

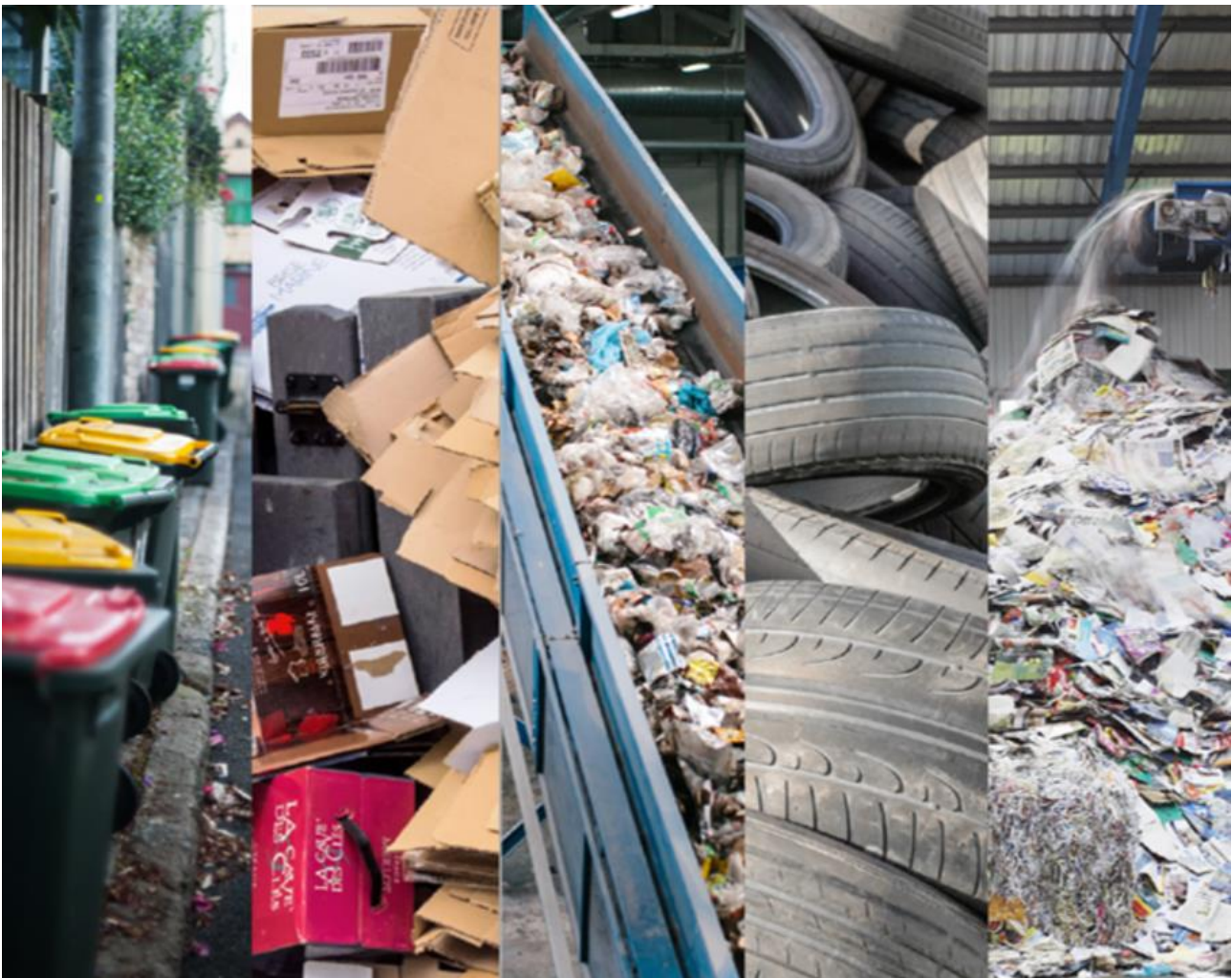
Far North Queensland Regional Organisation of Councils

## FNQROC Regional Resource Recovery Plan

Technical Document

Reference: R02

V4 | 31 March 2023



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Arup Australia Pty Ltd | ABN 76 625 912 665

**Arup Australia Pty Ltd**  
108 Wickham Street  
Fortitude Valley  
Brisbane  
QLD 4006  
Australia  
[arup.com](http://arup.com)

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# Glossary

<b><u>Term</u></b>	<b><u>Definition</u></b>
ABS	Australian Bureau of Statistics
AD	Anaerobic Digestion
APCO	Australian Packaging Covenant Organisation
ARRF	Advanced Resource Recovery Facility (also known as the 'Bedminster')
B2B	Business-to-Business
BAU	business as usual
Capex	Capital Expenditure
CBA	Cost-Benefit Analysis
CCRC	Cassowary Coast Regional Council
CoEx	Container Exchange
COMSEC	Council of Mayors South East Queensland
CPI	Consumer Price Index
CRC	Cairns Regional Council
CRS	Container Refund Scheme
CrSC	Croydon Shire Council
CSC	Cook Shire Council
C&D	Construction and Demolition
C&I	Commercial and Industrial
DES	Department of Environment and Science
DSC	Douglas Shire Council
EfW	Energy from Waste
EOW	End of Waste
EPR	Extended Producer Responsibility
ESC	Etheridge Shire Council
EU	European Union
EV	Electric Vehicle
FNQ	Far North Queensland
FNQROC	Far North Queensland Regional Organisation of Councils
FOGO	Food Organics and Garden Organics
FTE	Full Time Equivalent
GO	Garden Organics

<b><u>Term</u></b>	<b><u>Definition</u></b>
GHG	Greenhouse Gas
GRP	Gross Regional Product
GSP	Gross State Product
HVASC	Hope Vale Aboriginal Shire Council
ICCIP	Indigenous Councils Critical Infrastructure Program
ILM	Investment Logic Mapping
I&O	Issues and Options Paper
IVC	In-Vessel Composting
KPI	Key Performance Indicator
LGA	Local Government Area
LGAQ	Local Government Association of Queensland
LGLRGP	Local Government Levy Ready Grant Program
MCA	Multi-Criteria Analysis
MRF	Material Recovery Facility
MSC	Mareeba Shire Council
MSW	Municipal Solid Waste
MWOO	Mixed waste organic outputs
NEMP	National Environmental Management Plan
NQROC	North Queensland Regional Organisation of Councils
NTCRS	National Television and Computer Return Scheme
NWP	National Waste Policy
NWQROC	North West Queensland Regional Organisation of Councils
Opex	Operational Expenditure
PET	Polyethylene Terephthalate
PFAS	Per and poly-fluoroalkyl substances
PMO	Portfolio Management Office
PPPs	public/private partnership
PV	Present Value
Pv	Photovoltaic
QLD	Queensland
QTC	Queensland Treasury Corporation
RDF	Refuse Derived Fuel
RFI	Request for Information
RRR	Regional Resource Recovery (i.e., RRR Plan)

<b><u>Term</u></b>	<b><u>Definition</u></b>
RWMP	Regional Waste Management Plan
TCICA	Torres Cape Indigenous Council Alliance
TMR	Transport and Main Roads
TNQ	Tropical North Queensland
TRC	Tablelands Regional Council
SEQ	South East Queensland
SRF	Solid Recovered Fuel
Strategy	Queensland Waste Management and Resource Recovery Strategy (the Strategy)
WMF	Waste Management Facility
WMMR	Waste Management and Material Recovery
WMRR	Waste Management and Resource Recovery Association Australia
WWASC	Wujal Wujal Aboriginal Shire Council
YASC	Yarrabah Aboriginal Shire Council



# Executive Summary

## Introduction

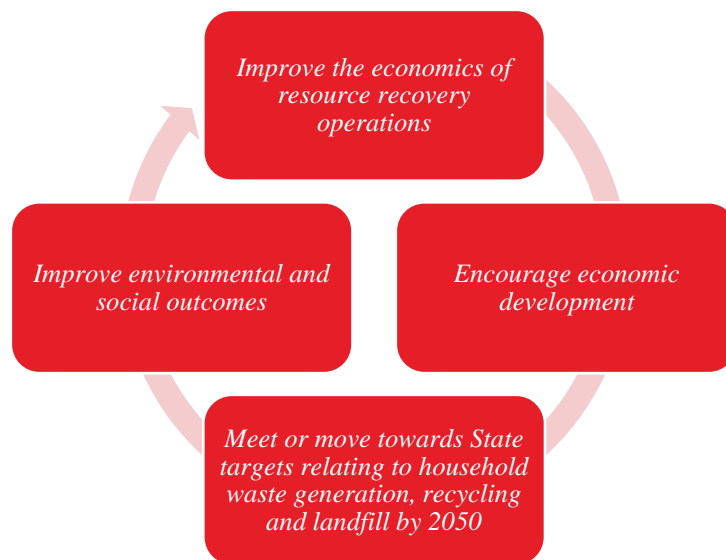
Resource recovery in Far North Queensland (FNQ) is at a crossroads. FNQ has the opportunity to move toward the Queensland (QLD) Government’s resource recovery targets and capitalise on the significant opportunities to enhance the regional economy, community, national parks and broader environment. The FNQ region is home to pristine natural landscapes, including the Great Barrier Reef and the Daintree Rainforest - both recognised world heritage sites. These internationally significant areas are vital to the FNQ community and national economy. It is therefore important that resource recovery initiatives enhance and support the local environment and industries. However, viability of these outcomes is impacted by a range of factors including vast transport distances, vulnerable transport routes, low economies of scale, lack of local secondary markets, tourism impacts and aging infrastructure. Without planning and support the region may not be able to realise these opportunities.

In response, the Far North Queensland Regional Organisation of Councils (FNQROC) has developed a Regional Resource Recovery Plan (RRR Plan) that presents a series of actions to collaboratively deliver resource recovery outcomes and provide positive impact across its 11 council areas. Together, these councils represented by FNQROC, have committed to *sharing and cooperating to minimise waste and maximise resilient and effective resource recovery systems for FNQ.*

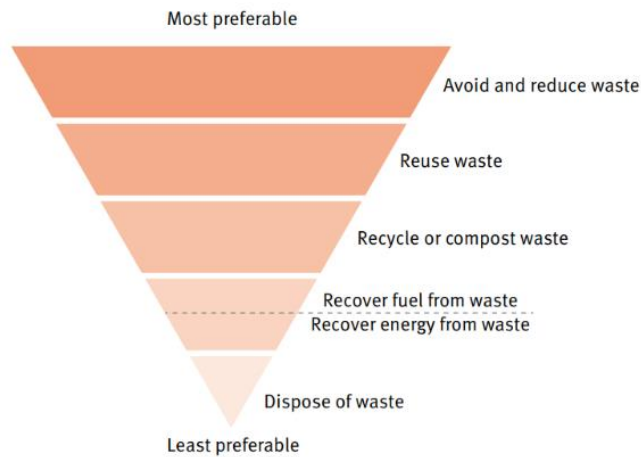
The FNQ region covered by the RRR Plan spans approximately 250,000km<sup>2</sup> with each of the 11 councils comprising diverse communities, natural environments, geographical areas, and primary industries, with varying drivers and capacities when it comes to waste and resource management. It is therefore critical that resource recovery initiatives in this RRR Plan represent the needs of these diverse councils and for the region as a whole.

The RRR Plan sets out for the region a series of coordinated actions required to improve regional resource recovery through investment in infrastructure and non-infrastructure solutions in FNQ.

This RRR Plan aims to:



In 2019, the Queensland Government released the Queensland Waste Management and Resource Recovery Strategy, which focused on a transition to a zero-waste society by harnessing the value of resources, supported by the waste hierarchy and circular economy principles. The strategy is underpinned by the waste and resource management hierarchy shown in Figure 1 below.



**Figure 1 Queensland's Waste and Resource Management Hierarchy**

To support the state’s vision of transiting to a zero-waste society, stretch targets are outlined in the strategy for municipal solid waste (MSW), commercial and industrial (C&I) and construction and demolition (C&D) waste streams. For councils within FNQROC to meet these targets regional MSW diverted from landfill will need to increase from the current 52% to 70% in 2030 and 95% in 2050.

Queensland has seen recent resource recovery policy reforms, including bans on single use plastics, uptake of product stewardship schemes, such as the Container Refund Scheme (CRS), and implementation of both an Organics Strategy and Energy from Waste (EfW) Policy, however, more support and certainty from State government is needed to realise the full benefits of these reforms. This RRR Plan has been developed in conjunction with the supporting documentation outlined below.

**Supporting Documents:**



**Federal Targets**

At a national level, the Australian Government has integrated key principles to enable a transition to a circular economy. From the National Waste Policy and Action Plan, federal targets include a 10% waste reduction per person by 2030, improving resource recovery to 80% by 2030, enabling reuse of recycled material, and building secondary markets. Improvements to material flows to benefit human health, the environment and economy, and improved information to support innovation, guide investment and enable informed consumer decisions are also highlighted as areas of importance. Bans on waste exports commenced in 2020, along with national targets to phase out problematic and unnecessary plastic by 2025 and halve organic waste to landfill by 2030.

**Funding**

The State government announced a \$2.1 billion waste investment package in December 2021, with \$1.1 billion allocated to a Recycling and Jobs Fund to be delivered over the next 10 years. This \$1.1 billion fund is to support increasing household recycling, building new resource recovery infrastructure and supporting

more jobs. MSW annual payments for councils are included in the additional \$1 billion package to offset the cost of the waste disposal levy.

The councils of FNQ need continued **funding and regulatory support** from the State and Federal government to improve resource recovery in the region and move toward key targets.

This RRR Plan represents the first stage of collaborative waste and resource recovery planning for the region in working towards these targets, whilst achieving the wider benefits of resource recovery. Following from this RRR Plan, further feasibility studies and business cases need to be developed for priority projects to ensure effective investment decisions. This would include more detailed cost assessments which would inform a staged investment process for these vastly important initiatives for the region.

## The Problem

The resource recovery sector in FNQ is facing a range of challenges, driven by changing policy, large transport distances, community behaviours and capacity to pay, and lack of infrastructure or aging assets. A low understanding about the urgency to reduce and effectively manage waste as a valued resource result in:

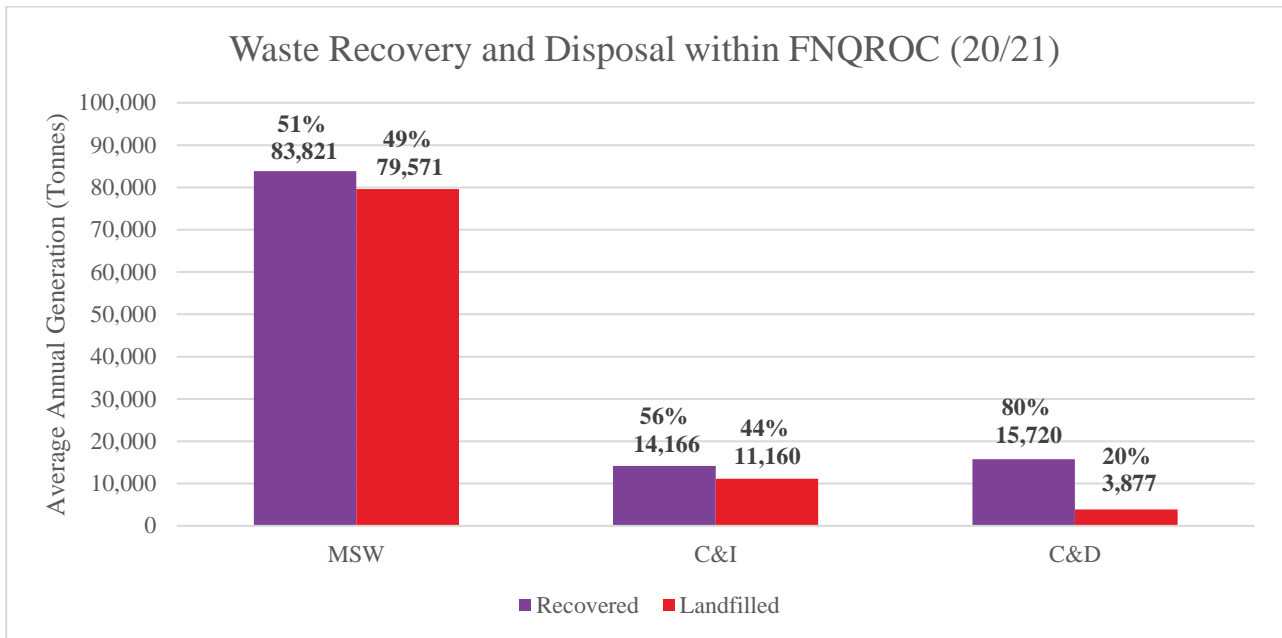
- decreased participation in recycling,
- low resource recovery rates, and
- increased volume of waste to landfill.

Further, global influence and disruption, fast changing or uncertainty in regulation, and regional complexity impacts the life of resource recovery assets and rate of return on investments. This results in adverse impacts to the environment, increases operating costs to council, and increases carbon emissions and lost opportunities for enhancement of resource recovery, the economy, environment, and community.

Policy changes creates a significant driver for councils to establish resilience in their resource recovery networks. For example, the reduction of local government annual repayments for the waste disposal levy which are set to be reduced annually from 105% to 20% in 2030 for Cairns Regional Council and from 105% to 100% for other councils in the Regional Levy Zone, commencing 2023/24 FY. The impact of the landfill levy and reduced annual payments for councils present a significant financial impact and incentive to increase diversion of waste from landfill. A review on levy policy is scheduled for 2025, which may see ongoing changes to the levy rates and annual payments for councils within the region.

## The Current State

The FNQ region is home to a population of approximately 280,000 residents, who generate approximately 205,000 tonnes of waste annually, handled through council's facilities. It is estimated an additional 115,000 tonnes of C&I and C&D waste is generated annually within the Cairns region and handled by private facilities. This increases the total annual regional waste generation from 205,000 tonnes to 320,000 tonnes. The current recovery and disposal of materials handled by council facilities is outlined below in Figure 2.



**Figure 2 Waste Recovery and Disposal within FNQROC**

### Future Waste Generation

It is expected that population in the FNQ region will reach approximately 390,000 by 2050, with the growing population directly linked to growth in MSW generation. Between 2021 and 2050 waste generation is expected to increase by 28% for MSW, 43% for C&I and 45% for C&D respectively under a business-as-usual scenario (if no progress is made toward targets). This accounts for approximately 100,000 tonnes of additional material annually that could be generated in the region by 2050 and will need to be handled by council facilities. If there are not adequate resource recovery systems and processes in place, and an engaged community ready to support these systems, increasing volumes of waste will put further strain on council infrastructure and contribute to landfill disposal. To avoid the environmental, financial, and social impacts of increased waste generation, urgent action and change to current waste behaviour and recycling practices is needed.

### Waste Infrastructure

The key waste streams are handled by a range of council assets in FNQ, distributed throughout the region, including landfills, transfer stations and resource recovery facilities.

Much of the existing waste infrastructure is designed to facilitate residual waste disposal rather than maximise resource recovery and as such is not well positioned to respond to a circular economy approach to resource management. Key parts of the network in each council will require upgrade or replacement to fulfil future resource recovery needs, supported by roll out of non-infrastructure initiatives.

Although some councils still operate a local landfill facility, many councils have recently closed council-owned landfills and rely primarily on the privately operated Springmount Waste Management Facility in Mareeba for the disposal of residual waste. The reliance on a private facility, with no regional competition to manage gate fee rises, compounded with the predicted increase of the landfill levy, poses a risk for many councils in the region. While landfill capacity in the region is understood to not be an imminent risk, the need for resilience and for other avenues for residual waste management is a key focus point for the region. Without effective resource recovery, councils will face increased volumes of MSW to landfill, making councils very susceptible to rising cost impacts for residual waste disposal.

The Advanced Resource Recovery Facility (ARRF, also referred to as the ‘Bedminster’ facility) located in Cairns is due to close in 2026. The Bedminster facility currently receives MSW general waste from Douglas Shire Council, Mareeba Shire Council and Cairns Regional Council. This facility currently provides good resource recovery rates and if a replacement facility is not operational by 2026, residual waste from those councils who use the Bedminster facility will end up in landfill, posing a significant impact on resource recovery rates for the region.

Cairns Regional Council have recently upgraded their Materials Recovery Facility (MRF) which is currently utilised by a number of councils in the region. This facility operates at approximately 50% capacity and has the potential to accept increased volumes of material.

Of the 11 councils, only Cairns Regional Council, Douglas Shire Council and Tablelands Regional Council provide a recycling bin for kerbside collection. No councils currently offer a green waste collection bin.

## Opportunities and Challenges

Transforming resource recovery systems and assets across FNQ presents many opportunities for enhancing the region. To realise this transformation a range of challenges presented across political, infrastructure, economic, social, and environmental aspects will need to be considered, as set out below:

**Table 1 Opportunities and Challenges across FNQ**

Opportunities	Challenges
<ul style="list-style-type: none"> <li>• Attracting new secondary industries.</li> <li>• Increased investment in the region.</li> <li>• Creating local jobs.</li> <li>• Increased reputation of FNQ.</li> <li>• Increased rate of return on investments.</li> <li>• Protecting reef and rainforest.</li> <li>• Enhancing environmental values.</li> <li>• Increased system productivity and efficiency, resulting in reduced cost to councils.</li> <li>• Incorporate First Nations participation and knowledge on caring for country into resource recovery activities.</li> <li>• Enhanced tourism and destination reputation.</li> <li>• Create an engaged and empowered community.</li> <li>• Support communities and environmental health through resource recovery and education programs.</li> <li>• Increased land, water and air quality.</li> <li>• Decreased risks to environment through disposal of contaminated material and/or infrastructure failure.</li> <li>• Decreased greenhouse gas emissions from waste operations and disposal.</li> <li>• Decreased reliance on landfills.</li> <li>• Increased resource recovery rates.</li> <li>• Reduced carbon emissions (for example through more efficient operations and reduced transport).</li> </ul>	<ul style="list-style-type: none"> <li>• High variability in population density from 100.3 persons per km<sup>2</sup> in Cairns Regional Council and 0.02 persons per km<sup>2</sup> in Etheridge Shire Council.</li> <li>• Low waste generation and economies of scale for waste transportation.</li> <li>• Long transport distances within LGA and to markets and processing infrastructure.</li> <li>• Suitable transport routes (e.g., in particular the Kuranda range) and vulnerable routes that can be impacted by the wet season.</li> <li>• Lack of local secondary markets, with most product needing to be transported to SEQ.</li> <li>• Low community engagement with respect to waste management.</li> <li>• Lack of ability or willingness from community to pay for waste services.</li> <li>• Inconsistent data capture and reporting, limited capacity and issues with data accuracy.</li> <li>• Aging assets nearing end of life and designed for waste disposal rather than resource recovery purposes.</li> <li>• Increasing waste disposal levy, and reduction in annual payments for local government.</li> <li>• Increasing landfill gate fees.</li> <li>• Regulatory changes and uncertainty, including emerging contaminants, landfill bans and infrastructure approval processes.</li> <li>• Potential cost impact to ratepayers if burden of resource recovery initiatives is passed on to residents.</li> <li>• Tourism generated waste in national parks left for councils to manage at their own cost.</li> </ul>

## Our Response

The RRR Plan has been developed through extensive engagement with all 11 councils, including data collation, face to face stakeholder interviews and site visits. Any information gaps have been informed by local government survey data provided by the Department of Environment and Science (DES) and other publicly available reports.

