generation for Townsville by 2050, and minor increases for Charters Towers and Palm Island, with reductions for Burdekin and Hinchinbrook. Townsville is forecast to have the highest increase in MSW generation at over 60% by 2050, while Hinchinbrook will have the greatest decrease, falling by around 25%.

Forecast MSW residual waste generated per council, including self-hauled and disaster waste (assuming no change in recovery rate)

Total MSW generation	2019	2030	2040	2050
Townsville City Council	122,627	146,430	171,133	197,634
Charters Towers Regional Council	7,762	7,901	7,920	7,911
Burdekin Shire Council	11,601	11,670	11,607	11,527
Hinchinbrook Shire Council	7,149	6,517	5,888	5,289
Palm Island Aboriginal Shire Council	621	721	812	903
TOTAL	**149,760**	**173,239**	**197,360**	**223,264**

The NQROC region is home to nine active landfills, including two privately owned inert-only landfills with relatively small inputs of C&D. The region's inventory of disposal and recycling infrastructure is summarised below.

Regional Infrastructure Snapshot

Landfill infrastructure	Ownership	Number of facilities	Remaining approved void capacity (million tonnes)*
Putrescible	Council-owned	7	7.0
	Privately-owned	0	-
Inert	Council-owned	1	-
	Privately-owned	1	10.0
Recovery Infrastructure	**Sub-category**	**Number of facilities**	**Estimated annual capacity (tonnes)**
Organics processing	Composting / Mulching	3	50,000
Recycling sorting	MRFs	1	18,000
	Source separated recycling facilities	2	13,500
C&D recycling		1	320,000
Metals	Metals recycling	1	Insufficient data
	Battery / e-waste processing	2	Insufficient data

* Capacity estimate excludes 'very small' rural landfills

Assessment of potential changes to waste services to test their alignment with council priorities is based on carefully defined scenarios and assumptions. The table below sets out the scenarios and assumptions for the major service options, focused on: collection and processing of source separated organics; and alternative waste treatment options for residual waste.

Scenarios and assumptions for the major options to inform quantitative assessment

Options	Assumptions
Business as Usual - BAU	• Current kerbside collection systems are maintained by each council • No new resource recovery programs or initiatives and the current recovery rates are maintained • Disposal of residual MSW to existing local landfills until they reach end-of-life • Landfill levy is assumed to apply to MSW beyond 2021-22 (i.e. rebate removed)
Organics collection options	
Opt-in fortnightly kerbside garden organics bin (GO)	• GO bin collected fortnightly, residual bin weekly • Participation ramping up to 40% of BAU serviced households (single unit dwellings only (over five years)

	• No change for Burdekin • Capture of 95% GO for each participating household • Processing via third party open windrow composting (rural)
Mandatory fortnightly kerbside garden organics bin (GO)	• GO bin collected fortnightly, residual bin weekly • Offered to all BAU serviced households (single unit dwellings only) in TCC and 70% in other councils (towns only) • Capture of 95% GO for each participating household • Processing via third party open windrow composting (rural)
Opt-in fortnightly kerbside bin with Vegetable and Garden Organics (VOGO)	• Vegetable organics (VO) makes up 90% of food organics stream • VOGO bin collected fortnightly, residual bin weekly • Participation ramping up to 40% of BAU serviced households (single unit dwellings only (over five years) • Capture of 35% VO, 95% GO for each participating household • Processing via third party aerated floor compost (open)
Mandatory fortnightly kerbside bin with Vegetable and Garden Organics (VOGO)	• Vegetable organics (VO) makes up 90% of food organics stream • VOGO bin collected fortnightly, residual bin weekly • Offered to all BAU serviced households (single unit dwellings only) in TCC and 70% in other councils (towns only) • Capture of 35% VO, 95% GO for each participating household • Processing via third party aerated floor compost (open)
Opt-in fortnightly kerbside Food Organics and Garden Organics bin (FOGO)	• FOGO bin collected fortnightly, residual bin weekly • Participation ramping up to 40% of BAU serviced households (single unit dwellings only (over five years) • Capture of 35% FO, 95% GO for each participating household • Processing via third party aerated floor compost (open) in rural area or in-vessel composting in urban (TCC)
Mandatory weekly kerbside Food Organics and Garden Organics bin (FOGO)	• FOGO bin collected fortnightly, residual bin weekly • Offered to all BAU serviced households (single unit dwellings only) in TCC and 70% in other councils (towns only) • Capture of 50% FO, 95% GO for each participating household • Processing via third party aerated floor compost (open) in rural area or in-vessel composting in urban (TCC)
Separate mandatory weekly food organics (FO) and fortnightly garden organics (GO) services	• FO bin collected weekly • GO bin collected fortnightly • Residual bin fortnightly • Offered to all BAU serviced households (single unit dwellings only) in TCC and 70% in other councils (towns only) • Capture of 50% FO, 95% GO for each participating household • FO processing via tunnel composting • GO processing via open windrow composting
Residual Waste – Alternative Waste Treatment options	