Stakeholder engagement discussions highlighted the unique challenges currently faced by FNQ hindering current resource recovery practices and emphasised the importance of State and Federal funding and regulatory support in tackling these issues, enhancing current systems and moving toward key targets.

The RRR Plan has been guided by the FNQROC Working Group, comprising representation from the FNQROC Waste Management and Materials Recovery (WMMR) Framework Advisory Group, Queensland Treasury Corporation (QTC), Local Government Association of Queensland (LGAQ) and the Department of Environment and Science, and endorsed by the FNQROC board.

A summary of the process undertaken to develop the RRR Plan and key outputs is outlined below:

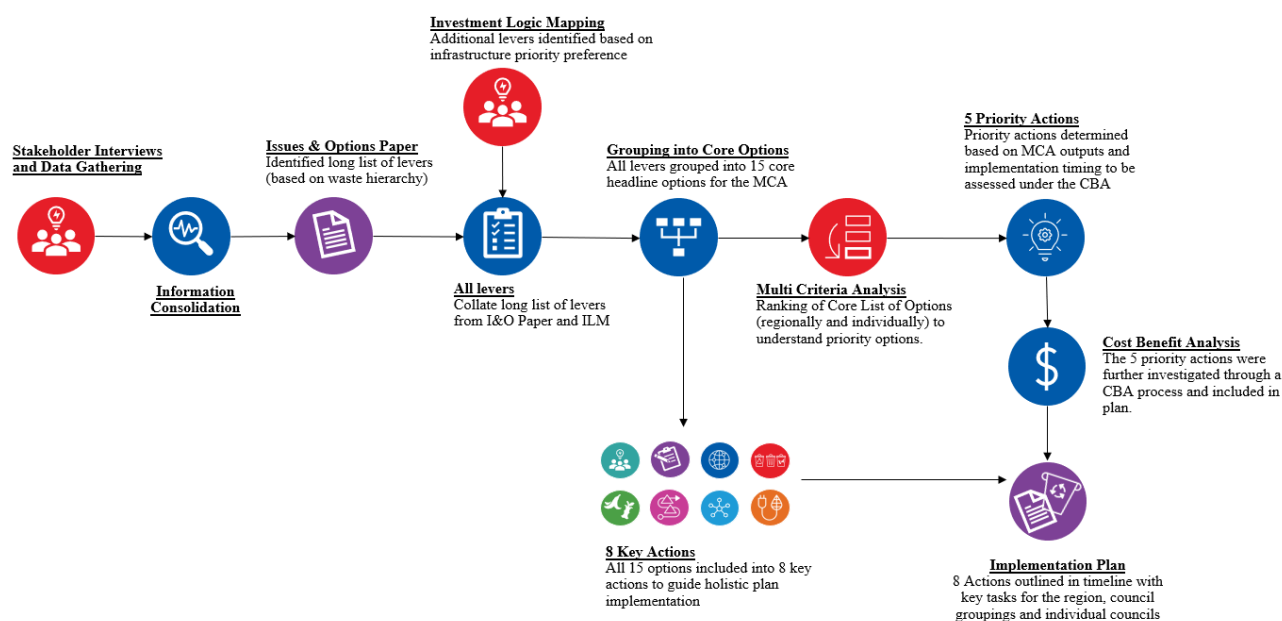


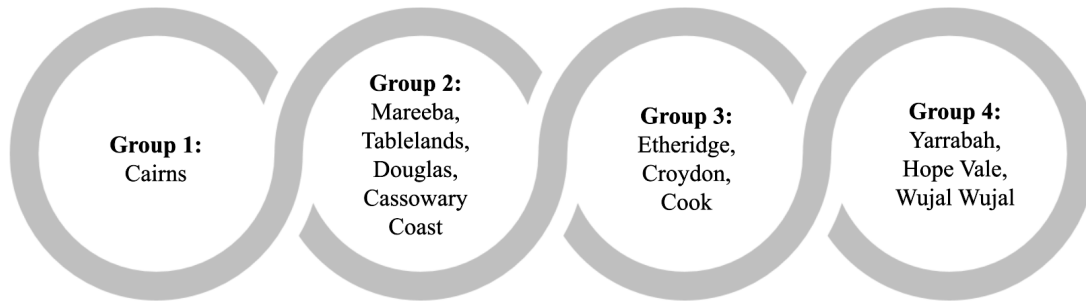
Figure 3 RRR Plan development process and outputs

### Sub-regional grouping

The RRR Plan recognises that it is essential to provide implementation strategies that are *fit for purpose* and *fit for place*. The guiding principle of the RRR Plan is to holistically assess key benefits for both the region and each individual council, without imposing constraints on individual councils who may not have the capacity to meet the proposed outcomes.

To support this principle a sub-regional grouping approach has been undertaken for implementation of actions under the RRR Plan. Groupings are proposed to highlight councils on a similar trajectory with respect to roll out of actions, however, does not limit collaboration between groups, regionally or collaboration with external councils. The sub-regional groups are formed based on the following key criteria:

- Landfill levy liability zoning,
- Size of local government area (LGA),
- Waste volumes/population, and
- Influence by other policies and plans (for example Respecting Country, A sustainable waste strategy for First Nation Communities)



By including First Nations participation and perspectives on caring for country into resource recovery practises, there are opportunities for protecting the environment and strengthening First Nations Peoples connection to country.

## Actions Overview

The RRR Plan sets out eight key actions to address the ranging priorities, issues and opportunities identified across the 11 councils within FNQ. The implementation initiatives and timing for each action are impacted by drivers and influences within and outside the region, including:

- National and State policy, bans, strategy outcomes and targets,
- Local issues or risks, including geographical challenges, gaps in market, capacity, or skills, and
- Local changes to infrastructure, resourcing, and capability.

The eight key actions are:



Action 1: Step-change in customer engagement.



Action 2: Optimise regional servicing arrangements.



Action 3: New transfer station facilities and closure of facilities with regulatory or environmental issues.



Action 4: Enhance kerbside collection approach.



Action 5: Maximise diversion of organic waste from landfill.



Action 6: Optimise regional network of resource recovery facilities.



Action 7: Develop centralised resource recovery precinct.



Action 8: Develop alternatives to landfill for residual waste.

## Impacts and Benefits

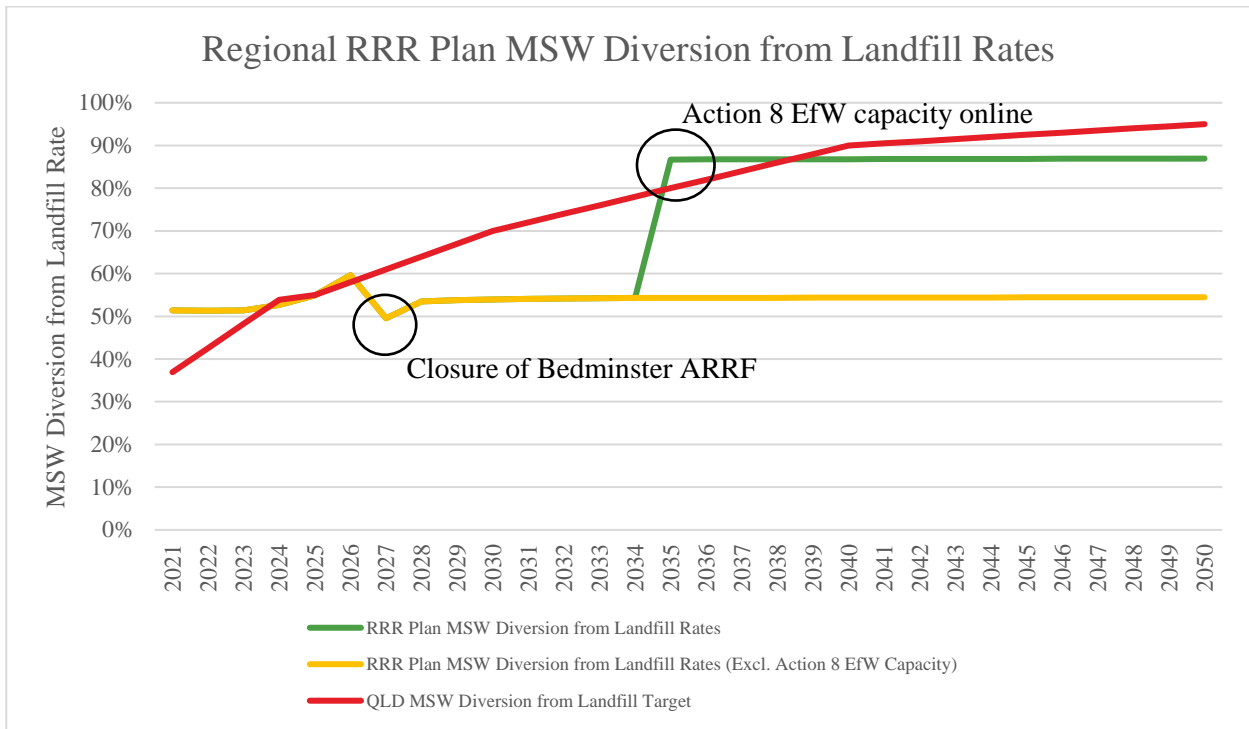
These eight key actions work together to provide improved regional resource recovery, economic viability, and development outcomes for FNQ. The potential environmental, social, and economic benefits associated with roll out of the eight RRR Plan actions include:

Table 2 Benefits for FNQ region at 2030 and 2050 milestones

	Total Cost (Present Value - PV)	Total Benefits (PV)	Direct Jobs*	MSW Landfill Diversion Rate	Avoided Carbon
Milestone	\$				
<b>2030</b>	\$143.6 million	Up to \$32.2 million	46.5 direct jobs created	54%	279,486 tCO <sub>2</sub> e
<b>2050</b>	\$246.6 million	Up to \$126.5 million	46.5 direct jobs created	87%	1.8+ million tCO <sub>2</sub> e

\*direct jobs does not include jobs created through construction or associated works.

The impact to regional landfill diversion rates against the state targets is provided on the following graph:



**Figure 4 Regional RRR Plan MSW Diversion from Landfill Rates**

The roll out of the eight RRR Plan actions equates to achieving a 54% recycling rate and an 87% regional landfill diversion rate (nearly 150,000 tonnes) for MSW by 2050, assuming energy from waste infrastructure capacity becomes available by 2035. These results highlight a shortfall from the 2050 MSW recycling target by 16% and waste diversion target by 8%. The above results are based on practical and available actions suitable for roll out in the region based on the current infrastructure and regulatory climate. However, these results highlight that further regulatory and funding support is required at a State and National level to support councils in making further progress against the 2050 State targets. These results also highlight the importance of residual waste management solutions for the region, accounting for over 40% of the MSW stream.

**Future Infrastructure Requirements**

The eight RRR Plan actions include expansion of the following services to the 11 councils across the region by 2050 are provided in Table 3:

**Table 3 FNQ Council expanded service offerings**

Council		CRC	CCRC	CSC	CrSC	DSC	ESC	HVASC	MSC	TRC	WWASC	YASC
Kerbside Residual Waste Collection		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kerbside Commingled Collection		✓	✓	✓		✓			✓	✓		
Container Refund Scheme access		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kerbside Organics Collection		✓	✓			✓			✓	✓		
Home Composting or similar organics capture initiatives				✓	✓		✓	✓			✓	✓



New infrastructure for the region will require funding to support site selection, design, planning, construction and operation phases. The large-scale regional infrastructure identified as needed to support the proposed goals of the RRR Plan include:

- Material Recovery Facility capacity of approximately 30,000 tpa in 2035,
- Organics Processing Facility throughput of approximately 45,500 tpa by 2041, and
- Regionally available potential EfW feedstock is estimated at approximately 90,000 tonnes by 2050 (which could capture MSW kerbside general waste, and residual waste streams for MSW, C&I and C&D self-haul material).

### RRR Roadmap

The RRR Plan initiatives and timing as outlined for Actions 1 to 8 are provided as a RRR Roadmap below.

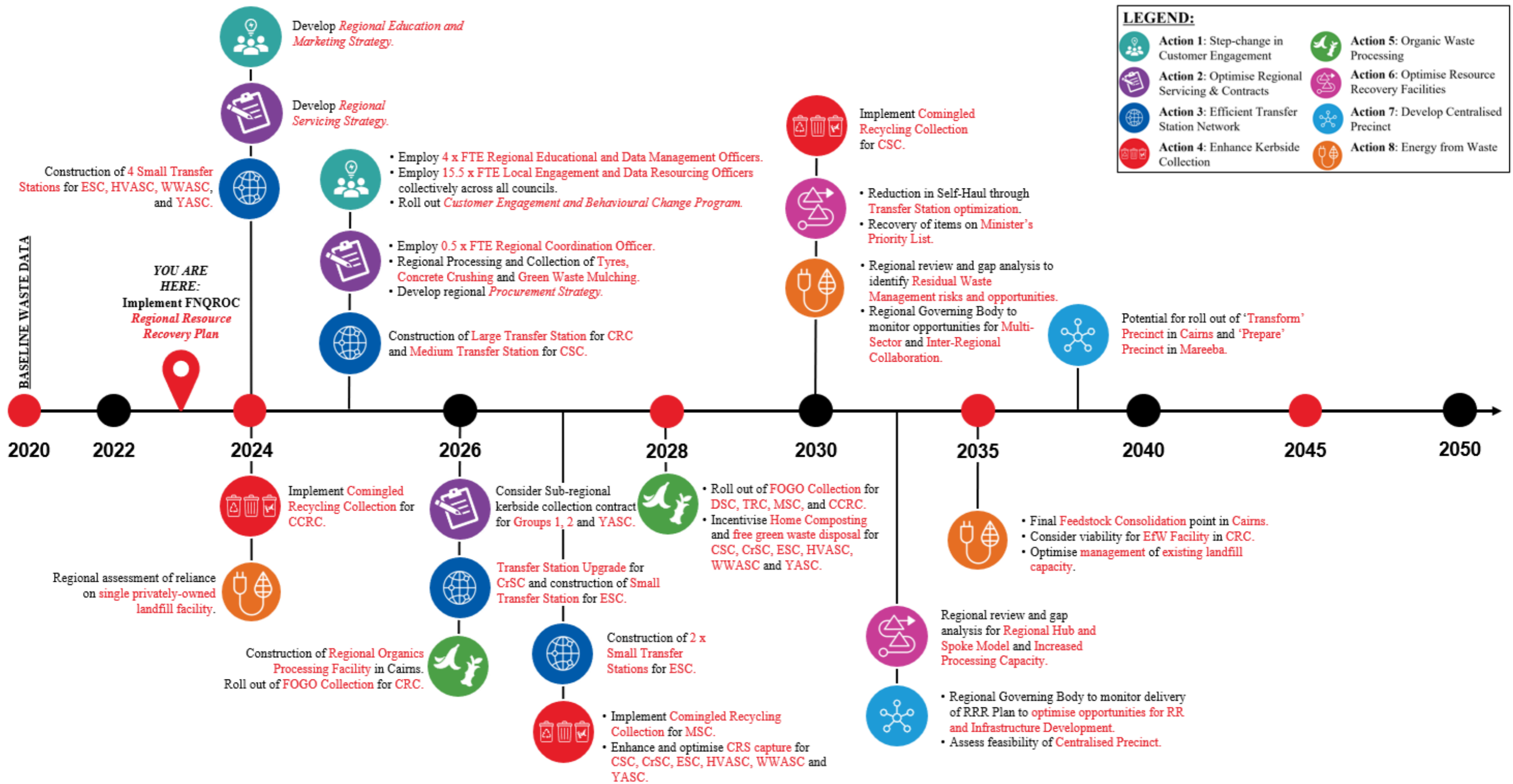


Figure 5 The FNQROC Regional Resource Recovery Roadmap

## Action 1: Step-change in Customer Engagement (NOW)

### Action 1a Education and engagement & Action 1b Data capture and reporting

This action focuses on providing delivery of marketing and education campaigns, including signage and wayfinding and support for improvement to data capture and reporting. This action aims to:

- Raise awareness and reduce waste generation across households, businesses, and tourism industries,
- Standardise waste education across the region, and
- Improve data capture and waste monitoring to track progress against state targets.

#### Key Initiatives:

##### Action 1a

- Develop Regional Education and Marketing Strategy
- Employ 2 x Regional Educational Officers to roll out Customer Engagement and Behaviour Change Program, provide support for training and brokering of relationship management between councils.
- Regional marketing and coordination budget.
- Employ touch point in every council in the form of Engagement Officers.

##### Action 1b

- Employ additional resourcing for routine waste audits, improved data capture, analysis and reporting.

Table 4 Action 1 Costs and Benefits

Milestone	Total Cost (PV)	Total Benefits (PV)	Direct Jobs	Household Waste Reduction	Avoided Carbon
2030	\$8.9 million	Up to \$5.4 million	19.5	7.5%	63,710 tCO <sub>2</sub> e
2050	\$20.1 million	Up to \$25.1 million	19.5	12.5%	488,000 tCO <sub>2</sub> e

## Action 2: Optimise Regional Servicing Arrangement (NOW)

This action focuses on providing better servicing for rural and remote communities, enhancing recovery opportunities of select problem waste streams and reducing the costs associated with these processes across all councils. Cost efficiencies may be realised through better economies of scale and competitive tender of a single regional contract. This action also explores the feasibility of sub-regional kerbside collection contracts and a regional strategy for procurement of recycled product, to enhance development of secondary markets. This action aims to:

- Assist economies of scale by optimising existing and new servicing arrangements through regional contracts,
- Provide servicing for remote communities and areas to enable improved resource recovery options,
- Enhance recovery opportunities for select problem materials,
- Enhance regional collaboration, and
- Enhance product sharing and reuse.

#### Key Initiatives:

- Develop Regional Servicing Strategy.

- Regional contract for processing of concrete, and green waste and collection of tyres for all councils on a set schedule.
- 0.5 x Full Time Equivalent (FTE) regional coordinator for contract procurement, advocacy of product stewardship and managing ad-hoc collection of recyclables and hazardous material.
- Development of procurement strategy and guidelines for recycled material including crumb rubber, crushed glass, and crushed concrete.\*
- Consider investment in mobile infrastructure (such as a crusher and shredder) for shared servicing should this be more economically viable.\*
- Consider sub-regional kerbside collection contract for Groups 1, 2 and YASC.\*

**Table 5 Action 2 Costs and Benefits**

Milestone	Total Cost (PV)	Total Benefits (PV)	Direct Jobs	Waste Recovery	Avoided Carbon
2030	\$2.7 million	Up to \$2.3 million	0.5	2% average increase in MSW recovery across councils impacted.	251 tCO <sub>2e</sub>
2050	\$6 million	Up to \$5.7 million	0.5	2% average increase in MSW recovery across councils impacted.	1,000 tCO <sub>2e</sub>

\*Indicate items not included in the cost benefit analysis results

### Action 3: New Transfer Station facilities and closure of facilities with regulatory or environmental issues (NOW)

This action focuses on development of new transfer stations, closure of existing rural landfill sites and consolidation of current transfer station facilities. The aim of this action is to provide all councils with the needed infrastructure to support long term regional resource recovery initiatives. This action aims to:

- Enhance social and environmental outcomes through improved facilities,
- Improve opportunities for material reuse and enrich secondary markets,
- Provide a long-term efficient network for resource recovery through optimisation of transfer station facilities, and
- Divert material from landfill.

#### Key Initiatives:

- Roll of new or upgraded transfer station facilities for Groups 1, 3 and 4 councils,

Regional support for\*:

- Site consolidation, optimisation, and upgrades to current sites to support product stewardship and recovery of key material streams for Group 2 councils.
- Sharing of planning, design, and tender advice for infrastructure development.
- Identifying funding opportunities and preparation of funding applications.
- Roll out of security and monitoring provisions at all sites.
- Integration of signage and data collection for all councils.

**Table 6 Action 3 Costs and Benefits**

Milestone	Total Cost (PV)	Total Benefits (PV)	Direct Jobs	Waste Recovery	Avoided Carbon
2030	\$48.8 million	Up to \$2.5 million	15.5	1% average increase in recovery across all impacted councils	27,700 tCO <sub>2</sub> e
2050	\$58.2 million	Up to \$7.5 million	15.5	1% average increase in recovery across all impacted councils	142,000 tCO <sub>2</sub> e

\*Indicate items not included in the cost benefit analysis results

### Action 4: Enhance Kerbside Collection approach (SHORT TERM)

This action focuses on enhancement of kerbside collection systems, in particular increase in capture of comingled kerbside recycling. This includes roll-out of a yellow comingled bins for councils without the service or enhancement of the Container Refund Scheme capture where kerbside collection is not feasible. This action aims to:

- Increase in resource recovery of comingled recyclables from the MSW stream,
- Increase household engagement and awareness about recycling, and
- Divert material from landfill.

#### Key Initiatives:

- Roll out of kerbside comingled recycling for Group 2 councils and Cook Shire Council.
- Processing of additional kerbside comingled recycling material at the existing Cairns MRF.

Regional support for\*:

- Assessment of benefits of sub-regional kerbside collection contracts for Groups 1 and 2.
- Advocacy for secure and sustainable CRS access across remote councils, in particular Groups 3 and 4.
- Resource sharing of contract specifications to support resourcing limitations.

**Table 7 Action 4 Costs and Benefits**

Milestone	Total Cost (PV)	Total Benefits (PV)	Direct Jobs	Waste Recovery	Avoided Carbon
2030	\$11.5 million	Up to \$2.7 million	1.5	4% average increase in recovery for the three councils impacted	25,000 tCO <sub>2</sub> e
2050	\$26.7 million	Up to \$7.6 million	1.5	5% average increase in recovery for the three councils impacted	92,000 tCO <sub>2</sub> e

\*Indicate items not included in the cost benefit analysis results

### Action 5: Maximise diversion of Organic Waste from landfill (SHORT TERM)

This action focuses on supporting collection of organic material from households that would otherwise be disposed to landfill. This action is particularly important for Douglas Shire Council, Mareeba Shire Council and Cairns Regional Council post closure of the ARRF. This action aims to:

- Increase recovery and recycling of organic material,
- Create a high value product,
- Increase diversion of waste from landfill, and
- Enhance community engagement, social and environmental outcomes.

### Key Initiatives:

- Roll out of kerbside Food Organics and Garden Organics (FOGO) for Groups 1 and 2 councils.
- Processing of a new organics processing facility located in Cairns, assumed In-Vessel Composting (IVC) technology but open windrow may also be appropriate. Further assessment required.

Regional support to\*:

- Undertake engagement with councils in development of regional processing facility.
- Roll out home composting or community garden initiatives for councils where FOGO roll out is not feasible.
- Resource sharing of contract specifications to support resourcing limitations.

**Table 8 Action 5 Costs and Benefits**

Milestone	Total Cost (PV)	Total Benefits (PV)	Direct Jobs	Waste Recovery	Avoided Carbon
2030	\$71.8 million	Up to \$19.3 million	9.5	12% average increase for impacted councils	162,000 tCO <sub>2</sub> e
2050	\$135.6 million	Up to \$80.7 million	9.5	12% average increase for impacted councils	1,092,000 tCO <sub>2</sub> e

\*Indicate items not included in the cost benefit analysis results

### Action 6: Optimise regional network of Resource Recovery facilities (MED TERM)

This action focuses on implementation of a hub and spoke transfer station network, utilising existing and new facilities, and the expansion into new recovery and processing facilities in the region. Optimisation of the regional network of resource recovery facilities will aim to achieve the following:

- Increase local material processing capacity,
- Improve economies of scale,
- Increase local market development,
- Reduce long haul transportation costs, and
- Optimise regional networks and support precinct development.

### Key Initiatives:

Regional support and coordination to:

- Undertake gap analysis in the medium term to identify need for regional hub and spoke model and increased local processing capacity to accommodate:
  - Emerging infrastructure gaps for processing of high-value, high-volume or hazardous streams,
  - Changes to market dynamics and viability of local processing,
  - Adequate storage capacity at current facilities to align with regional service contracts, and
  - Infrastructure gaps for emerging and increasing material volumes, including future product stewardship materials (such as mattresses, photovoltaic systems, electronic products, plastics, and textiles).

Providing suitable transfer station and processing facilities as a key anchor point will support subsequent development of local businesses, creating value and economic opportunities. In development of new transfer stations, the consideration of additional space to accommodate management of future waste streams such as mattresses and solar, and modular storage can incentivise investment in local processing capacity.

## Action 7: Develop Centralised Resource Recovery Precinct. (MED TERM)

Development of a centralised resource recovery precinct within the FNQ region is a high priority across all councils. Implementation of Actions 3 and 6 in particular will support feed in of materials for a centralised precinct. This action aims to:

- Increase local material processing capacity,
- Increase local market development,
- Realise product sharing efficiencies and savings,
- Reduce long haul transportation costs, and
- Support regional facility networks.

### Key Initiatives:

Regional support to:

- Regional governing body to monitor delivery of the RRR Plan outcomes and associated pieces of work to optimise opportunities for resource recovery and infrastructure developments and align development of precincts with the *Recycling Enterprise Precinct Location Strategy* developed in 2022.

The aim of the precinct should include support for processing of problematic waste materials and product stewardship scheme materials (tyres, photovoltaic systems, textiles, batteries, e-waste, soft plastics) to maximise reuse, processing and secondary recovery opportunities from regional aggregation and proximity to other processing infrastructure.

Development of all new infrastructure should encourage investment in data technologies and innovative technologies to leverage opportunities for accurate and consistent measurement and reporting given single point of capture at entry/exit to precinct.

## Action 8: Develop alternatives to landfill for Residual Waste. (LONG TERM)

This action focusses on providing the region with long term residual waste management security and identify long-term alternatives to landfill for residual waste streams. The overarching outcomes include:

- Long term planning and security for disposal of residual waste, and
- Improved landfill diversion and resource recovery rates.

### Key Initiatives:

Regional support to:

- Monitor opportunities for multi-sector and inter-regional collaboration.
- Undertake assessment in the short term to identify vulnerability associated with reliance on single privately-owned landfill (Springmount Waste Management Facility) and need to develop regional resilience.
- Medium term regional review and gap analysis to identify risks and opportunities associated with long term management of residual waste and potential to transition away from landfill (where feasible).

The majority of councils within FNQROC are reliant on the Springmount WMF for disposal of residual waste. The reliance on one private facility is a risk for the region, particularly with predicted increases to the landfill levy, decreases in annual payments (for Cairns Regional Council) and uncertainty regarding increases to gate fees. While landfill capacity in the region is understood to not be an imminent risk, the need for other avenues for residual waste management needs to be assessed, to mitigate risk associated with reliance, predominantly on one landfill. In addition, acknowledging that there will always be a need for some residual waste to go to landfill, the region should consider developing a long-term plan to transition to alternative methods of residual waste management.

It is likely that recovery of residual waste through an EfW facility will form part of an ultimate long-term solution to manage residual waste within the region. Streams that could be accommodated within an EfW facility include:

- MSW kerbside residual,
- MSW self-haul residual,
- C&I residual,
- Timber, and
- Biosolids.

The region is unlikely to have economy of scale for EfW to be economically viable in the short term (low volumes/ high transport distances), however, opportunities for multi-sector collaboration (e.g., with agricultural industry) and inter-regional collaboration between regional groups should be monitored.

## Implementing the Plan

### Governance Structure

The RRR Plan actions must be underpinned by an effective governance structure, implemented at a regional level, and supported by State government.

There are long standing and established relationships and trust between councils within FNQ. FNQROC has had success in operating for 30 years, which is a great foundation for a governance structure to leverage the extensive depth and understanding of the region and support implementation of the RRR Plan.

DES and FNQROC have commenced conversations regarding establishment of a bilateral agreement to enable efficient and effective governance and timely delivery of the actions under the RRR Plan. These discussions are still evolving, and the final agreement is yet to be finalised. A bilateral agreement would provide clear project pathway structure, clear contact points, channels of communication between the FNQROC and State government.

The governing body structure aims to be streamline and will follow the existing structure of FNQROC, including a dedicated program coordinator who is responsible for administering actions under the RRR Plan, a working group to guide project prioritisation and decision making, the FNQROC board for priority project endorsement. A dedicated project coordinator will require adequate and sustained resourcing to deliver on the actions outlined within the RRR Plan.

The RRR Plan governance structure is provided below in Table 9:

**Table 9 RRR Plan Governance Structure**

Governance structure role	Participants	Responsibilities
<b>Program Coordinator</b>	Dedicated FNQROC program coordination resource	Coordination of RRR Plan deliverables and project prioritisation process.
<b>FNQROC Working Group</b>	Member council waste and resource management technical officers	Undertake initial assessment of projects against key criteria e.g., regional economic, social and environmental benefit, alignment with RRR Plan outcomes and resource recovery targets.
<b>FNQROC board</b>	Member council Mayors	Endorsement of priority project proposals.
<b>Investment Review Committee</b>	DES Executive Director	Review and assessment of priority project documentations including



Governance structure role	Participants	Responsibilities
	Department of State Development Executive Director  Local Government Association of Queensland (observer)  Queensland Treasury Corporation (advisory body)	business cases or summary documents, request further information as required prior to approval.
<b>State Funding and Approvals Gateway</b>	As required based on project value.	Priority project funding assessment and approval.

FNQROC would provide a mechanism for regional collaboration and communication, including a contact point for other governing bodies responsible for roll out of Queensland resource recovery plans and strategies.

It is important that a clear pathway is established by the Queensland Government to progress initiatives developed by regional governing bodies under the RRR Plan. This pathway must consider support for regional collaboration and not create competition between councils when bidding for available funding.

### Funding and Regulatory Support

The action total costs indicate that substantial investment is required for the region to achieve key outcomes outlined within this RRR Plan, move toward state targets, and improve overall resources recovery practices. For FNQ councils, this cost of transition will need to be heavily supported by funding levers from the State and Federal government.

The Queensland State government has clearly outlined targets for improvements to resources recovery and waste generation, and while it is recognised that South East Queensland will contribute a large portion of heavy lifting towards these targets, if the Queensland State government is committed to improving resource recovery practices within the regions, they will need to financially support regional and remote councils to do so.

Communities within FNQ have a limited ability and willingness to pay for waste services, and low-rate bases (or no rate bases in the case of First Nation councils) which reduces the funding available within councils to invest in improved waste and resource recovery services. Therefore, to minimise the pass on of costs to the rate payer and provide a FNQ councils with the opportunity to improve resource recovery, a large amount of funding support will be required by State and Federal governments to achieve the RRR Plan outcomes.

Large investments in new infrastructure, are not economically viable for all councils without sustained funding support for the planning, development, design, construction and operational phases, and transportation costs of materials. Funding should be allocated to support resource recovery outcomes identified within the RRR Plan, both in the immediate and longer term.

The roll out of the eight RRR Plan actions demonstrate that it currently not possible for the region to meet current State 2050 targets and that while funding support is important for transition to improved resource recovery, additional and timely regulatory and policy reform such as expansion of Product Stewardship Schemes, mandated recycled product, support for market development and landfill bans will be critical to make further progress toward achieving the State and Federal targets.

### Measuring our Success

The actions administered under the RRR Plan need a clear pathway for reporting, to capture progress and provide accountability for the governing body.

1. Annual reporting of progress against the RRR Plan would assess projects complete and identify key limitations or barriers for any actions not undertaken. This reporting structure will provide a mechanism

for regional tracking and reporting on progress and outcomes. Annual reporting requirements would seek to create internal accountability for progress and program decisions.

2. The RRR Plan should be agile and able to be updated to incorporate changes in policy, materials and local capability or needs. Criteria should be established to trigger review of the plan and undertake update of implementation actions and timings to capture of changes to infrastructure capacity, community needs, technology, and material streams.

### What's Next?

Following from this RRR Plan, the required governance arrangements will be established to support the initiatives, and any funding and assistance required by the state and national governments to move toward the 2050 Queensland state targets.

Additionally, each of the 11 individual councils will need to incorporate relevant RRR Plan outcomes into their forward planning, strategy, and capital works budgets.

# 1. Introduction

## 1.1 Aim

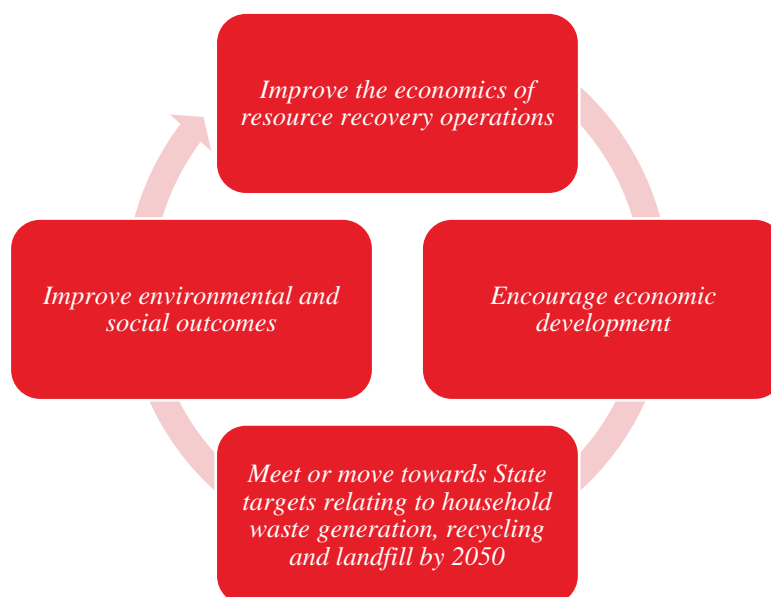
### 1.1.1 Purpose

Arup has been engaged by Far North Queensland Regional Organisation of Councils to develop this Regional Resource Recovery Plan for the 11 participating councils, including:

- Cairns Regional Council (CRC)
- Cassowary Coast Regional Council (CCRC)
- Cook Shire Council (CSC)
- Croydon Shire Council (CrSC)
- Douglas Shire Council (DSC)
- Etheridge Shire Council (ESC)
- Hope Vale Aboriginal Shire Council (HVASC)
- Mareeba Shire Council (MSC)
- Tablelands Regional Council (TRC)
- Wujal Wujal Aboriginal Shire Council (WWASC)
- Yarrabah Aboriginal Shire Council (YASC)

The purpose of this RRR Plan is to provide FNQROC with a regional, long-term and coordinated plan that identifies appropriate levers to support improved regional resource recovery, through planning and investment in waste and resource recovery infrastructure and non-infrastructure solutions in the Far North Queensland region. Hinchinbrook Shire Council is a member of FNQROC but has opted out of the FNQROC RRR Plan as they are included in the North Queensland Regional Waste Management Plan.

The objective of this RRR Plan is to identify a sequence of levers that will allow 11 FNQ regional councils to:



This RRR Plan is aimed to provide councils with individual and regional benefits to improve resource recovery outcomes. It is recognised that different councils may have different requirements and/or targets.

The guiding principle of the RRR Plan is to holistically assess key benefits for both the region and each individual council, without imposing constraints on individual councils who may not have the capacity to meet the proposed outcomes.

The FNQ region is also home to pristine natural landscapes, including the Great Barrier Reef and the Daintree Rainforest (as part of the Wet Tropics) which are both world heritage recognised sites. These internationally significant areas are vital to the FNQ community and national economy. It is therefore important that regional resource recovery initiatives enhance and support the local environment and industries which cultivate nature-based solutions and seek to provide preventive measures against climate change.

It is intended that this RRR Plan will be the first stage of waste and resource recovery planning, with it anticipated that additional stages such as feasibility studies and business cases will be required to assist in the implementation of the planned initiatives. This RRR Plan will demonstrate the required governance arrangement to support the initiatives, and any funding and assistance required by the state and national governments to move toward the 2050 Queensland state targets.

### 1.1.2 Outcomes

This RRR Plan will provide FNQROC with a list of planned outcomes to enable FNQ to move toward the Queensland state targets to reduce waste generation, increase waste diversion from landfill and improve regional resource recovery. The outcomes of this RRR Plan will be informed by the strategic context and existing FNQ waste management environment. It will focus on providing cost-effective investment opportunities for regional cooperation for waste and resource recovery. To provide a list of outcomes that are the most appropriate for regional resource recovery, the initiatives were revised through extensive stakeholder engagement, Investment Logic Mapping (ILM), multi-criteria analysis (MCA), and cost-benefit analysis (CBA) processes to deliver the most suitable infrastructure and non-infrastructure solutions for FNQ.

An implementation roadmap for the planned outcomes is provided in this RRR Plan to provide FNQ with direction to achieve key milestones. Details on financial requirements, governance arrangement and monitoring of the planned outcomes is outlined in this RRR Plan to provide FNQ with the appropriate tools to facilitate improved regional resource recovery for the region.

The economic analysis has been prepared to support strategic planning for waste management in the region. The cost-benefit analysis is intended to support a strategic understanding of the timing and order of magnitude of potential investment pathways. Further analysis is required to support feasibility studies and inform investment decisions. To understand the exact costs associated with each of the Actions for each of the individual councils more detailed cost analysis is required.

### 1.1.3 Key Stakeholders

The key stakeholders for this project are as follows:

- FNQROC Board consisting of the member council Mayors and administratively managed by the FNQROC organisation. The FNQROC Board is the governing and decision-making body for the Project.
- The working group for the Project which includes Queensland Treasury Corporation, Department of Environment and Science, Local Government Association of Queensland and the FNQROC Waste Management and Materials Recovery Framework Advisory Group. Key representatives from each council are listed below in Table 10:

**Table 10 WMRR Advisory Group**

Council	Representatives
CRC	Cr Brett Moller, Councillor Steve Cosatto, Executive Manager Resource Recovery Nigel Crumpton, Resource Recovery Strategy Coordinator Mark Wuth, Director Infrastructure and Assets
CCRC	Cr Teresa Millwood, Councillor Gavin Hammond, Manger Regulatory Services

Council	Representatives
CSC	Cr Peter Burns, Councillor Cr Ross Logan, Councillor Peter Tonkes, Director, Infrastructure Jim Doidge, Manager, Parks and Waste Operations
CrSC	Garr Pickering, Works Manager
DSC	Cr Lisa Scomazzon, Councillor Paul Hoye, Manager Environment and Planning
ESC	Cr Barry Hughes, Mayor Alan Clarke, Director of Engineering Services
HVASC	Cr Bruce Woibo, Mayor Gene Brookes, Operations Manager
MSC	Cr Mayor Toppin, Mayor Cr Lenore Wyatt, Councillor Morris Hamill, Manager Water and Waste
TRC	Cr David Clifton, Councillor Bruce Gardiner, Manager Water and Waste Daniel Beverland, Coordinator Waste Services
WWASC	John Kelly, Interim Director, Works & Building Services Michael Leslie, Water and Sewerage
YASC	Cr Andrews, Councillor Sam Bann, Infrastructure Manager

- Other stakeholders including employees and councillors of all FNQROC councils and other councils in the region, representatives from Queensland Government, including *Department of State Development, Infrastructure, Local Government and Planning*, and representatives from Australian Government, and waste industry and peak bodies.

To contextualise the specific issues regarding waste management and resource recovery that come with these diverse councils, a series of stakeholder engagement activities were conducted both with individual councils and as a collective FNQROC group. Face-to-face interviews were held with individual councils including site visits to gather specific information and provide an understanding of each council's needs, issues, and drivers. In addition to these interviews with individual councils, supplementary support was provided through workshops conducted with the FNQROC working group and other conversations conducted with other key regional councils, government representatives, and industry members to build a broader picture of key regional needs, risks and opportunities.

#### 1.1.4 Issues and Options Paper

An Issues and Options (I&O) Paper (Arup Australia Pty Ltd) was produced in November 2022 and outlines in detail a summary of the key issues, risks and opportunities for each council and for the FNQ region and should be read in conjunction with this RRR Plan. The I&O Paper supports the content provided in this RRR Plan and provides additional detail on the information collected from stakeholder engagement conversations, preliminary research and a desktop review of any and all studies and policies conducted to date. The work highlighted in the I&O Paper presented a long list of options suitable in addressing the issues and risks identified for FNQROC refer Appendix A.

## 1.2 Strategic and Policy Context

The following sections provide a high-level overview of the strategic and policy context surrounding the FNQ region at a global, national, state, regional and local level, reinforcing the need to develop and implement the RRR Plan.

## 1.2.1 International Context

### *Waste hierarchy and the Circular Economy*

A shifting focus on global resource recovery has championed the waste hierarchy and circular economy principles as the primary mechanisms to managing waste resources. The European Union (EU) is widely considered a leader in implementing circular economy principles with their focus shifting towards greater extended producer responsibility (EPR) schemes and measures to promote the recycling and re-use of products. In aiming to align directly with the waste hierarchy for improved waste and resource management, to further reduce waste to landfill and incineration, waste charges of pay-as-you-throw schemes have been implemented.

### *Material Export*

Globalisation of trade and labour markets has fundamentally shaped resource recovery markets over the past 50 years. Previously, Australia sent a large volume of waste resource materials to emerging South-East Asian economies to upgrade the low-quality mixed scrap materials into usable feedstocks to manufacture new products. Implementation of stricter contamination limits, which were initially introduced in 2018 with the China National Sword Policy, Australian waste exports of various materials were effectively banned under the new regulations. This market shock has prompted renewed attention among developed countries on economically and environmentally acceptable options for managing recyclable material within national borders. Limitations places on specifications for recovered material is an ongoing issue for councils and industry.

### *Plastic Pollution*

There has been growing public awareness of plastic pollution in global oceans over the years. Pollution levels have strongly been linked to the global reliance on high levels of plastic waste exports for sorting and reprocessing because importing nations typically have weaker waste management and environmental protection regulations. Increased focus on plastic packaging and products has seen restrictions on various single-use plastic items in many countries, including within Australia across the past few years. The EU also implemented a Plastic Packaging Levy in 2021 as a means of reducing packaging waste and directly tax the plastics sector which would encourage producer responsibility.

## 1.2.2 National Context

In Australia, waste and resource recovery strategy is primarily defined at a state level, resulting in differing policy and regulatory approaches, and different resource recovery outcomes, between the states and territories. Inconsistency across jurisdictions has at times resulted in gaps and unintended consequences including the transport of waste across state borders to avoid disposal levy liability or to access less stringent end of life solutions. Waste and resource recovery data is consistently poor and is hampered by differing classification systems, regulatory systems, and reporting requirements in each jurisdiction, including differences within states at a local council level.

There has historically been limited federal policy or intervention in waste and resource recovery issues however, in more recent times the Federal Government has introduced sovereign waste export bans and seeking to promote extended producer responsibility. The key policy and plans at a federal level are described below.

### *2018 National Waste Policy: Less Waste, More Resources*

The Australian Government released the updated *2018 National Waste Policy: Less Waste, More Resources* which establishes a framework for national waste and resource recovery policy direction to 2030 (Commonwealth of Australia, 2018). The policy provides the framework for waste and resource recovery in Australia, outlining the following key principles to enable the transition to a circular economy:

- Avoid waste.
- Improve resource recovery.
- Increase use of recycled material and build demand and markets for recycled products.

- Better manage material flows to benefit human health, the environment and the economy.
- Improve information to support innovation, guide investment and enable informed consumer decisions.

The policy creates a national direction to create a circular economy and RRR Plan should seek to align with the principles of the National Waste Policy.

### *2019 National Waste Policy Action Plan*

The *2019 National Waste Policy Action Plan* set the following national targets to implement the National Waste Policy (NWP) (Commonwealth of Australia, 2019):

1. Ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020.
2. Reduce total waste generated in Australia by 10% per person by 2030.
3. 80% average resource recovery rate from all waste streams following the waste hierarchy by 2030.
4. Significantly increase the use of recycled content by governments and industry.
5. Phase out problematic and unnecessary plastics by 2025.
6. Halve the amount of organic waste sent to landfill by 2030.
7. Make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions.

There is strong opportunity to align to the National Waste Policy Action Plan with respect to waste reduction, diversion of waste from landfill and recovery of organic waste streams.

### *Environment Ministers Meeting – Agreed Communiqué*

The Action Plan was reviewed at the recent *Environment Ministers Meeting* held on 21 October 2022, where the progress made to improve waste management and recycling activities was acknowledged. It was agreed that the Action Plan will be expanded in 2023 to strengthen Australia's efforts to achieving the 2030 targets (Department of Climate Change, Energy, the Environment and Water, 2022). Updates to the 2019 Action Plan's action items were updated in the *National Waste Policy Action Plan Annexure 2022* which reflected the items delivered, adjustments required to accommodate the long-term impacts of COVID-19 and the disruptions to supply chains and government's resources caused by the series of natural disasters.

The *Environment Ministers Meeting* also highlighted the growing concerns around the environmental impacts of problematic waste streams. The Ministers released the *Agreed Communiqué* which listed the following actions specific to waste, recycling and the circular economy (Austalian Government, 2022):

- To develop a regulatory product stewardship scheme for solar panels and household electronics.
- To develop nationally harmonised definitions to support the phase out of problematic single use plastic.
- To reform the regulation of packaging by 2025, to ensure that all packaging available in Australia is designed to be recovered, reused, recycled and reprocessed safely in line with circular economy principles.
- The Australian Government to add end of life tyres to the Minister's Product Stewardship Priority List, signalling the intention to regulate should industry not lift its game.
- The Commonwealth will work with jurisdictions to phase out the use of harmful chemicals in food packaging.

The ministers agreed to the following commitment which recognises the scale and urgency of environmental challenges for waste and resource management:

- To work with the private sector to design out waste and pollution, keep materials in use and foster markets to achieve a circular economy by 2030.

### *Export of Waste Products*

In 2020 the Australian Government increased regulation on the export of waste products to align what was occurring within the global context for waste contamination requirements. This increased regulation, which has taken effect from 2021 in a staged approach to various waste resources, aim to increase local jobs and capacity to process materials into higher value products. Export bans have since commenced on unprocessed glass, mixed plastics, whole used tyres, and single resin/polymer plastics, with mixed and unsorted paper and cardboard bans to commence in July 2024. The increased quality of recycled material feedstock also improves the viability and creation of local secondary product markets.