A mixed waste processing energy from waste (EfW) facility	• BAU residual MSW tonnages direct to a 90,000 tpa EfW (combustion) plant
	• MSW residual under a high organics and recycling scenario, with C&I supplementing feedstock to 90,000 tpa EfW (combustion) plant

APPENDIX B ACTIONS FOR EACH COUNCIL

Burdekin Shire Council

Implementation Plan Reference	Action	Years		
		1-3	4-6	7-10
1	Determine optimum organic collection model including community acceptance and feasibility, i.e. food and garden organics.			
2	Determine options for removal and/or value adding to existing organic resource (mulch) stockpiles.			
3	Develop a food waste avoidance strategy for the community. (*Regional program*)			
5	Expand recycling at public events through council operations or via recycling clauses in approvals.			
6	Investigate the potential for a regional tyre reprocessing facility and associated collection network. (*Regional program*)			
7	Consider joint procurement of mobile equipment for processing C&D waste and/or timber and/or green. (*Regional program*)			
10	Explore mattress recycling models, including collection options such as drop-off events/locations. (*Regional program*)			
12	Be party to an Energy from Waste feasibility study for a facility located within the NQ region. (*Regional program, underway*).			
14	Define problem, hazardous and emerging wastes; evaluate regional and local options to improve their capture; and ensure effective treatment methods and sufficient data is available to manage these waste streams.			
15	Review illegal dumping services and options to reduce dumping/litter, including a regional compliance and communications campaign and development of an illegal dumping and litter strategy. (*Regional program*)			
16	Revise council procurement processes and technical specifications to preference local suppliers of recycled materials, where feasible and suitable. (*Regional program*)			
-	Support regional and local market development initiatives for recycled material where viable.			

Implementation Plan Reference	Action	Years		
		1-3	4-6	7-10
18	Investigate the benefits and feasibility of developing a Single Use Plastics action plan to complement the Queensland Plastic Pollution Reduction Plan. (*Regional program*)			
20	Develop consistent regional education campaigns and material to improve community waste practices in areas of waste avoidance, recycling uptake and contamination levels. (*Regional program*)			
-	Investigate and undertake actions to reduce waste generated from local government operations.			
-	Investigate opportunities for greater segregation/recovery of C&I and C&D waste at landfill and transfer station sites.			
-	Monitor, review and benchmark waste management costs to ensure an accurate and cost effective waste management service is being provided to residents and businesses.			
21	Develop a regional approach to disaster waste to coordinate responses, share equipment and improve resource recovery. (*Regional program*)			
22	Improve the recording, quality and transparency of council waste data to better inform decision making.			

Charters Towers Regional Council

Implementation Plan Reference	Action	Years		
		1-3	4-6	7-10
1	Investigate organics kerbside collections in the NQROC region, including viability, model and timing.			
2	Investigate the optimal organics processing technologies aligned to the preferred organics collection option.			
-	Investigate kerbside commingled recycling			
4	Improve capture of emerging wastes as product stewardship or other recycling schemes arise			
5	Investigate options to expand recycling at public events through council operations, including through consolidation of plastics at the landfill			
6	Investigate the potential for a regional tyre reprocessing facility and associated collection network.			
7	Consider joint procurement of mobile equipment for processing C&D waste and/or timber			
10	Explore mattress recycling models, including collection options such as drop-off events / locations.			
12	Be party to an Energy from Waste feasibility study for a facility located within the NQ region (*Regional program, underway*).			
13	Assess the need for additional long-term landfill capacity in the region and waste transfer needs to support any region-wide solutions.			
14	Evaluate regional options to improve capture of problem and hazardous wastes, including paint, gas bottles and			
15	Review illegal dumping services and options to reduce dumping / litter, including a regional compliance and communications campaign. *Regional program*)			
16	Revise council procurement processes and technical specifications to preference local suppliers of recycled materials, where suitable.			