### *Product Stewardship*

Product stewardship or EPR schemes operate in many countries, including Australia, enabling producers and others along the supply chain to take responsibility for end-of-life management of products they put on the market, as well as providing end users with an alternative means of recovery that supports a safe and environmentally responsible disposal option. Under the NWP, the *Product Stewardship Act 2011* provides a framework for three types of EPR schemes:

- Mandatory schemes – Such as used oil products.
- Co-regulatory schemes between industry and governments – currently under the Act there are schemes for televisions and computers (National Television and Computer Return Scheme - NTCRS), and for plastics and packaging (Australian Packaging Covenant Organisation - APCO).
- Voluntary industry-led schemes (either accredited or not) – currently includes but not limited to:
  - Tyre Stewardship Australia for tyres,
  - MobileMuster for mobile phones (accredited),
  - Battery Stewardship Council for batteries (accredited),
  - Paintback for paint,
  - DrumMuster for agricultural chemical containers, and
  - Big Bag Recovery for large plastic bags or sacks (Industry Waste Recovery Ltd) – also called Bulka Bags scheme.

The Minister for the Environment also releases a priority list annually for potential product stewardship schemes. The Minister's priority list for 2022-23 includes (DCCEEW, 2022):

- End of life tyres,
- Photovoltaic systems,
- Clothing textiles,
- Problematic and unnecessary single-use plastics,
- Plastics in healthcare products,
- Electrical and electronic products,
- Child Care Seats, and
- Oil Containers.

Uptake of product stewardship schemes for existing materials, whilst investigating other potential areas for expansion to provide an economical and sustained pathways for collection and transport of is a key focus area for the RRR Plan.



## PFAS NEMP

The Per and poly-fluoroalkyl substances (PFAS) National Environmental Management Plan (NEMP) is a document agreed upon by the Heads of EPAs in October 2019, and endorsed by Environment Ministers, and is in the process of being implemented by the Commonwealth and all states (barring Victoria). The PFAS NEMP 2.0 is currently in effect, and provides guidance on the environmental management of PFAS, with a focus upon preventing and managing PFAS contamination especially with soil and water environs. However, earlier this year the draft PFAS NEMP 3.0 was released for consultation, and this document gives much more attention to PFAS within waste management contexts (which had been absent from previous versions of the plan). In this draft document, there is greater explicit recognition of the presence of PFAS within organic waste and resource recovery materials, the process of disposing of PFAS in landfill, and the presence of PFAS in biosolids. Whilst the PFAS NEMP 3.0 has not yet been ratified, it is becoming more apparent that the beneficial reuse of organic waste or other resource recovery products requires closer scrutiny, to ensure that risks to human health, the environment, and environmental values are avoided or minimised.

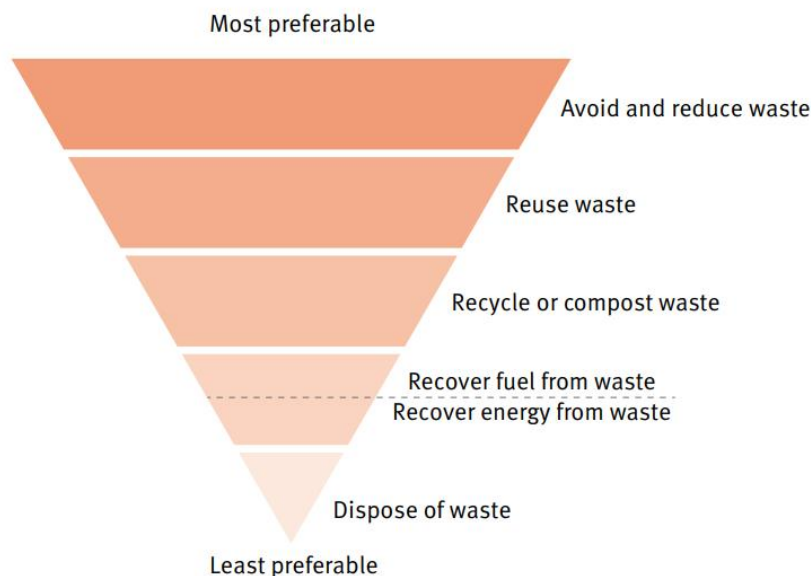
### 1.2.3 State Context

The Queensland Government policy is the primary strategic driver for FNQ in supporting waste avoidance, reuse and resource recovery. It is important to enable investment in regional resource recovery solutions will continue to be relevant in a rapidly changing legislative and industry landscape. Key state policy and strategy influencing resource recovery action for the FNQ region are set out below.

#### *Queensland Waste Management and Resource Recovery Strategy*




In the past five years Queensland's resource recovery industry has undergone extensive structural reform, with release of new strategy, regulatory and policy driving the need to accelerate resource recovery and landfill diversion.

In 2019 the Queensland Government released the *Queensland Waste Management and Resource Recovery Strategy* (the Strategy). The Strategy outlined a need for change in the approach to waste management for Queensland, aligning with the global context in focusing on a transition to a zero-waste society by harnessing the value of resources, supported by the waste hierarchy and circular economy principles. The Strategy is underpinned by the waste and resource management hierarchy which guides the order of preference for management of waste and recycling materials as shown in Figure 6. The hierarchy is fundamental in shaping the planned initiatives for FNQROC.



**Figure 6 Queensland's Waste and Resource Management Hierarchy (Queensland Government, 2019)**

To support the overall vision of transiting to a zero-waste society, the strategy outlines set targets for MSW, C&I and C&D waste streams. The targets are summarised in Figure 7, along with FNQROC's current regional resource recovery rates.

	CURRENT RECOVERY RATE	2025	2030	2040	2050
<b>HOUSEHOLD WASTE REDUCTION</b> 					
MSW		10%	15%	20%	25%
<b>WASTE DIVERSION FROM LANDFILL</b> 					
MSW	51%	55%	70%	90%	95%
C&I	50%	65%	80%	90%	95%
C&D	68%	75%	85%	85%	85%
<b>Overall</b>	<b>52%</b>	<b>65%</b>	<b>85%</b>	<b>85%</b>	<b>90%</b>
<b>TARGET RECYCLING RATES</b> 					
MSW	51%	50%	60%	65%	70%
C&I	50%	55%	60%	65%	> 65%
C&D	68%	75%	80%	> 80%	> 80%
<b>Overall</b>	<b>52%</b>	<b>60%</b>	<b>65%</b>	<b>70%</b>	<b>75%</b>

**Figure 7 Queensland's Waste and Resource Recovery Targets**

### *Queensland Waste Levy*

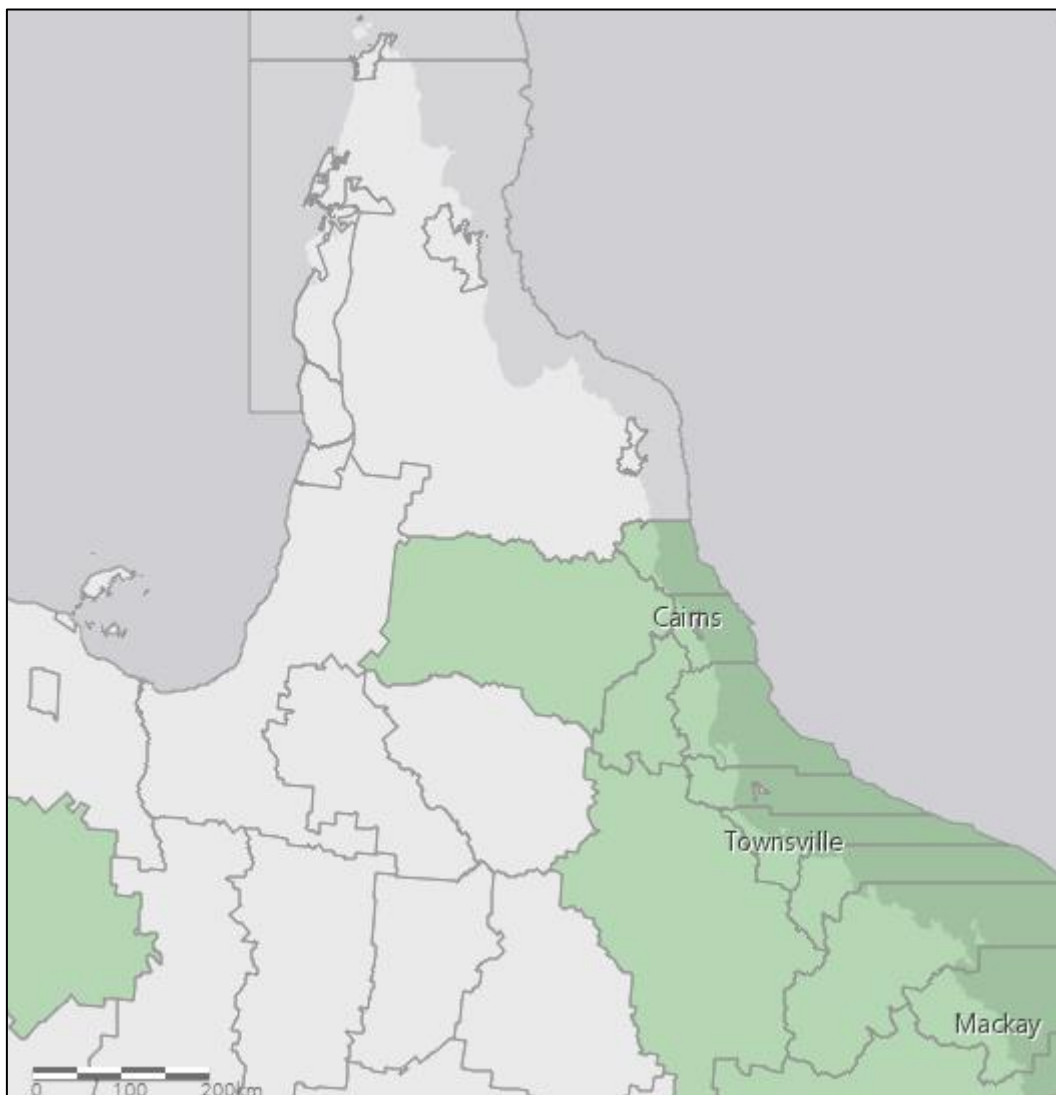
To support the objectives outlined in the Strategy, in 2019 the Queensland Government introduced a waste levy on material disposed to landfill. Three levy zones have been established within Queensland: a metro, regional and non-levy zone.

The participating councils within FNQROC are categorised under the following zones:

**Table 11 Queensland Waste Levy FNQ Council Zoning**

Levy Zone	Councils
<b>Regional Levy Zone</b>	CRC, DSC, MSC, CCRC, TRC
<b>Non-Levy Zone</b>	ESC, CrSC, CSC, HVASC, WWASC, YASC

The following map provided in Figure 8 shows the distinction between Regional and Non-Levy zoning for the FNQ region.



**Figure 8 Queensland Levy Zone Map for LGAs – Regional Levy Zone (green) and Non-Levy Zone (grey) (Queensland Government, 2022)**

Councils within the regional levy zone are subject to a waste levy for disposal of:

- general waste,
- treated timber sawdust and shavings,
- contaminated earth, and
- regulated waste (category 1 and 2).

From 1 July 2022, levy rates for each of these materials are projected to increase per financial year until 2030, with annual rates provided by the Queensland government based on the Consumer Price Index (CPI) for regional areas. The CPI increase used for 1 July 2022 was 4.3%.

Since the introduction of the levy, annual payments (or rebates) have been provided to affected councils to minimise the impact of the levy on households while they transition their waste systems. Eligible councils receive a 105% payment from the Queensland Government, calculated using the councils' annual leviable MSW disposal from the previous year. However, from 1 July 2023, the annual payment amount for metro and select regional councils, of which CRC is the only participating council affected, will be reduced each year calculated using a baseline tonnage of the annual average leviable MSW disposed to landfill in 2019–20 and 2020–21 until 20% of the baseline is reached by 2030–31 (Queensland Government, 2022). For other councils within the regional levy zone, annual repayments will drop to 100% until 2030–31. Refer Table 12 for further details.

**Table 12 Local government annual repayments**

Zone	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
<b>Metro (including CRC)</b>	105%	95%	85%	70%	60%	50%	40%	30%	20%
<b>Regional</b>	105%	100%	100%	100%	100%	100%	100%	100%	100%

CRC is the only council within FNQROC who will see a significant decline in the annual payment over the period 2023 to 2031. This significant financial impact therefore places increased pressure on CRC to improve its landfill diversion.

### *Queensland Waste and Resource Recovery Infrastructure Report*

To support the Strategy, the *Queensland Waste and Resource Recovery Infrastructure Report* was prepared in 2019 which provides a high-level report that identifies opportunities and the types of infrastructure needed to meet the 2050 waste and resource recovery targets. It highlights the need for new infrastructure and supporting initiatives such as rethinking waste collection and developing sustainable end markets for recovered materials (Arcadis Australia Pacific Pty Limited, 2019).

### *Container Refund Scheme – Containers for Change*

The Queensland State Government introduced a container refund scheme in 2018. The CRS is a product stewardship scheme operated within QLD by Container Exchange (CoEx) that facilitates the improved recycling of beverage containers. Eligible beverage containers can be returned to a Container Refund Point for a 10-cent refund, where this refund and the cost of operating the scheme is paid for by drink manufacturers. The scheme is underpinned by agreements between CoEx and Container Refund Point Operators, logistics providers, processors, Material Recovery Facilities, and the operation of an online auction portal that facilitates the sale of recovered materials, such as polyethylene terephthalate (PET) plastic.

Most aluminium, glass, plastic, steel and liquid paperboard beverage containers between 150ml and 3L are eligible for return, and in the near future the range of eligible containers may be extended to also include other containers like glass wine or spirit bottles. Public consultation for expansion of the CRS ended on the 20<sup>th</sup> of February 2023, with the results of the consultation currently being reviewed at the time of this RRR Plan being produced with no decision currently made by the Queensland Government. Altogether, the scheme is capable of diverting a portion of recyclable materials out of kerbside commingled recycling bins, with anticipated improvements to kerbside bin contamination rates also expected.

### *Queensland Organics Strategy and Action Plan 2022-2023*

The *Queensland Organics Strategy 2022-2032* and *Queensland Organics Action Plan 2022-2032* were released by the Queensland Government in 2022 (Department of Environment and Science, 2022). The Organics Strategy outline targets to halve the amount of food waste generated, divert 80% of organic material generated from landfill and achieve a minimum organics recycling rate of 70% by 2030. These targets provide further incentive and pressure for councils to improve recovery of organic material.

### *End of Waste codes*

End of waste (EOW) codes can be used to specify the requirements for waste to be deemed as a reusable resource (Queensland Government, 2022). For waste to be deemed as a resource it must demonstrate sustainable reuse benefits and prove to have negligible environmental risks associated. Producers of waste products must comply with the EOW codes which specify the criteria and quality characteristics of the resource and ensure it is used in accordance with the appropriate application conditions. These producers must also be registered with the Department of Environment and Science.

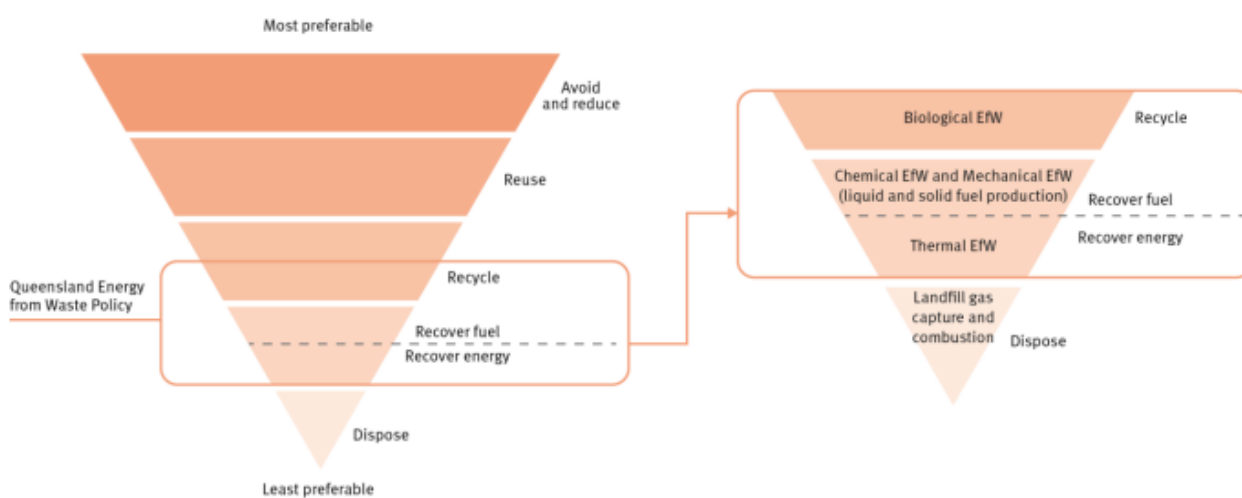
There is uncertainty around how EOW codes and other regulations may be affected as a result of ongoing research into the fate of emerging contaminants, such as PFAS and microplastics, in these waste streams transmitting into environmental and human systems. This is particularly relevant to the application of

biosolids and mixed waste organic outputs (MWOO), such as those produced by CRC’s Advanced Resource Recovery Facility. Should policy regulatory changes prevent MWOO and/or biosolids being applied to land, all material generated will need to go to landfill and attract a waste disposal levy.

### *Energy from Waste Policy*

The Queensland Government published the Energy from Waste Policy in December 2021 to support the Waste Management and Resource Recovery Strategy (Department of Environment and Science, 2021). EfW refers to energy recovery from residual waste materials that were not suitable for a higher level of management on the waste hierarchy. The EfW Policy outlines the requirements for residual waste feedstock to support Queensland’s recycling targets which preferences reuse and recycling of waste material, however, under the Queensland targets by 2050 up to 15% of residual waste material may be suitable for EfW.

EfW prioritises biological EfW such as anaerobic digestion (AD) and fermentation as this is regarded as recycling of waste material and as such a higher priority to chemical, mechanical and thermal EfW treatments. The EfW hierarchy is provided in Figure 9 which shows this internal prioritisation within the EfW policy.



**Figure 9 Queensland’s EfW Hierarchy for Residual Waste (Department of Environment and Science, 2021)**

The EfW policy has seven policy outcomes to guide the approval of EfW facilities and provide guidance on how they will be regulated. Policy outcome 4 specifies that only residual wastes are used for energy recovery (excluding biological EfW). The classification of residual waste is material where it is not technically, environmental, and economically practical to reuse or recycle. Residual waste from waste recycling or remanufacturing processed and/or waste that is too degraded or contaminated to be recycled may be used as EfW feedstock.

### *Queensland’s Indigenous Waste Management Strategy*

In 2021, the Queensland Government released the *Respecting Country – A sustainable waste strategy for First Nations communities* which acknowledges the unique challenges facing Queensland’s Aboriginal and Torres Strait Islander councils in meeting the expectations set out by the Strategy (Queensland Government, 2021). Challenges facing these councils can include:

- Scarce resources,
- High costs for products,
- Geographical isolation,
- Long transport distances by land or water, and
- Harsh and unpredictable climates.

The Indigenous Waste Strategy aims to act as a guide to develop regional waste management plans and tailored waste management solutions that meet the needs of each individual community. This strategy is specifically relevant to Hope Vale, Wujal Wujal and Yarrabah Aboriginal Shire Councils in the FNQ region and highlights the importance of connection to Country and association with land and sea.

An Eastern Cape Regional Waste Management Plan (RWMP) for Hope Vale, Wujal Wujal and Yarrabah Aboriginal Shire Councils has been developed by A Prince Consulting Pty Ltd (dated September 2022) and this plan has been used to guide action outcomes for each of these three councils under the RRR Plan. This Eastern Cape RWMP is provided in Appendix B.

#### *Recycling Enterprise Precinct Guidelines and Strategy*

The Department of State Development, Infrastructure, Local Government and Planning has identified that Recycling Enterprise Precincts should be established throughout Queensland as places to transform and remanufacture recovered materials into new products and have developed the *Recycling Enterprise Precinct Location Strategy*, (dated 2022 produced by E3 Advisory). This strategy investigates how the establishment of resource recovery precincts may assist in the transition towards a system where waste is a valuable eco-industrial resource to create new products, industries, and jobs. The establishment of precincts can assist in supporting energy reuse, generation of new products and development of secondary markets for recyclable materials. The strategy outlines the following as relevant to this RRR Plan:

- Potential ‘transform’ precinct in Cairns with a focus on organics and C&D waste,
- Potential ‘prepare’ precinct in Mareeba, and
- Transformation of a large range of materials in Townsville.

## 2. Regional Context and Waste Management Environment

### 2.1 FNQROC Region Overview

The Far North Queensland region spans a large area consisting of councils diverse in their communities, natural environment, geographical area, primary industries and drivers when it comes to waste and resource management. The FNQ region is home to pristine natural landscapes, including the Great Barrier Reef and the Daintree Rainforest which are both recognised world heritage sites. These internationally significant areas are vital to the FNQ community and economy.

Figure 10 provides an overview of the councils within the FNQ region that are considered within this RRR Plan (Hinchinbrook Shire Council, is a member of FNQROC but has opted out of the FNQROC RRR Plan as they are included within the North Queensland Waste Management Plan).



Figure 10 Far North Queensland Local Councils included in the RRR Plan

## 2.2 Stakeholder Engagement

To contextualise the specific issues regarding waste management and resource recovery that come with these vastly diverse councils, a series of stakeholder engagement activities were conducted both with individual councils and as a collective FNQROC group. Face-to-face interviews were held with individual councils including site visits to gather specific information and provide an understanding of each council's needs, issues, and drivers. In addition to these interviews with individual councils, supplementary support was provided through workshops conducted with the FNQROC working group and other conversations conducted with other key regional councils, government representatives, and industry members to build a broader picture of key regional needs, risks and opportunities. A full description of stakeholder engagement activities and outcomes is provided within the Issues and Options Paper (Arup Australia Pty Ltd, 2022).

## 2.3 Current Waste and Resources Profile

### 2.3.1 Information Sources

Waste and resource recovery material flows for councils within FNQROC has been informed through information collated from the following sources for each council:

- Requests for information (RFI) issued to council by Arup to inform the RRR Plan,
- Face to face stakeholder interviews and site visits, and
- DES local council survey data 2013-2021.

This information has been used to form the basis of a waste flow model which provides an understanding of current material flows throughout the region and a mechanism for modelling future waste generation and impact of proposed actions within the RRR Plan. Appendix C outlines key assumptions underpinning the waste flow model.

### 2.3.2 Waste and Resources Data

The RRR Plan aims to determine resource recovery solutions that can be implemented by councils. Therefore, council controlled and handled tonnages have been the primary focus for this analysis. Regionally, the 11 councils within FNQROC handle approximately 205,100 tonnes per year. The proportion of recovered and landfilled waste streams and recovery rate and landfilled percentage for key waste streams (MSW, C&I and C&D) handled by councils are shown in Figure 11.

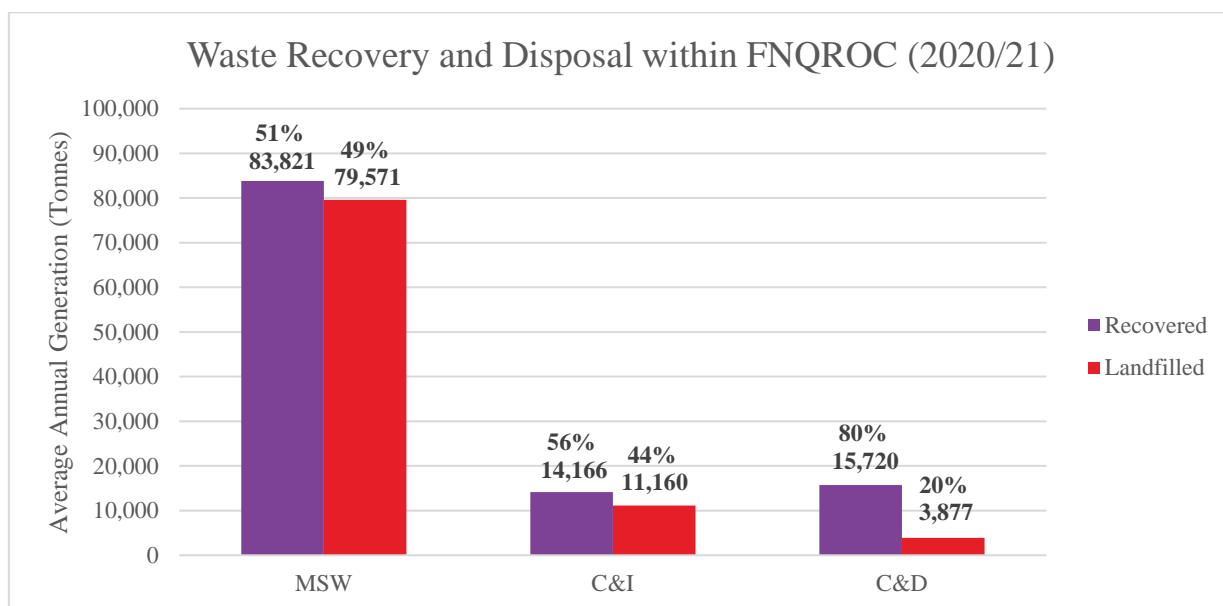
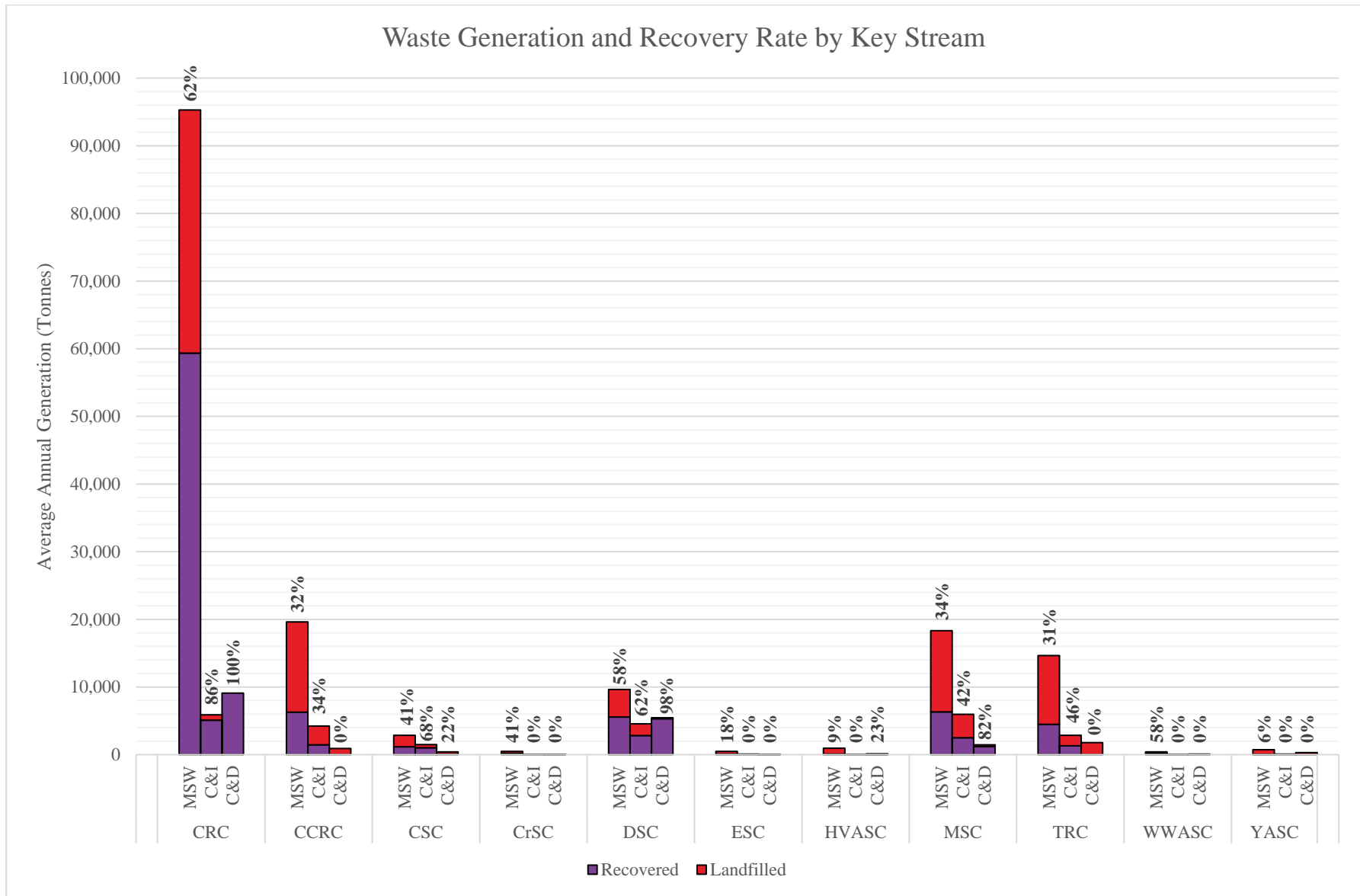


Figure 11 Current management of waste totals within FNQROC



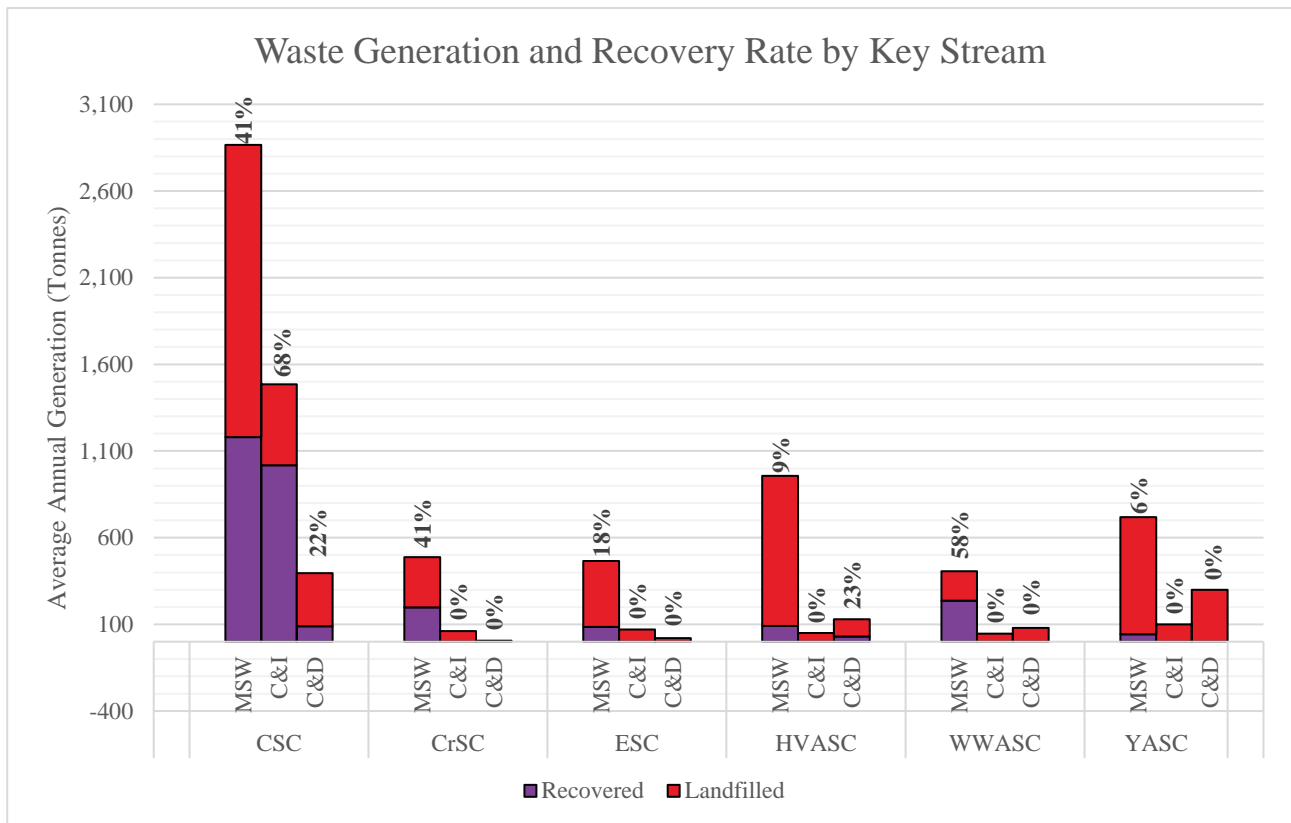
It is estimated an additional 115,000 tonnes of C&I and C&D waste is generated annually within the Cairns region and handled by private facilities. It is not clearly understood the recovery rate for the additional tonnage of private C&I and C&D waste. These privately managed tonnes increase the total annual regional waste generation from 205,000 tonnes to approx. 320,000 tonnes. However, as these additional tonnages are not directly controlled by council they have been excluded from our analysis. Quantification of these materials would be valuable to support future feedstock assessments for resource recovery infrastructure development.

Total average annual waste generation across the three key waste streams for each council is provided in Figure 12. CRC is shown to have produced over 95,000 tonnes per annum of MSW whilst CrSC, ESC and WWASC only generate roughly 500 tonnes per annum. The values presented in Figure 12 include waste reported from council facilities only and does not capture material collected and processed in private facilities. The resource recovery for each stream and council is also presented in Figure 12. As shown in the figure, there is a significant variance in recovery rates between councils.



**Figure 12 Waste Generation Breakdown and Recovery Rate for each participating Council by Key Stream**

The average annual generation for councils handling less than 3,000 tonnes of waste per stream is provided in Figure 13 for clearer viewing. Total waste generation and recovery values are provided per material stream for each council in Appendix D.



**Figure 13 Waste Generation Breakdown and Recovery Rate for councils handling >3,000 tonnes per Key Stream**

Arup acknowledges that the Queensland Government waste reduction targets for households (per capita) were established using a 2018 baseline, however, has factored in councils reducing their MSW generation rate per capita from a 2021 starting point. This was done to consistently apply 2021 data throughout the waste flow model. To be confident in this approach, an investigation was performed to quantify whether a significant difference in the waste generation per capita rate of a council existed when using either 2018, or 2021 data. This investigation found that there was a negligible difference in the waste generation per capita rate for a council whether a 2018 or 2021 baseline was applied.

## 2.4 Future Generation

The projected future generation for the key streams handled by councils within FNQROC is provided in Figure 14. Between 2021 and 2050 waste generation it is expected to increase by 28% for MSW, 43% for C&I and 45% for C&D respectively under a business-as-usual (BAU) scenario. This accounts for approx. 100,000 tonnes of additional material that will be generated in the region by 2050. Noting this figure will be larger for total regional generation, with the inclusion of material handled by private facilities.

Future waste generation projections have been estimated for MSW, utilising ABS data population counts. Taking 2021 as a baseline, the waste generation rate per capita for 2021 is used in combination with projected population counts to estimate the tonnes of MSW to be generated out to 2050. Future waste generation for C&I and C&D have been forecast using 2021 totals as a baseline, population and estimates of future Gross Regional Product (GRP).

This projection has been used as a basis for modelling for RRR Plan actions (as described in Section 4).

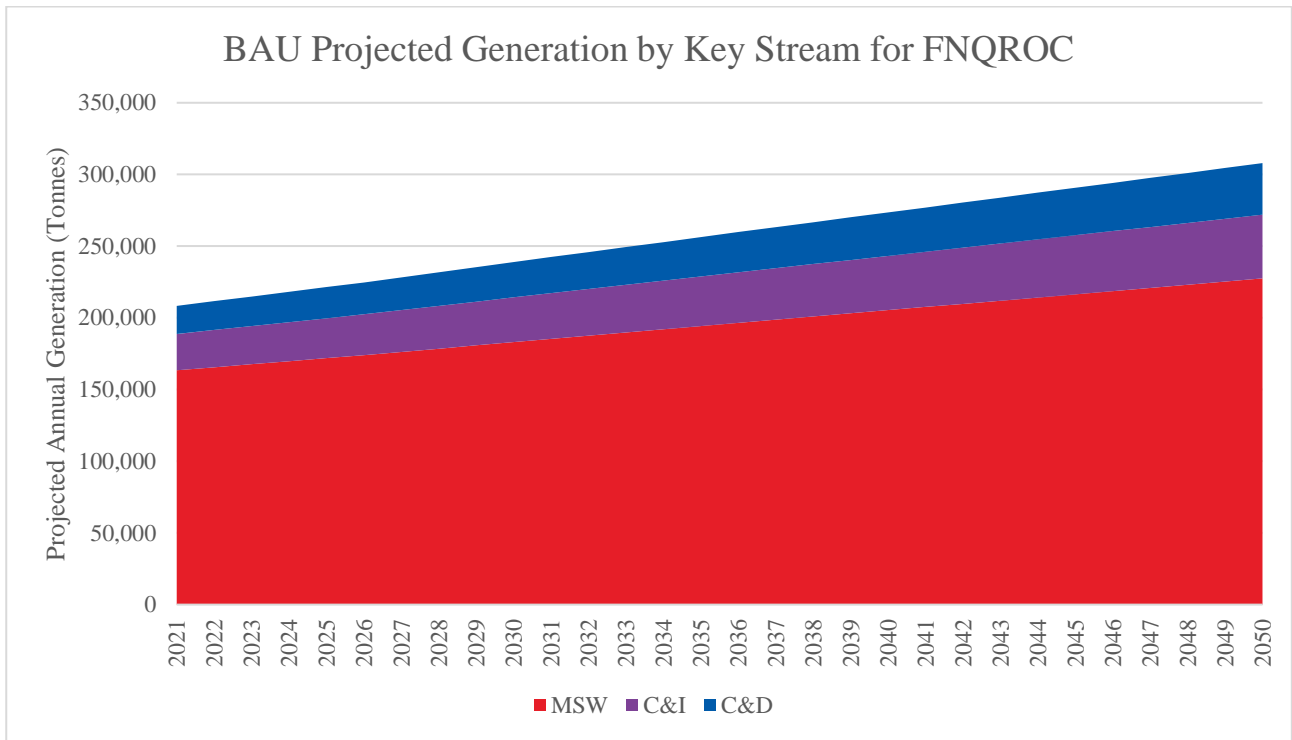


Figure 14 BAU Projected Generation by Key Stream for FNQROC

## 2.5 Existing Waste Infrastructure

### 2.5.1 Council Facilities

Council waste management and resource recovery facility networks primarily comprise of landfills, and transfer stations. Transfer stations operate primarily to segregate and consolidate material streams. On occasion some processing may occur at the transfer station sites, such as green waste mulching or concrete crushing to produce aggregate for reuse.

Understanding the challenges and limitations of existing waste and recycling infrastructure is key in developing a RRR Plan that informs future infrastructure decisions. Several councils described challenges associated with existing waste infrastructure designed to facilitate residual waste disposal rather than to maximise resource recovery and the need to upgrade or establish new sites to fulfil resource recovery needs.

The location of existing infrastructure also impacts how regional collaboration and management is undertaken. Figure 15 below presents the existing council owned and operated waste management and resource recovery facilities within the FNQ region.

A number of councils within the region operate local landfill facilities. However, several councils have recently undertaken rehabilitation and closure of council owned landfills and rely primarily on the privately operated Springmount Waste Management Facility (WMF) in Mareeba for the disposal of residual waste. An assessment of landfill infrastructure and capacity has been undertaken for each council. Table 13 provides the capacity assessment key and Table 14 outlines the results of this assessment. The council owned and operated landfill facilities are presented in Figure 15.

Table 13 Landfill Capacity Assessment Key

Key	Category description
Red	<ul style="list-style-type: none"> <li>&lt;10 years in current landfill site with no identified expansion location; or</li> <li>Reliant on landfill capacity outside of council area.</li> </ul>
Yellow	<ul style="list-style-type: none"> <li>Landfill capacity sufficient until 2050 but:               <ul style="list-style-type: none"> <li>Does not service the entire council area; or</li> </ul> </li> </ul>

Key	Category description
	<ul style="list-style-type: none"> <li>– Does not service all waste streams.</li> </ul>
Green	<ul style="list-style-type: none"> <li>• Sufficient landfill capacity within the council area until 2050, servicing:               <ul style="list-style-type: none"> <li>– all residual waste streams; and</li> <li>– the entire council area.</li> </ul> </li> </ul>

**Table 14 Council Residual Waste Disposal Infrastructure and capacity**

Council	Active landfill	Residual disposal details	Landfill site	Approx. capacity (years)	Rating
CRC	No	Residual waste transported to Springmount WMF	NA	NA	Waste disposal to external landfill site
CCRC	Yes	Inert waste only disposed to council owned landfill, wet residual transported to Springmount WMF	Tully Landfill	3 years	Sufficient capacity for dry waste only
	Yes	Residual waste transported to Springmount WMF (except for small council owned landfill facility in Coen)	Stoters Hill Landfill	Approx. 50 years	
CSC	No	Residual waste transported to Springmount WMF (except for small council owned landfill facility in Coen)	Coen Landfill	10 years (30-year expansion potential)	Capacity within Coen area only, majority of shire reliant on disposal to external landfill sites
CrSC	Yes	Residual waste disposed at council owned landfill site	Croydon Landfill	40 years	Sufficient capacity
DSC	No	Residual waste transported to Springmount WMF	NA	NA	Waste disposal to external landfill site
ESC	Yes	Residual waste disposed at council owned landfill site	Mt Sullivan landfill	10 years	Insufficient capacity and no expansion location identified
HVASC	Yes	Residual waste disposed at council owned landfill site	Hope Vale Landfill	10 years with possible further expansion potential.	Sufficient capacity
MSC	Yes	Utilise Springmount WMF, potential expansion of council facility.	Mareeba Landfill	>70 years long term expansion potential	Sufficient capacity
TRC	Yes	Residual waste disposed at council owned landfill. Utilise Springmount WMF as required.	Atherton Landfill	4 years capacity remaining	Assessment to be undertaken regarding expansion options
WWASC	No	Residual waste transported to Springmount WMF.	NA	NA	Waste disposal to external landfill site

Council	Active landfill	Residual disposal details	Landfill site	Approx. capacity (years)	Rating
YASC	No	Residual waste transported to Springmount WMF.	NA	NA	Waste disposal to external landfill site

Table 14 highlights the importance of the Springmount Waste Management Facility within the region but also the vulnerability of the reliance on one facility for the disposal of waste (entirely or in part) for up to eight regional councils. The reliance on a private facility, with no regional competition to manage gate fee increases and increase of the landfill levy is a key risk for the region.

MSC landfill site is centrally located and has long term expansion potential with capacity that could service not only MSC but a number of councils within the region, to 2050 and beyond. An assessment as the feasibility of the MSC landfill as additional disposal capacity for the region should be undertaken in the short term. This assessment should not only consider ongoing landfill capacity requirements, but risk mitigation and long-term resilience for disposal of residual waste.

For smaller regional councils with a local landfill site, expansion and maintenance of these facilities to main control of landfill assets is a priority.

In addition to transfer station and landfill sites, CRC operates a Material Recovery Facility which processes comingled recycling. A glass crushing facility is co-located with the CRC MRF for processing of the glass stream for use in council and Transport and Main Roads (TMR) projects. The Advanced Resource Recovery Facility is collocated at the Portsmouth transfer station. The ARRF is a mechanical biological facility which recovers organic material from MSW waste generating an organic compost product which is suitable for land application. This facility currently recovers a significant portion of material from the kerbside general waste from CRC, DSC and MSC before any residual waste is disposed to landfill. The ARRF is planned to close in 2026 which is anticipated to decrease resource recovery rates for those councils currently using the facility as without an alternative all kerbside waste would be disposed directly to landfill. This closure is creating a significant driver for implementation of resource recovery options in the region.

A full summary of infrastructure for each council and material flows is provided in Appendix D.

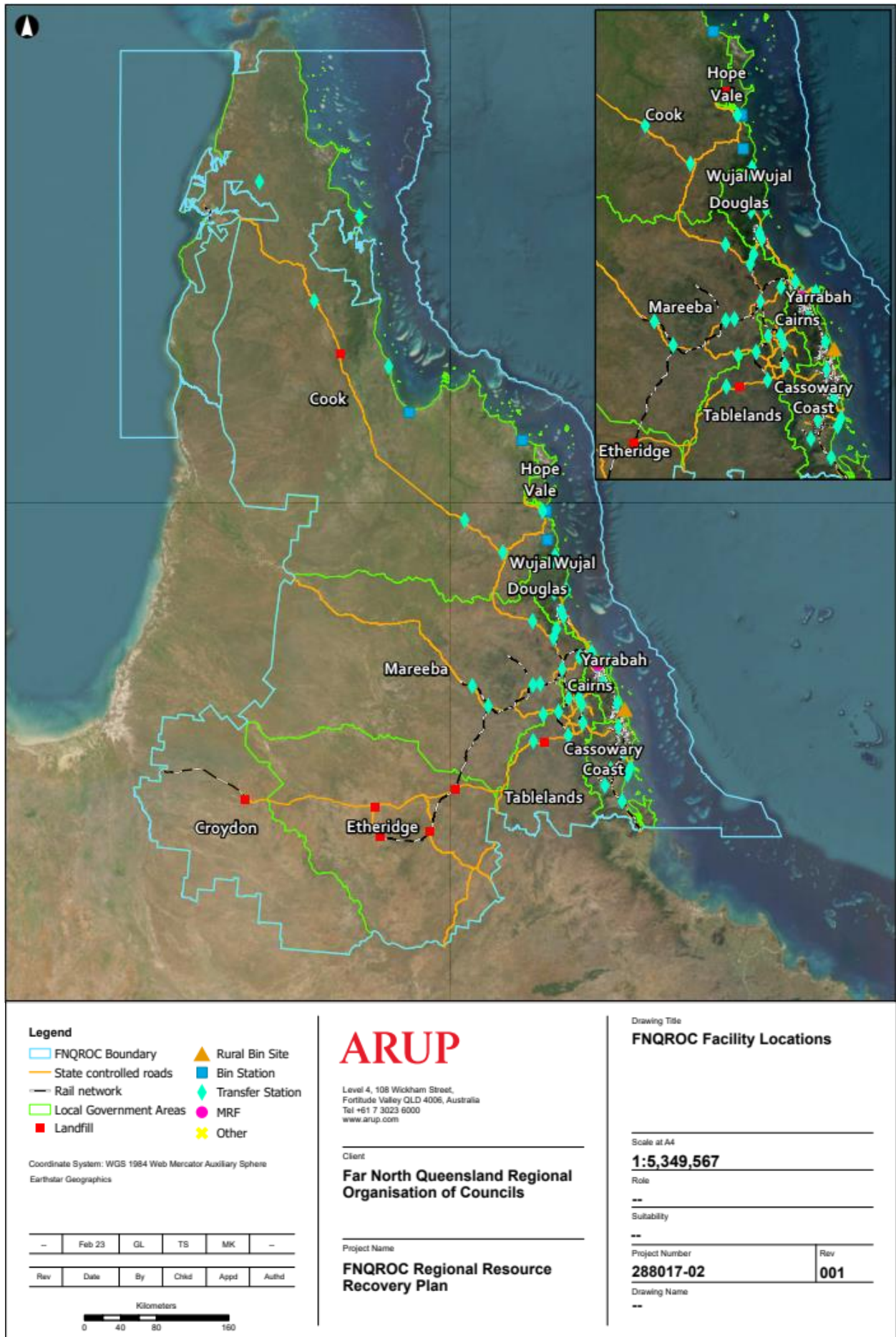


Figure 15 FNQROC Council-Owned Waste Management and Resource Recovery Facility Locations

### 2.5.2 Private Facilities

A map of private waste management and recycling facilities within the FNQ region is provided in Figure 16. This summary is based on discussions with councils and a desktop search of licenced facilities within the region, therefore it may not be an exhaustive record of all operators within the region.