18	Develop a Single Use Plastics action plan to complement the Queensland Plastic Pollution Reduction Plan	
20	Develop consistent regional education campaigns and material to improve community waste practices (*Regional program)*	
22	Investigate options to enhance the quality and transparency of council waste data, including the role of a regional waste data coordinator.	

Hinchinbrook Shire Council

Implementation Plan Reference	Action	Years		
		1-3 years	4-6 years	7-10 years
Reduce waste to landfill				
1	Participate in NQROC Organics Management Roadmap.			
12	Participate in NQROC Energy from Waste business case.			
3	Participate in NQROC Food Avoidance Strategy			
-	Increase understanding of local waste behaviour through bin characteristics audit.			
-	Increase public recycling opportunities via the provision of suitable infrastructure and services.			
20	Develop and deliver a community engagement / education program aimed at waste avoidance and resource recovery.			
-	Implement internal corporate sustainability processes.			
Optimise resource recovery				
4, 9, 10, 11, 17	Explore reuse / recycling options for all waste streams.			
6,	Identify local opportunities and partnerships for resource recovery.			
-	Develop and deliver a local Business Recycling Program.			
Practice sustainable land management practices				
-	Manage open and active landfills in accordance with relevant legislations and best practice.			
15	Target and reduce littering and illegal dumping activities.			
13	Assess local long-term landfill capacity and waste transfer needs.			
-	Strategic planning for alternative waste and resource recovery strategies.			

Investigate	
Implement (if investigation is positive)	
Maintain	

Townsville City Council

Action	Implementation Timeframe											Strategic Alignment
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Organics												
Develop an Organics Roadmap targeting MSW feedstock												1,2,3,4
Procure and commence organics collection and processing services												1,4
Procure / establish a large scale organics processing facility												1,2,3
Support the establishment of a regional bio hub												1,3
Residual Waste Management – MSW												
Develop an Energy from Waste Business Case for MSW												1,2
Develop the EfW Procurement Plan for an appropriate technology												1,2
Develop Financial Plan to fund technology and undertake approvals process												1,2
Undertake market sounding and release Expression of Interest												1,2
Release Request for Tender and undertake contract negotiations												2
Implementation Plan												1,2
Design and construct EfW plant												1,2

Action	Implementation Timeframe											Strategic Alignment
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Operate and maintain EfW plant												1,2
Residual Waste Management – C&I / C&D												
Undertake an audit on the incoming C&I and C&D waste streams												1
Develop C&I and C&D diversion and processing capacity												1,3
Improve capture of emerging wastes as product stewardship or other recycling schemes arise												1,3
Long Term Community Engagement												
Develop long term internal TCC diversion and recycling campaign												1,4
Deliver long term TCC diversion and recycling campaign												1,4
Develop and implement a long term community engagement plan												1,4
Deliver waste minimisation campaign												1,4
Deliver public facing recycling education campaign												1,4
Deliver organics avoidance and recycling campaign												1,4
Deliver illegal dumping partnership and engagement campaign												1,4
Participate in industry groups to advocate and lobby government												3

Action	Implementation Timeframe											Strategic Alignment
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Identify and implement waste avoidance and resource recovery initiatives through Council's activities (e.g. events management, development applications)												1,4
Market Development and Procurement												
Review and amend TCC Procurement Policy to support increased recycled content												1,3
Amend TCC Design Standards to facilitate incorporation of processed material into TCC infrastructure												1,3
Continue to develop sustainable markets for processed organic material												1,3
Develop and support markets for diverted / processed C&D and C&I product (e.g. glass, concrete, tyres, mattresses)												1,3
Investigate and support new opportunities for identified recovered resources (e.g. gypsum, timber)												1,3
Infrastructure to Support the Circular Economy												
Identify key infrastructure requirements through the development of an Infrastructure Strategy												1,2

Action	Implementation Timeframe											Strategic Alignment
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Conduct a siting study to identify suitable land parcel/s to locate required infrastructure (e.g. regional landfill, AWT, organics/biohub, bulk haul WTS, C&D/C&I processing, MRF).												1,2
Recognise and reflect critical infrastructure requirements in local planning instruments												1,2
Support the development of required infrastructure through the introduction of a funding strategy												2
Implement Infrastructure Strategy												1,2,3
Data Strategy												
Identify key waste metrics / targets												1
Conduct baseline assessment against metrics												1
Undertake gap analysis												1
Develop and implement strategy												1
Monitor and review performance against key metrics and report to internal stakeholders												1,3,4