In CRC in particular private facilities undertake management of the majority of C&I and C&D waste for the region. In other areas the presence of private facilities is less pronounced, and councils manage a large share of the C&I and C&D streams. Other private facility capacity includes the processing of organics and hazardous waste streams.



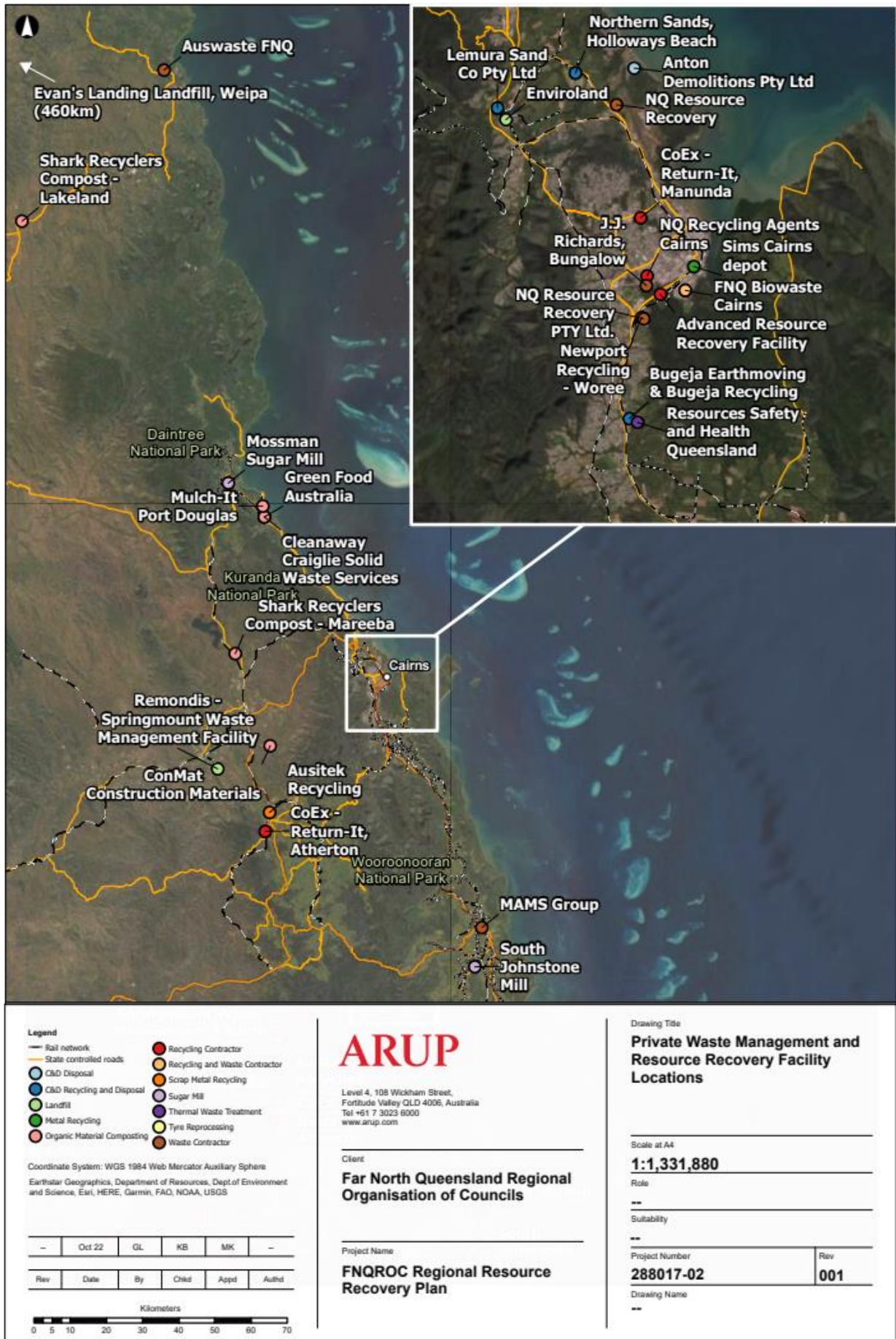




Figure 16 Private Waste Management and Resource Recovery Facility Locations

### 2.5.3 Kerbside Collection Infrastructure

The kerbside collection services currently offered by each council are outlined in Table 15. The majority of the FNQ councils do not offer a comingled recycling service and no councils offer a kerbside collections service for organics. However, it has been expressed during stakeholder engagement that councils and the community are eager to increase recovery rates for household recycling materials. Based on provided audit data, on average a kerbside general waste can contain approximately 20% comingled material in a two-bin service and up to 35% comingled material in a one bin service.

**Table 15 Household Collection Services for FNQROC participating Councils**

Council		CRC	CCRC	CSC	CrSC	DSC	ESC	HVASC	MSC	TRC	WWASC	YASC
Collection Service		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		✓				✓				✓		

### 2.5.4 Container Exchange

For councils where it is not viable to undertake a comingled recycling service, due to transport distances, resourcing or economic constraints, establishing and sustaining a CoEx collection point within the community may be a suitable alternative to recover this material. A summary of CoEx collection drop off points for the region are outlined in Table 16.

**Table 16 CoEx collection points**

Council	CRC	CCRC	CSC	CrSC	DSC	ESC	HVASC	MSC	TRC	WWASC	YASC
CoEx Collection	✓	✓	✓	No official drop off location (locally run)	✓	No official drop off location (locally run)	✓	✓	✓	✓	✓

Stakeholder engagement conversations indicated that CoEx is very popular with residents in regions where this service is offered. Eligible containers currently include aluminium, glass, plastic, steel and liquid paperboard beverage containers between 150ml and 3L. These items can contribute to a significant portion of the comingled recycling bin; therefore, this mechanism can increase recovery for councils which do not currently offer a comingled recycling service.

### 2.5.5 Problematic Waste Streams

Engagement with councils highlighted a number of key materials as problematic to handle, store or recover within the region. Key aspects of materials that contribute to materials being classified as problematic include:

- **Space:** materials such as concrete, scrap metal, white goods and tyres can consume considerable space at facilities making them difficult to accommodate, particularly for sites that are space constrained.
- **Recovery:** collection or processing of these materials is challenging due to access to collection, processing and markets. E.g., attracting contractors to collect material due to large transport distances or low material volumes. High costs to recover material due to secondary markets located out of the region.
- **Storage:** materials such as mattresses, cardboard or any reusable furniture and goods need to be kept out of the weather therefore require suitable infrastructure that is in most cases limited by available funding.

- **Volumes:** materials that are generated in large quantities and are going into landfill, become problematic to dispose, for two reasons 1. These materials are difficult to compact and take up valuable landfill space or 2. Incur a gate fee. This covers materials such as concrete and mattresses, but also includes garden and food organics.
- **Cost:** materials that are costly which hinder councils' ability to manage or recover.
- **Specific handling/disposal requirements:** Materials that have specific disposal or treatment requirements, such as asbestos, hazardous chemicals and oils can be problematic, particularly if presented at facilities infrequently or illegally dumped at facilities that are not set up to manage these streams. Limited access to services for collection and treatment can be challenging.

The below is a list of key problematic wastes for the FNQROC region:

- Tyres
- Plastics
- Mattresses
- Hazardous waste/chemicals
- Concrete
- Scrap metal and car bodies (refer section 2.5.6)
- Soft Plastics
- Batteries
- Emerging waste streams (e.g., renewable energy infrastructure)
- E-Waste
- Textiles/clothes
- Illegally dumped material
- Biosolids
- Organics
- Concrete

There are several constructed and planned renewable energy developments (solar and wind farms) within FNQ. Councils have highlighted concern that the renewable energy industry may, as infrastructure reaches end of life generate waste streams in the future that they are not set up to manage. Renewable energy developments are typically assessed through the State Significant Development processes and local councils have little or no oversight in the planning commitments of these developments, including waste management provisions.

It is important to note that problematic waste streams are volatile and can emerge due to changes in products or policy change, resulting in emerging problematic waste streams over time.

### 2.5.6 Regional Collaboration

Collaboration across the FNQ region serves to provide more opportunities for resource recovery of streams that may not otherwise be feasible for individual councils. This can be facilitated through initiatives such as shared contracts for collection, transport, or processing where a need can be demonstrated.

For example, the current regional scrap metal collection contract, managed by FNQROC is an example of how the quantity of a product across the region rather than in just one council can help to overcome some of these challenges.

## 2.6 Regional Issues and Risks

The FNQ Region presents issues and risks that vary between each individual council and the region as a whole. The key regional issues identified are summarised below and further discussion is provided in the I&O Paper (Arup Australia Pty Ltd, 2022).

### 2.6.1 Population Density and Transport Distances

The FNQROC region covers a land area of more than 250,000km. The resident population of the region is approximately 280,000 with a ranging density in population from 100.3 persons per km<sup>2</sup> in CRC and 0.02 persons per km<sup>2</sup> in ESC. Due to this ranging population density, transport distances and economies of scale for waste are an issue for councils, particularly in remote and rural areas. Small populations result in low

waste generation quantities and dispersed populations increase the difficulty of collection and servicing. Transport distances are also an issue due to access to secondary markets for recycling materials.

Low waste quantities have a significant impact on the economies of scale for council to operate facilities as well as to access recycling collection services. Comingled recyclables are a relatively low-density material, with a relatively low value. As a result, in many cases the transport costs far outweigh the value of the materials transported to markets.

In some cases, the low value of material and high transport cost factors influences the willingness or capacity of collection operators to travel the long distances to service remote communities. A number of councils are currently 'stockpiling with intent' for those difficult to recycle materials. These are resources that in other areas of Australia would be recovered through kerbside recycling or various product stewardship schemes. These issues demonstrate how the geographical distance and current transport infrastructure/processes do not support effective resource recovery and deter collaborative efforts to adopt more circular practices.

The distribution of population within a council area also impacts the costs associated with servicing and infrastructure. Councils that have populations distributed across large distances must service and provide facilities for each of these communities.

### 2.6.2 Transport Routes

A number of councils within FNQ rely on access through the Great Dividing Range for management of waste and resources and this can present one of the primary transport route challenges. The FNQ Regional Roads Investment Strategy has recognised the urgent need for improvement to roads, with key actions, which include road widening, reconstruction and rehabilitation across 56% of local government roads and 10% of state-controlled networks in the next 20 years. The FNQ roads network is limited, and must accommodate community, tourist and freight use. This shared road use presents more than an issue of increased traffic, but also a challenge of efficiency and safety for high productivity vehicles. Transport costs and barriers have been recognised by each of the FNQ councils, impacting the supply of materials and waste in-and-out of regional hubs. Transport routes are also impacted by seasonal weather which can result in primary access routes being cut-off for the wet season. Planning needs to consider how to build resilience into any new waste management practices for these communities so that they can maintain service provision to their communities.

The FNQ Regional Road Investment Strategy, published by FNQROC refers to the Kuranda range as extreme terrain, which is unsuitable for high productivity vehicles, especially when sharing the road with community members and tourists. The Barron River Bridge is also a load limiting factor for the route.

There are a number of alternative transport routes through the Great Dividing Range, including the Palmerston Highway, Gillies Range Road and the Mossman – Mt Molloy Road (Rex Range). These transport routes have been assessed as part of the TMR Cairns to Northern Tablelands Access Strategy. B-double transport is prohibited on the Gillies Range Road but permitted on the Palmerston highway. The Mossman – Mt Molloy Road requires a B-double (up to 23m) permit and is used for the transport of sugar cane to the Mossman sugar mill seasonally.

Rail infrastructure is limited in FNQ and is mainly used for tourism, particularly for inland councils. CRC transfer station is located adjacent to a freight railway line in Portsmouth which provides a connection for the transport of goods on the North Coast Line, providing links to Townsville, Mackay, and South East Queensland (SEQ).

### 2.6.3 Secondary Markets

Currently there is a lack of access to local secondary markets for FNQROC councils. The majority of recyclable material is segregated and consolidated for transport by road to SEQ (some 1,700km away) for reprocessing. Some materials are used locally, such as glass product from the CRC glass reprocessing facility and mulched green waste. However, for most recycled product materials, markets exist outside the region. Transport of materials to markets within SEQ or interstate is a large economic cost to councils and vulnerable to fluctuation in product value. As a result, the local recycling processing industry lacks resilience.

#### 2.6.4 Environmental Value

The FNQ region is home to pristine natural landscapes, including the Great Barrier Reef and the Daintree Rainforest within the Wet Tropics which are both world heritage recognised sites. The Great Barrier Reef is home to the world's most extensive coral reef ecosystem. The eastern councils within FNQROC (CSC, WWASC, DSC, MSC, YASC, TRC, CRC, and CCRC) are all contributors to the Reef Guardian Councils program. This stewardship initiative showcases environmentally sustainable practices with its 19 participating councils to preserve the pristine natural environment and coastline of FNQ. The Reef Guardian Councils program is a coordinated effort to help reduce the impacts on the Great Barrier Reef.

The Daintree Rainforest, situated within the Wet Tropics world Heritage-listed region, along with the Kuranda Rainforest, includes areas of global significance and is part of the largest continuous area of tropical rainforest in Australia. The Wet Tropics region provides an unparalleled record of the ecological and evolutionary processes that shaped the flora and fauna of Australia, containing the relicts of the great Gondwanan Forest that covered Australia and part of Antarctica 50 to 100 million years ago (UNESCO, 2023).

These internationally significant natural areas are vital to the FNQ environment, community, and economy. A strategic goal for FNQROC is to respect and manage these unique environments. In FNQ alone, the tourism industry which is heavily reliant on these pristine natural environments provides 25,000 jobs (pre-pandemic data) and state-wide contributes 6.3% to Gross State Product (GSP).

Landfills, particularly historic or unlined landfills, pose a relatively high environmental risk if not managed correctly. Leachate migration from landfill sites can pose risk of contamination of groundwater and surface water, impacting on the surrounding environment. Litter and illegal dumping also pose an environmental risk. Illegal dumping or incorrect management of hazardous materials can have serious environmental and health impacts.

#### 2.6.5 Skills and Labour

Skills and labour shortages are widespread across the FNQ region and hinder the operation of current services. Resourcing challenges have been described as a product of many factors including, remuneration availability, remote location, housing affordability and availability, as well as a lack of appropriately skilled candidates. A lack of skilled resources in councils can hinder the development and improvement of waste management systems including the ability for new roles to be created.

#### 2.6.6 Data Capture

A lack of data capture, visibility and standardisation is a significant barrier to understanding the scale of waste challenges and opportunities for FNQ. Currently across the region exists a range of data capture practices due to variation in infrastructure and abilities to capture data for management and reporting. Many of these practices are driven at a minimum by the program and reporting requirements implemented by the State and Federal Government.

#### 2.6.7 Community Engagement

MSW represents the most significant portion of waste managed by FNQ councils. Increasing the recycling rate and landfill diversion of MSW requires significant community engagement and education, which has proven to be an issue for most FNQ councils. Undertaking community education around waste management and recycling is a resource intensive activity. A number of councils in FNQ do not have the funding for appointment of a full time Waste Education Officer (or similar) role. In addition, FNQ welcome a large number of visitors and tourists each year which increases the challenge of community engagement and education.

A number of councils in the region already share marketing and education resources. However, this sharing of material between councils has issues with community messaging due to incorrect branding. To support community engagement, materials must be tailored to suit the messaging and needs of each community. A regional broadcast campaign has recently commenced between CRC, TRC and DSC. Advertisements are branded with CRC, TRC and DSC's logos. Given geographical location and distribution of station networks MSC and CCRC will receive the advertisements but weren't involved in the campaign, as they currently have different kerbside bin arrangements.

### 2.6.8 Tourism

Councils with large national parks currently experience issues with tourist generated waste. National parks do not supply bins therefore waste is disposed at point of entry or exit to the parks and becomes council's responsibility to manage. This can create increased operational and cost burden for councils, with no financial contribution from tourism to support waste management.

Tourism fluctuations have a significant impact on several councils, particularly those with low resident population numbers. Tourism Australia's National Visitor Survey (Tourism Australia, 2022) shows that Tropical North Queensland (TNQ) is one of the Top 10 overnight domestic tourist destinations in Australia. Prior to the COVID-19 pandemic outbreak in 2020, the region hosted 6,732,908 overnight international visitors, and 9,137,439 overnight domestic visitors in 2018/19 – equivalent to 12% of all international overnight visitors staying in Queensland, or 9% of all domestic overnight visitors staying in Queensland (Informed Decisions, 2021). This equates to an additional regional population of 48,480 people. Whilst a significant decline in international visitors was experienced over the past two years, Tourism Research Australia forecasts Queensland domestic visitor nights will increase with an annual growth of 6.6% from 2021-22 to 2025-26, returning to previous pre-pandemic peak level (2018-19) in 2022-23 (Tourism Research Australia, 2021).

While tourist numbers can in some cases double the population in communities, when council budgets are operated based on rateable properties there is a strain on service provision when tourists are contributing to waste production. Very little direct cost recovery occurs from tourists for council waste businesses.

### 2.6.9 Council specific risks and issues

A summary of the key issues and risks faced by each council within FNQROC is provided in Table 17. This summary has been informed through stakeholder engagement with each individual council and through site visits. This table highlights the variation in key drivers or concerns across the region and has helped to shape and inform the solutions for each council that have been developed as part of this RRR Plan.

**Table 17 Priority Mapping of Council-specific Risks and Issues**

	Transport Distances	Economies of Scale	Transport Routes	Secondary Markets	Environmental impacts	Resourcing and Skills	Waste Data	Education and Engagement	Tourism Fluctuations	Existing Infrastructure and Transfer Stations	Problematic Waste Streams
CRC	Yellow	Yellow	Green	Yellow	Yellow	Green	Green	Yellow	Yellow	Red	Green
CCRC	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow
CSC	Red	Red	Yellow	Red	Yellow	Red	Yellow	Yellow	Yellow	Red	Yellow
CrSC	Red	Red	Red	Red	Green	Yellow	Red	Yellow	Green	Green	Yellow
DSC	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Yellow	Yellow
ESC	Red	Red	Red	Red	Yellow	Yellow	Red	Yellow	Green	Red	Red
HVASC	Red	Red	Red	Red	Yellow	Yellow	Red	Red	Yellow	Red	Yellow
MSC	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Green	Yellow
TRC	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
WWASC	Red	Red	Red	Red	Yellow	Yellow	Red	Red	Green	Red	Yellow
YASC	Yellow	Yellow	Green	Yellow	Yellow	Red	Red	Red	Green	Red	Red

**Table key:**

High risk/ issue	Medium risk/issue	Low risk/issue
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### 3. RRR Plan Development

The process followed for development of the RRR Plan is outlined in Figure 17 and key elements are described in the following sections.

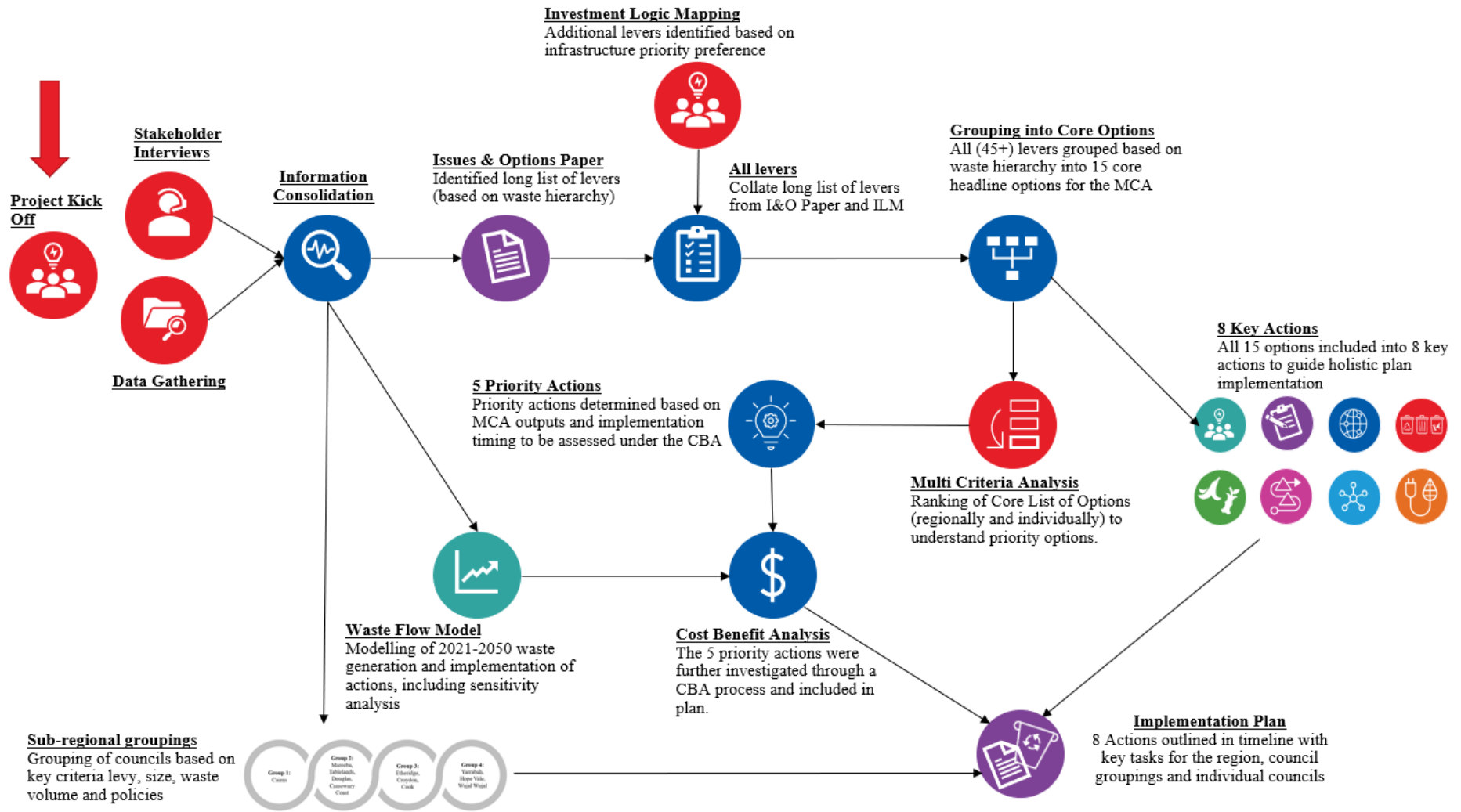


Figure 17 RRR Plan Development Process Overview



### 3.1 Issues and Options Paper Long List

Development of a long list of levers for FNQROC was undertaken during collation of the Issues and Options Paper (Arup Australia Pty Ltd, 2022) with levers arranged based on the waste hierarchy and circular economy principles. A complete long list of levers identified in *Chapter 5 – Options long list* of the *Issues and Options Paper* is provided in Appendix A and are summarised in Table 18.

**Table 18 Issues and Options Paper levers (options).**

Goal	Initiatives
<b>Reduce</b>	<ul style="list-style-type: none"> <li>Establish an education program targeting residents, businesses, tourism and agricultural industry.</li> <li>Consideration of generator pays schemes and consistency in charging across the region.</li> </ul>
<b>Reuse</b>	<ul style="list-style-type: none"> <li>Increase uptake of buy back shops.</li> <li>Increase uptake of product or service sharing opportunities (including opportunistic recycling, relationship brokering and sharing or leasing models).</li> <li>Distributed processing technologies.</li> <li>Planning and policies including support for precinct development.</li> <li>Support for market development.</li> </ul>
<b>Recycle and Compost</b>	<ul style="list-style-type: none"> <li>Enhancement of kerbside bin infrastructure (including comingled recycling and FOGO).</li> <li>Increase organics processing capability.</li> <li>Consolidation of sites, including landfill closure and transfer station optimisation.</li> <li>Support increased access and availability of product stewardship for materials.</li> </ul>
<b>Recovery and Residual</b>	<ul style="list-style-type: none"> <li>Landfill disposal with and without gas capture.</li> <li>Recovery of fuel or energy from waste.</li> </ul>

To achieve the goals in improving the economics of resource recovery, encouraging economic development and in moving towards meeting the Queensland state targets for improved resource recovery and waste management, a series of levers are available to manage waste and resources in the region. This long list of levers was developed based on practices undertaken within Australia and internationally.

In developing these levers, it is critical to understand that they are framed in the context that they are separate levers that operate in combination with BAU conditions. These levers typically require some degree of additional investment, planning or governance to assist in meeting the strategic objectives and goals set out by the organisation.

The levers have been selected for the FNQ region recognising the significance of both the circular economy and implementation of the waste hierarchy. In managing waste and resources, there are many solutions available in improving the conditions for individual communities and councils, as well as regional issues which stem from a broad range of both infrastructure and non-infrastructure mechanisms.

The I&O Paper long list of levers was supplemented with outputs from the Investment Logic Mapping workshop, which is described in Section 3.2.

## 3.2 Investment Logic Mapping Workshop

### 3.2.1 Guiding statement and problem definition

As part of development of the RRR Plan, an ILM workshop was conducted with the FNQROC Working Group to define the following for the region:

- The problem or opportunity,
- Articulate the key benefits sought, and
- Develop a strategic response and identify business changes and potential initiatives needed to achieve key benefits for the region.

The ILM process follows the Business Case Development Framework to guide the development of business cases for infrastructure proposals. This framework follows the methodology laid out in the *Guide for Business Case Development Framework* released by the Department of State Development, Infrastructure, Local Government and Planning. This Guide defines ILM as follows:

*Investment logic mapping (ILM) is an early stage technique that assists in developing and documenting the logic that underpins a potential investment decision, before specific solutions are identified, and before a decision is made*

The ILM workshop conducted with the FNQROC Working Group identified the following as a guiding statement for development of the RRR Plan:

***Committing, sharing and cooperating to minimise waste and maximise resilient and effective resource recovery systems in FNQ.***

The ILM process also provided the following as the key problem definition for the region:

A low understanding of the urgency to reduce and effectively manage waste as a valued resource decreases resource recovery rates and participation, FNQ reputation and job opportunities and increases the volume of waste into landfill, carbon and councils operating costs.

Global influence and disruptions, fast changing regulation, regional complexity and community expectations highlights systemic inadequacy and risk and reduces resource recovery rates and the rate of return on investments.

The ILM outputs are provided for reference in Appendix E.

### 3.2.2 Success measures

The following key performance indicators outlined in Table 19 have been identified by the ILM as the success measures for the FNQROC RRR Plan. These success measures have been used to inform development of key actions (refer Section 4) and future monitoring and reporting requirements (refer Section 8).

**Table 19 Key success measures**

Benefit	Key performance indicator
<b>Improved Regional Resource Recovery Outcomes</b>	<ul style="list-style-type: none"> <li>• Increase resource recovery rate.</li> <li>• Decrease reliance on landfills.</li> <li>• Increase system productivity and efficiency.</li> </ul>
<b>Economic Prosperity</b>	<ul style="list-style-type: none"> <li>• Attraction of new secondary industries.</li> <li>• Increase investment in the region.</li> <li>• Increase reputation of FNQ.</li> <li>• Increase rate of return on investments.</li> </ul>

Benefit	Key performance indicator
<b>Environmental and Health Outcomes</b>	<ul style="list-style-type: none"> <li>Support communities and environmental health through resource recovery and education programs.</li> <li>Increase land, water and air quality.</li> <li>Decrease risks to environment through contaminated material and/or infrastructure failure.</li> <li>Decrease Greenhouse Gas emissions from waste operations.</li> </ul>

The guiding statement, key benefits and KPIs have been used to guide development of the RRR Plan implementation strategies, targeted actions and sequencing of infrastructure and non-infrastructure solutions. The ILM outputs are provided for reference in Appendix E.

### 3.2.3 ILM Levers

In addition to the above, the LM workshop identified a long list of potential levers for the region, categorised according to infrastructure priority preference of Reform, Better Use, Improve Existing and New Build. In some cases, these levers were similar or the same as those identified within the I&O Paper however a reframing of the assessment around infrastructure priority preference made sure that no potential levers were missed from the assessment process.

The full list of ILM levers is provided in Appendix E and Section 3.3 outlines the process of grouping the levers long list for assessment through the MCA.

## 3.3 Core Headline Options

The long list of levers presented in the I&O Paper and the ILM workshop were grouped into 15 core headline options, for assessment as part of an MCA. The full initiatives and description of the consolidation process for each is provided in Appendix A. This consolidated list of 15 core options and descriptions is provided below in Table 20.

**Table 20 FNQROC Core Headline Options**

Refined ID	Option	Description
1	Regional and subregional kerbside collection and processing contracts.	Roll out regional and subregional kerbside collection and processing contracts to improve economies of scale and management of existing infrastructure.
2	Soft infrastructure (education, standardisation, monitoring).	Implement soft infrastructure including education programs across residents and businesses, agricultural and tourism industries, and standardisation of signage. Undertake data capture, waste monitoring/tracking technologies, for use in reporting, compliance, behaviour change programs, and tracking against targets.
3	Broker Sharing and Service Opportunities.	Broker sharing and service opportunities – Business-to-Business (B2B), opportunistic recycling, product reuse, sharing and leasing models with the community and businesses.
4	Distributed processing technologies with local scale infrastructure.	Implement distributed processing technologies with local scale infrastructure to improve remote/rural resource reuse efficiency of problematic waste streams.
5	Buy back shops at existing transfer station facilities.	Establishment of buy back shops at existing transfer station facilities.
6	Centralised resource recovery precinct.	Development of a new centralised resource recovery precinct.
7	Consolidation of current sites.	Consolidation of current sites, optimising latent capacity and increase process efficiency to leverage existing assets and maximise resource recovery and operational efficiency (e.g., minor improvements to optimise transport connections, traffic flows, increased volumes or site material flows).
8	New transfer station and recovery facilities.	Development of new transfer station and recovery facilities to provide the opportunity to design sites focused on resource recovery and recycling capture.

Refined ID	Option	Description
9	Hub and spoke transfer station network.	Maximise collection of recyclables and problematic wastes by regional approach to consolidating waste streams using hub and spoke transfer station network.
10	Mobile processing technology options for recyclables.	Mobile processing technology options for recyclables based on waste streams and volumes now and in the future.
11	Expansion of comingled recycling bins or enhance CRS.	Expansion of comingled recycling bins to councils without this service. Where this isn't possible there may be options to enhance CRS (or similar product return schemes) to improve recovery.
12	Kerbside organics collection stream (FOGO, GO, home/community).	Implement a kerbside organics collection stream (e.g., combination of FOGO, GO or home/community composting based on current service level).
13	Organics processing options and/or for recovery of biosolids through composting.	Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g., processing of organic waste through EfW Bioenergy precincts integrated with existing facilities in the region).
14	Development of an EfW facility with incineration capability.	Management of residual waste through development of an EfW facility which utilises physical and/or chemical mechanisms or incineration to recover energy.
15	New or existing landfill facilities.	Management of residual waste through disposal to new or existing landfill facilities (with or without LFG capture and energy recovery).

### 3.4 Multi-Criteria Analysis

#### 3.4.1 The MCA Process

An MCA process was used to rank the consolidated list of 15 core headline options as provided above in Section 3.3. The assessment and ranking of these options was undertaken to help guide areas of focus for development of this RRR Plan.

An MCA workshop with the FNQROC Working Group was facilitated by Arup to assess the 15 core headline options and provide a ranking of priorities for the FNQ region. This workshop utilised a set of agreed MCA criteria as provided in Table 21. These 20 criteria were developed by Arup using the Six Capitals approach which looked at financial, manufactured, human, intellectual, social and relationship, and natural capital criterion. Each council was asked to score the importance of each criterion ahead of the workshop.

**Table 21 Assessment Criteria for MCA**

MCA criteria			
Option is likely to result in job creation and/or regional investment	Option has lowest upfront investment and has potential to minimise ongoing costs	Option will minimise asset stranding risk	Option is financially sustainable
Option will generate opportunities to engage with local Traditional Owner businesses	Option will create shift in location of industry or use of new technology	Option will be supported by the community and other stakeholders	Option will maximise community & tourist participation
Option will result in improvements to land, water & air quality	Option will reduce environmental risks including through littering, nuisance, and contamination	Option will result in GHG emissions in plant and transport	Option provides an opportunity for circular economy solutions (either infrastructure or materials)
Option will increase system productivity & efficiency	Option can be adapted to meet requirements over the long term (i.e., technology can be used for other products or repurposing can occur)	Option will increase the resource recovery rate	Option will create opportunities to access new markets

MCA criteria			
Option has infrastructure that is scalable or flexible	Option will likely result in innovation	Option is likely to deliver opportunity for value capture	Option is likely to result in improved capability

**Table Key:**

Financial Capital	Manufactured Capital	Human Capital
Intellectual Capital	Social & Relationship Capital	Natural Capital

### 3.4.2 MCA Outcomes

The regional MCA workshop ranking results for the 15 core headline options are provided in Table 22.

Concerns were raised during the MCA workshop that the final regional collaborative ranking did not reflect the individual needs of each council. Therefore, each council was asked to provide their own individual response ranking the 15 options. Out of the 11 councils, 9 of these councils provided a response with their own ranking of initiatives. The rankings of each option supplied by the individual councils provided in Table 23.

The regional MCA outcomes have slight variance from the individual council rankings. However, regionally it can be identified that circular economy and reuse opportunities ranked highly, with development of new landfill infrastructure ranking the lowest. The regional and individual council MCA results have been used to guide the development of actions as outlined in Section 4.

**Table 22 Regional MCA Outcomes (Collaborative Regional Ranking)**

Ranking	Option	Waste Hierarchy
1	Centralised resource recovery precinct.	Reuse
2	Broker Sharing and Service Opportunities.	Reuse
3	Distributed processing technologies with local scale infrastructure.	Reuse
4	Soft infrastructure (education, standardisation, monitoring).	Avoid and Reduce
5	Hub and spoke transfer station network.	Recycle and Compost
6	Kerbside organics collection stream (FOGO, Garden Organics (GO), home/community).	Recycle and Compost
7	New transfer station and recovery facilities.	Recycle and Compost
8	Buy back shops at existing transfer station facilities.	Reuse
9	Consolidation of current sites.	Recycle and Compost
10	Mobile processing technology options for recyclables.	Recycle and Compost
11	Regional and subregional kerbside collection and processing contracts.	Governance/Recycle and Compost
12	Expansion of comingled recycling bins or enhance CRS.	Recycle and Compost
13	Development of an EfW facility with incineration capability	Residual Waste Management
14	Organics processing options and/or for recovery of biosolids through composting	Recycle and Compost
15	New or existing landfill facilities	Residual Waste Management

Further detail on the technical details in developing the MCA criteria and ranking sensitivity assessment is provided in Appendix F.



## 3.5 RRR Plan Implementation Method

### 3.5.1 Key Action Areas

To provide a holistic approach in development and implementation of the RRR Plan priority headline options, eight key collective regional actions have been developed, refer Figure 18. These actions have been formed acknowledging that waste and resource recovery infrastructure and initiatives are an integrated system, and that a number of the options will be interdependent with each other. Therefore, the eight regional actions provide a mechanism for development of tasks for each option with consideration of interdependencies and influencing factors.



**Figure 18 FNQROC 8 Key Regional Actions**

Development of these eight key regional actions has evolved by grouping the core headline options from the MCA into clear actions that can be conducted regionally. The following Table 24 provides a summary of the eight regional actions and a link to the MCA options.

**Table 24 Integration of MCA initiatives into the 8 Key Regional Actions**

Regional Action	Core Headline Option Integration
<b>Action 1: Step-change in customer engagement</b>	Soft infrastructure (education, standardisation and monitoring).
<b>Action 2: Optimise regional servicing arrangements</b>	Distributed processing technologies with local scale infrastructure. Broker sharing and service opportunities. Regional and subregional kerbside collection and processing contracts. Mobile processing technology for recyclables.
<b>Action 3: New transfer station facilities and closure of facilities with regulatory or environmental issues</b>	New transfer station facilities. Consolidation of current sites. Buy back shops at existing transfer stations.
<b>Action 4: Enhance kerbside collection approach</b>	Expansion of comingled recycling bins or enhances CRS.
<b>Action 5: Maximise diversion of organic waste from landfill</b>	Kerbside organics collection stream (FOGO, GO, home composting).

Regional Action	Core Headline Option Integration
	Organics processing options and/or for recovery of biosolids.
<b>Action 6: Optimise regional network of resource recovery facilities</b>	Hub and spoke transfer station network. New recovery and processing facilities.
<b>Action 7: Develop centralised resource recovery precinct</b>	Centralised resource recovery precinct.
<b>Action 8: Develop alternatives to landfill for residual waste</b>	Development of an energy from waste facility. New or existing landfill facilities.

### 3.5.2 Sub-regional Groups

FNQROC covers vast geographical area with 11 diverse councils included in this RRR Plan, each with different needs and drivers for resource recovery. The implementation of actions under the RRR Plan needs to represent these 11 diverse councils and the region as a whole. As such it is important to understand that a one size fits all approach is not necessarily feasible for the FNQ region. It is essential to provide implementation strategies that are *fit for purpose* and *fit for place*. Overall, the RRR Plan needs to outline a roadmap that will assist to meet objectives for the FNQ region and State strategy outcomes.

The approach to implementation of the RRR Plan is based on the following key principles:

- Key guiding principles and investment priorities – *consistent across the region*.
- Approach to implementation and staging:
  - Varied across the region,
  - Tailored to individual council needs,
  - Complementary and interface with integrated regional system, and
  - Must be acceptable and affordable to each individual community.

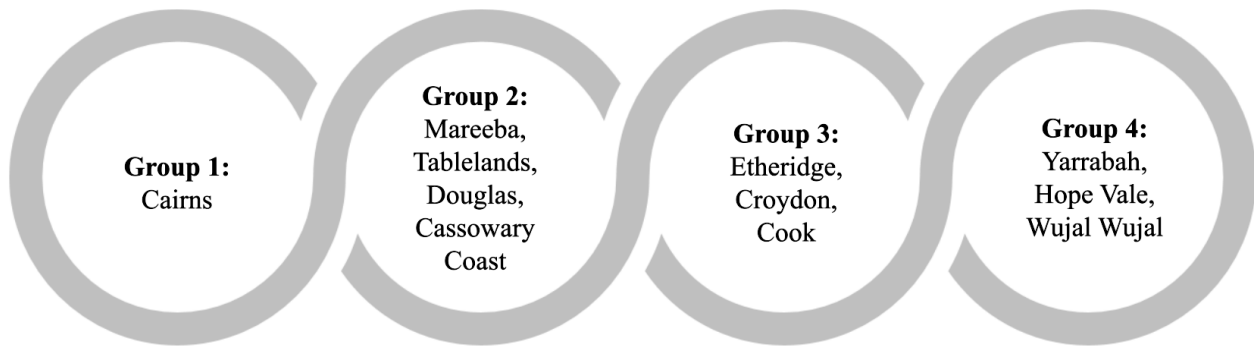
To support these key guiding principles a sub-regional grouping approach has been proposed for implementation of actions under the RRR Plan, to gain the most effective and efficient outcomes for the region. The RRR Plan implementation strategies and staging will vary between each sub-regional group as required. Groupings are proposed to highlight councils on a similar trajectory with respect to roll out of actions, however, does not limit collaboration between groups.

The sub-regional groups were determined based on the following key criteria:

- Landfill levy liability zoning,
- Size of LGA,
- Waste volumes/population, and
- Influence by other policies and plans.

From this approach the following four sub-regional groups have been identified to guide implementation of the RRR Plan:





**Figure 19 Four Regional Groups**

Table 25 outlines the assessment for each group based on key criteria.

**Table 25 Regional Group Criteria**

Group	Grouping Criteria
<b>Group 1: CRC</b>	Within levy zone Subject to annual levy payment reduction from 2023 Generates 58.3% of all waste within region
<b>Group 2: MSC, TRC, DSC, CCRC</b>	Within levy zone Subject to annual levy payment review from 2025 Generate 38.1% of all waste within region
<b>Group 3: ESC, CrSC, CSC</b>	Outside levy zone Not subject to annual levy Generates 2.4% of all waste within region
<b>Group 4: YASC, HVASC, WWASC</b>	Outside levy zone Part of Queensland’s Indigenous Waste Management Strategy Generates 1.3% of all waste within region

For implementation of the RRR Plan, the sub-regional groups will be on a similar trajectory for infrastructure and non-infrastructure solutions, however the timing and staging for each council within the group may differ.

### 3.5.3 Action Timeframes and Priorities

Each of the eight actions has been assessed based on likely timing of implementation, based on need or feasibility, from immediate to the long term. The proposed timing of each action and the priorities of these actions across the four sub-regional groups, based on rankings provided in the MCA is presented in the Table 26. This assessment of implementation timing and priorities has been used to distinguish which actions are of most value to assess through the Cost Benefit Analysis.

The implementation plan as outlined in Sections 4 and 5 includes all initiatives required under each of the eight actions for the region, sub regional groups and individual councils. In addition, a CBA has been undertaken to understand costs and benefits for a selection of actions. The criteria for selection of these actions and the CBA process are described further in Section 3.6.

Table 26 Key Action Timeframes and Group Priorities

Action	Timeframe				
<b>Action 1: Step-change in customer engagement</b>	Immediate Implementation (<3 years)	✓ <i>very high priority</i>	✓ <i>very high priority</i>	✓ <i>high priority</i>	✓ <i>high priority</i>
<b>Action 2: Optimise regional servicing arrangements</b>		✓ <i>medium priority</i>	✓ <i>medium priority</i>	✓ <i>very high priority</i>	✓ <i>very high priority</i>
<b>Action 3: New transfer station facilities and closure of facilities with regulatory or environmental issues</b>		✓ <i>high priority</i>	✓ <i>high priority</i>	✓ <i>very high priority</i>	✓ <i>very high priority</i>
<b>Action 4: Enhance kerbside collection approach</b>	Short-Term Implementation (3-6 years)	✓ <i>high priority</i>	✓ <i>high priority</i>	✓ <i>low priority</i>	✓ <i>low priority</i>
<b>Action 5: Maximise diversion of organic waste from landfill</b>		✓ <i>very high priority</i>	✓ <i>high priority</i>	✓ <i>medium priority</i>	✓ <i>medium priority</i>
<b>Action 6: Optimise regional network of resource recovery facilities</b>	Medium-Term Implementation (6-10 years)	✓ <i>high priority</i>	✓ <i>high priority</i>	✓ <i>very high priority</i>	✓ <i>High priority</i>
<b>Action 7: Develop centralised resource recovery precinct</b>		✓ <i>very high priority</i>	✓ <i>very high priority</i>	✓ <i>high priority</i>	✓ <i>high priority</i>
<b>Action 8: Develop alternatives to landfill for residual waste</b>	Long-Term Implementation (>10 years)	✓ <i>medium priority</i>	✓ <i>medium priority</i>	✓ <i>low priority</i>	✓ <i>low priority</i>

## 3.6 Cost-Benefit Analysis

### 3.6.1 Approach to Cost-Benefit Analysis

An assessment was undertaken to determine which actions were of most value to include in the CBA. This assessment was based on if the action could be implemented in the immediate to short term and if it was identified as a priority area for any of the sub regional groups, as outlined in Table 26. Actions assessed as suitable for inclusion in the CBA were determined based on if they were listed as any of the following for a subregional group:

- Very high priority,
- High priority, and
- Medium/low priority (only when part of larger regional approach or supporting future initiatives).

Based on these criteria, the CBA analysis included assessment of the following key actions as listed in Table 27.

**Table 27 Actions included in CBA analysis**

Action	Summary
Action 1	Step-change in customer engagement
Action 2	Optimise regional servicing arrangements
Action 3	New transfer station facilities and closure of facilities with regulatory or environmental issues
Action 4	Implement a recycling kerbside collection service for relevant councils
Action 5	Implement an organic kerbside collection service for relevant councils

A CBA was undertaken to assess the extent of the economic, social and environmental impacts resulting from the five prioritised Actions. This is done by demonstrating how the economic benefits generated by the Actions compare to the costs of implementing them.

The assessment compares the incremental changes in costs and benefits between the base case scenario and the Actions, and a qualitative assessment of the non-measurable impacts. For example, avoided landfill disposal costs were estimated by comparing the total disposal costs in the base case (without the Action) and the disposal costs following implementation (Project case).

Benefits and costs are presented in real terms to account for inflation and discounted to present value (PV) using an industry standard discount rate of seven percent. Impacts are forecast over an appraisal period of 27 years to 2050. The technical report to support this analysis is provided in Appendix G.

### 3.6.2 Key Inputs

The key inputs into this analysis are the waste flow modelling and benchmark cost estimates developed by Arup. Key benefits that are monetised as part of the CBA include:

- Avoided landfill disposal costs,
- Reduced greenhouse gas emissions (GHGs) from diversion of material from landfill,
- Resource recovery value (of materials), and
- Cost-efficiencies.

Outputs of the economic analysis include the following for each Action considered:

- Total Cost (present value),
- Total Benefits (present value),

- Direct Jobs, and
- Recovery rates.

### 3.6.3 Base Case Assumption

The base case has been developed based on the following assumptions:

- Municipal solid waste generation is proportional to population change.
- Consumer Price Index is assumed to increase at 3% each year till 2050.
- The Queensland Government waste levy for regional levy areas continues to increase with respect to CPI post 2023-24, out to 2050 (at the time of writing, how the general levy rate for regional levy areas has not been explicitly defined beyond 2023-24).
- Under the Queensland Government waste levy, councils located within the regional levy area continue to be offered a fully repayment of the waste levy out to 2050, with the exception of CRC (at the time of writing, the structure of levy repayments has not been explicitly defined beyond 2030-31).
- The waste levy zones, and areas do not change between now and 2050.
- Cairns ARRF Facility ('Bedminster') closes in 2026 and following this all kerbside general waste generated by CRC, DSC and MSC is sent to landfill.
- Existing waste management practices are maintained and not changed over time (e.g., number of bins offered to households, services offered through transfer stations, transfer station configuration and number, end destination for waste materials (with the exception mentioned above regarding the Bedminster closing).
- The Cost Benefit Analysis only focuses upon Actions 1 – 5, as it is assumed that Actions 6 – 8 will occur in the medium – long term, as opposed to the immediate – short term. Longer-term investment is associated with increased uncertainty in key cost and demand parameters that limits the relevance of CBA analysis.

### 3.6.4 Waste Levy Analysis

The economic analysis considers a scenario where changes are made to government annual payment rates for the waste levy. The central case follows the current Queensland Government guidance where the annual payment for Cairns is reduced year on year until 20% of the baseline is reached in FY2030/31, and the annual payment for all other eligible councils continues at 100%. These annual payment rates are assumed to continue over the forecast period to 2050.

The alternative waste levy scenario assumes that rates continue to fall to 0% over time. For Cairns this means a reduction to 0% in FY2032/33. For all other eligible councils, it is assumed that the annual payment starts to decline following FY2025/26, reducing by 10% each year to reach 0% in FY2035/36.

The impact of this alternative scenario is shown in the results. The change in annual payments to councils is shown in the benefits through a change in the avoided disposal costs. In the alternative scenario, more waste levy costs are avoided than in the central case, as the cost of disposing to landfill increases for any given tonne.

### 3.6.5 Disclaimer

The economic analysis has been prepared to support strategic planning for waste management in the region. The cost-benefit analysis is intended to support a strategic understanding of the timing and order of magnitude of potential investment pathways. Further analysis is required to support feasibility studies and inform investment decisions.

It should also be noted the benefits identified in the CBA considers non-financial benefits and undertakes the appraisal from an overall community perspective. For example, the value of compost used in the analysis does not necessarily represent the sale price a council would be able to charge for compost. It instead

represents the value of compost to society, estimated using metrics and parameter values based on case study research.

As a result of the reliance on benchmark costs from Arup's experience, supplied by councils, or through third-party information, Arup has low confidence in the level of accuracy of the pricing data used to inform the CBA. To understand the exact costs associated with each of the Actions for each of the individual councils more detailed cost analysis is required.

The waste levy analysis is dependent on the waste flow modelling and the tonnes of waste estimated to be diverted from landfill as a result of each of the Actions. The assumptions underpinning this modelling are based on Appendix C and therefore changes in the cost of the waste levy should be considered indicative only.

## 4. RRR Plan Actions

### 4.1 Overview

The implementation plan for Actions 1 to 8 is provided in the sections below. Further detail regarding the waste flow model assumptions and results and the CBA are provided in Appendix C and Appendix G.

Timeframes for the implementation of the eight actions and associated initiatives provided in this section and provided in the RRR Roadmap in Section 5 are noted as potentially ambitious with actual timing subject to change based on further investigation and impacting factors such as changes to infrastructure capacity, community needs, or policy. The timeframes noted are included as commencement dates for the initiative and provide a guide for the beginning phases of each initiative.

The success of the RRR Plan must be underpinned by an effective governance structure implemented at a regional level. A governing body is critical to provide a single point of accountability for delivery of actions under the RRR Plan.

### 4.2 Governance Structure

#### 4.2.1 FNQROC RRR Plan Governance Structure

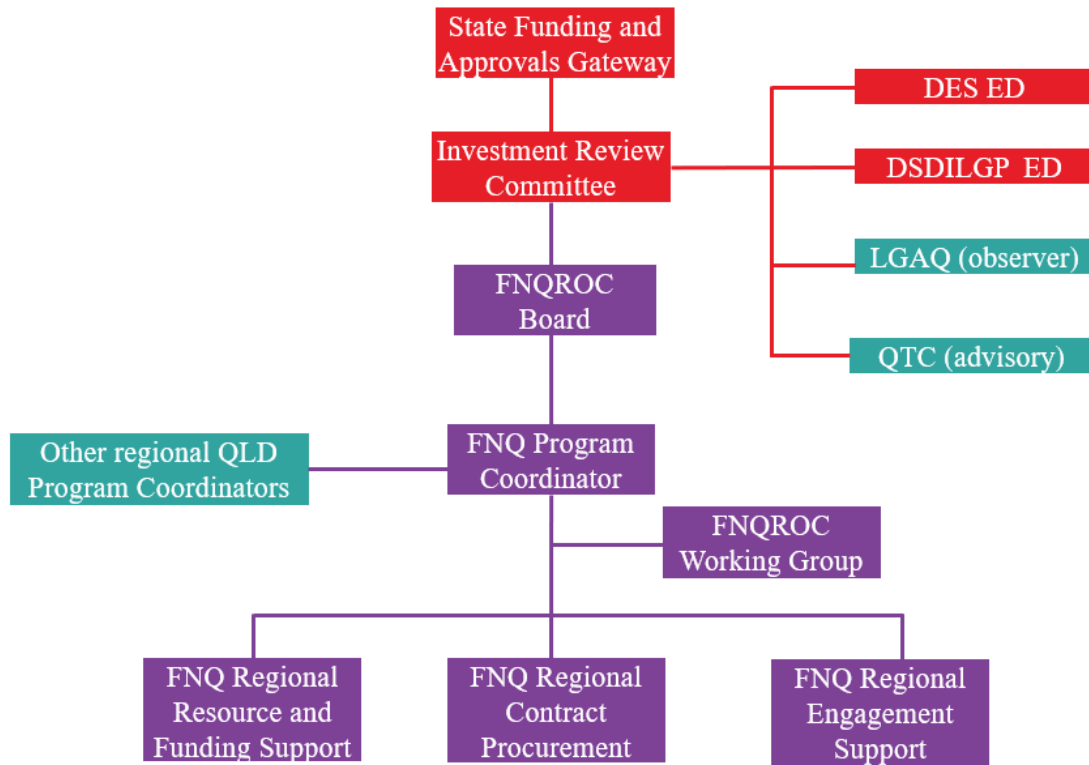
There are long standing and established relationships and trust between councils within FNQ. These relationships provide a sound foundation for development of a governance structure and implementation of the RRR Plan. FNQROC has had success in operating for 30 years, which is a great foundation for leveraging and delivery of the RRR Plan. Building on the existing ROC structure to expand on current capacity to deliver on the RRR Plan, will require the availability of adequate and sustained resourcing.

DES and FNQROC have commenced conversations regarding establishment of a bilateral agreement to enable efficient and effective governance and timely delivery of the actions under the RRR Plan. These discussions are still evolving, and the final agreement is yet to be finalised. A bilateral agreement would provide clear project pathway structure, clear contact points, channels of communication between FNQROC and State government.

A bilateral arrangement between DES and FNQROC will enable efficient and effective governance and timely delivery of the RRR Plan. The FNQROC governance structure would be part of a cohort of regional bodies administering tasks under a waste and resource recovery program and would provide a platform for inter-regional cooperation.

The governing structure will have a central program coordinator who is responsible for administering actions under the RRR Plan and to provide a single point of contact for government departments and other regional governing bodies. The governing body will be guided by a waste and resources technical committee and working group. It is important that the governance structure supports political buy in and investment review, without hindering progress of priority projects.

The program coordinator would be supported by regional resources identified to help support councils in delivery of each action under the RRR Plan. A schematic of the governance structure is provided in Figure 20.



**Figure 20 Example governance structure**

The RRR Plan governance structure is provided below in Table 28.

**Table 28 FNQROC RRR Plan Governance Structure**

Governance structure role	Participants	Responsibilities
<b>Program Coordinator</b>	Dedicated FNQROC program coordination resource	Coordination of RRR Plan deliverables and project prioritisation process.
<b>FNQROC Working Group</b>	Member council waste and resource management technical officers	Undertake initial assessment of projects against key criteria e.g., regional economic, social and environmental benefit, alignment with RRR Plan outcomes and resource recovery targets.
<b>FNQROC board</b>	Member council Mayors	Endorsement of priority project proposals.
<b>Investment Review Committee</b>	DES Executive Director Department of State Development Executive Director Local Government Association of Queensland (observer) Queensland Treasury Corporation (advisory body)	Review and assessment of priority project documentations including business cases or summary documents, request further information as required prior to approval.
<b>State Funding and Approvals Gateway</b>	As required based on project value.	Priority project funding assessment and approval.

The required governance arrangements will be established to support the initiatives, and any funding and assistance required by the state and national governments to move toward the 2050 Queensland state targets.

#### 4.2.2 Governing Body Capabilities

The governing body needs to adopt a model that supports collaborative engagement and transparency. The governing body can act as a means of advocating for funding regionally, supporting local councils and providing accountability both upwards to state level and downwards to local level.

The objective of the governing body is to support an entire program view without limiting the progress of individual councils, whilst providing a mechanism for regional collaboration and communication. The governing body would enable all applications and developments are aligned to the overall RRR Plan, but not restrict councils in their ability to proceed with individual initiatives. The governing body would make sure that all councils are engaged in processes that impact them, whether this be in the immediate or longer term. For example, development of an organics processing facility may be undertaken by CRC in the short term, but it would require consultation with all councils anticipated to utilise the facility in the medium to long term.

The governing body administering the RRR Plan would be required to have the following capability in providing:

- A key and single contact for government departments and other regional groups (e.g., North Queensland Regional Organisation of Councils (NQ ROC), Torres Cape Indigenous Council Alliance (TCICA), and North West Queensland Regional Organisation of Councils (NWQROC)).
- Regional coordination of education and awareness, including consistent messaging and services offered at facilities. Sharing of unbranded education materials between councils, regional training of local education officers and education campaigns for communities, businesses, and visitors. Support for training of operators and upskilling of staff. Coordination of discussion regarding charging and paying for waste services, including standardisation and consistency of waste acceptance and disposal pricing between councils, and alignment to the state level.
- Regional coordination of contracts for select materials, such as green waste, tyres, concrete, and support sub-regional alignment for kerbside collection contracts. Brokering of products, services, and relationships within councils and across the region to aid in improved material recovery and reuse.
- Central coordinator for multiple funding sources. Supporting councils in submitting funding applications (notification of funding opportunities, templates), particularly for rural councils that are resource constrained.
- Support sharing of resources between councils including tender and contract specifications.
- Administer procurement requirements under the RRR Plan.
- Ensure review requirements for RRR Plan are fulfilled.

#### 4.2.3 COMSEQ PMO case study

The Queensland Government provided a \$500,000 commitment to establish a joint Portfolio Management Office (PMO) with Council of Mayors South East Queensland (COMSEQ) to drive delivery of the SEQ Waste Management Plan. **Error! Reference source not found.** Table 29 outlines the key groups, participants and individual purposes under the COMSEQ PMO structure.

**Table 29 CoMSEQ PMO Governance Structure**

Structure	Participants	Purpose
<b>PMO</b>	3 x FTEs	PMO is responsible for assisting councils to work in collaboration. For some initiatives this approach will be more successful but, in some cases, initiatives will only be viable on an individual basis. Core element of PMO is to bring people together and get through gateways.
<b>Sub-waste working group</b>	Waste managers from participating councils	Group meets every three weeks with an action program and agenda. Meetings used to:



		<ul style="list-style-type: none"> <li>• show case initiatives,</li> <li>• flag interest, or</li> <li>• seek input on initiatives.</li> </ul> <p>Additional council staff can attend as relevant.</p>
<b>Waste working group</b>	Mayors and elected officials from participating councils	Discuss issues raised in the sub-waste working group. The waste working group must be comfortable on proposed initiatives and undertake checks and balances. This forum provides for open discussion and collaboration. This group is chaired by a mayor from one of the participating councils. DES attend these meetings to understand agenda and need for political buy in. QTC attend to provide advice.
<b>Investment review committee</b>	DES Executive Director DSD Executive Director CEO COMSEQ	Assess initiatives (through business case or summary document) and request further information from the sub waste working group for further detail as required. Review how initiative fits in with the regional waste management plan. QTC provide support and advice.
<b>Project control group</b>	Director General DES  Director General DSDILGP	Final gateway before green light to proceed. LGAQ provide support.

\* Note the above information has been summarised based on Arup discussions with PMO stakeholders. No review of group terms of reference or similar documentation has been undertaken.

The sub-waste working group, waste working group, investment review committee and project control group all act as individual approval gateways for proposed initiatives. The aim of the PMO is to assist with collaboration between councils, particularly when a combined approach to an initiative roll out would be more successful. The PMO functions to bring councils together and help transition initiatives through the gateway process.

It is recognised by DES that whilst approval pathways will be similar for priority projects, individual regions will need tailored governance structures to suit the needs and plans for each group of councils.

### 4.3 Action Drivers and Influences

The implementation initiatives and timing for each action are impacted by drivers and influences within and outside the region. These drivers and influences include:

- National policy, bans, strategy outcomes and targets,
- State policy, bans, strategy outcomes and targets,
- Local issues or risks including geographical challenges, gaps in market, capacity or skills, and
- Local changes to infrastructure, resourcing and capability.

The following Table 30 provides an overview of the key drivers and influences and where they may be applicable to each action.

**Table 30 Action Drivers and Influences**

Drivers and Influences	Action							
	1	2	3	4	5	6	7	8
<b>Policy and Strategy</b>								
<i>National Waste Policy</i> – The key principles in transitioning to a circular economy:	✓							
1. <b>Avoid waste</b>	✓							
2. Improve resource recovery		✓	✓					
3. Increase use of recycled material and build demand and markets for recycled products.			✓					
4. Better manage material flows to benefit human health, the environment and the economy.								
5. Improve information to support innovation, guide investment and enable informed consumer decisions.	✓							
<i>National Waste Policy Action Plan</i> – Progress towards the following national targets will be made:								
1. Ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020.						✓	✓	
2. Reduce total waste generated in Australia by 10% per person by 2030.	✓							
3. 80% average resource recovery rate from all waste streams following the waste hierarchy by 2030.						✓	✓	
4. Significantly increase the use of recycled content by governments and industry.						✓	✓	
5. Phase out problematic and unnecessary plastics by 2025.						✓		
6. Halve the amount of organic waste sent to landfill by 2030.		✓			✓			
7. Make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions.	✓							
<i>Export of Waste Products</i> - Bans on unprocessed recyclable materials have been in place since 2020 with the last ban to roll out for mixed paper and cardboard in July 2024.				✓				
<i>Future Proofing against Potential Ban of Organics to Landfill</i> – Many developed countries are moving towards the removal of organic material from landfills. There is potential for similar legislation to emerge within Australia.					✓			
<b>State drivers and influences</b>								
<i>Queensland Waste Management and Resource Recovery Strategy targets</i>								
Reduction in waste generation	✓							
Increase recycling		✓	✓	✓	✓	✓	✓	
Increase diversion from landfill		✓	✓	✓	✓	✓	✓	✓

Drivers and Influences	Action							
	1	2	3	4	5	6	7	8
<i>Impact of Queensland Waste Disposal Levy</i>			✓	✓	✓			
<i>Reduction to Levy Annual Payments - From July 1st, 2023 the local government annual payments for Cairns will be reduced yearly until 2030 and plateau at 100% for regional councils</i>					✓			
<i>Queensland Waste and Resource Recovery Infrastructure Report - New infrastructure opportunities and types of facilities require significant planning and supporting initiatives.</i>			✓					
<i>Queensland Organics Strategy and Action Plan – Targets listed to improve organic material recovery by diverting 80% from landfill and recovering 70% by 2030.</i>		✓			✓			
<i>Queensland’s Indigenous Waste Management Strategy – This strategy highlights the difficulties with geographical isolation and long transport distances by land.</i>		✓	✓					
<i>Recycling Enterprise Precinct Location Strategy – Highlights the following:</i> <ul style="list-style-type: none"> <li>- Potential ‘transform’ precinct in Cairns with a focus on organics and C&amp;D waste,</li> <li>- Potential ‘prepare’ precinct in Mareeba, and</li> <li>- Transformation of a large range of materials in Townsville.</li> </ul>							✓	
<b>Local risks and issues</b>								
<i>Long Transport Distances and Low Economies of Scale</i>		✓				✓	✓	
<i>Issues with Transport Routes</i>								✓
<i>Community Engagement and Tourism Impacts</i>	✓							
<i>Lack of Local Secondary Markets</i>						✓	✓	
<i>Lack of Local Skills and Labour</i>	✓							
<i>Lack of Funding</i>		✓						
<i>Issues with capacity existing infrastructure or movement of materials</i>	✓	✓						
<i>Bedminster Closure - The closure of the ARRF in 2026.</i>					✓			
<i>Long term landfill capacity and resilience</i>								✓

## 4.4 Action 1: Step Change in Customer Engagement

### 4.4.1 Proposed Outcomes of Action 1

Providing a step change in customer engagement to the region is a high priority for the entire region which stems from delivering soft infrastructure mechanisms through education, standardisation of messaging and data capture for monitoring of waste and resource flows. The overarching outcomes for this action are to:

- Raise awareness and reduce waste generation across households, businesses and tourism industries,
- Standardise waste education across the region, and
- Improve data capture and waste monitoring to track progress against state targets.

### 4.4.2 Action Implementation

#### Action 1a Education and Engagement

The initiatives and tasks included within **Action 1a: Step Change in Customer Engagement** particularly focused around education and engagement to achieve the objectives outlined above are outlined in Table 31.

**Table 31 Action 1a Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Development of Regional Education and Marketing Strategy. Review and update every 5 years.	2024	✓
	Employ 2 x Regional FTE educational officers to: <ul style="list-style-type: none"> <li>• Provide a touch point for designated education offices within councils.</li> <li>• Roll out engagement and behavioral change program.</li> <li>• Increase operator and officer capacity and capability through access to training opportunities.</li> <li>• Provide support for professional accreditation (when available).</li> <li>• Promote brokering and sharing opportunities within and between councils through relationship management.</li> </ul>	2025	✓
	Regional marketing and coordination budget to cover educational and engagement, signage and wayfinding material (required changeover of bins included as part of collection contracts modelling).	2025	✓
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Employ 1 x FTE engagement officer (CRC).	2025	✓
<b>Group 2</b>	Employ additional 3.5 x FTE engagement officers to allow each council to have an officer (CCRC, MSC, DSC, TRC).	2025	✓
<b>Group 3</b>	Employ 1.5 x FTE engagement officers (ESC, CrSC, and CSC).	2025	✓
<b>Group 4</b>	Employ 1.5 x FTE engagement officers (HVASC, WWASC, and YASC).	2025	✓

Coordination of this Action will be conducted regionally with dedicated resources to undertake program management and distribution. program coordination. Development of the Customer Engagement and Behavioral Change program will deliver consistency in messages delivered across the region (with the ability to tie into wider state messaging) and will be tailored towards target communities, issues and opportunities including residents, businesses, tourism industry specific issues.

Providing a regional marketing and coordination budget will promote a collaboration and pooling of resources to deliver maximum value from marketing and education campaigns through utilisation of consistent television broadcast networks, education materials and signage. This will not only provide efficiencies in creation of material but deliver consistency in messaging, signage and wayfinding for bins, transfer stations and educational resources for example.

Education material must be in a template format that councils can then add personal council branding to and tailored to meet local needs and messaging based on demographics. This needs to highlight that local councils are typically time and resource poor, so these templates would require only minimal changes to add council branding.

Education will be provided for by regional officers with local staff acting as touch points within each council to assist with campaign roll out and delivering of messaging. Local educational officers will be considered as key contacts within each council group to engage with for regional liaison. For smaller councils these local waste education staff may have a number of responsibilities in their role and the regional team will help support resourcing loads. The aim of a regional team is to help support and increase local and regional operator and officer capacity and capability.

Education material will be tailored based on the needs of each council. For example, education campaigns within Aboriginal Shire Councils could include connection to and caring for country and association with land and sea. These connections will be central to creating sustainable waste and recycling solutions.

In order to prevent confusion or mixed messaging within the community, timing of education campaign roll out will vary between each council and will be guided by the timing of key initiatives as relevant for each council group.

The regional team also provide an avenue for notification of training and accreditation opportunities for council operations staff. These opportunities may be provided through peak industry bodies such as professional accreditation that is currently being developed through Waste Management and Resource Recovery Association Australia (WMRR).

### Action 1b Data capture and reporting

The initiatives and tasks included within **Action 1b: Data capture and reporting** particularly focused around data capture and reporting to achieve the objectives outlined above are included in Table 32.

**Table 32 Action 1b Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	2 x FTE regional data management officers also to support: <ul style="list-style-type: none"> <li>Enhance data tracking, monitoring and reporting including routine waste audits.</li> <li>Undertake data gap analysis and identify key barriers for data capture in the region.</li> </ul>	2025	✓
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Employ 1 x FTE data management officer (CRC).	2025	✓
<b>Group 2</b>	Employ additional 3.5 x FTE data management officers to allow each council to have a resource (CCRC, MSC, DSC, TRC).	2025	✓

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
Group 3	Employ 2 x FTE data management officers (ESC, CrSC, and CSC).	2025	✓
Group 4	Employ 1.5 x FTE data management officers (HVASC, WWASC, and YASC).	2025	✓

The capacity to capture and report data is a key issue across the region with large variation in the mechanism used by individual councils. Improvements to soft infrastructure to increase data capture and reporting on sites is a key task within Action 1, particularly for non-levy areas. Improvement data quality and accuracy within these council areas, including harmonisation of data collection and consistent capture and reporting across the region will help track waste reduction and resource recovery against the state targets and help make informed decisions at a regional level.

Coordination of this Action will be conducted regionally. The regional team, in collaboration with council technical officers will continue to work to improve data capture, share learnings and advocate for statewide consistency in data capture and reporting. The regional team will also support local council resources to improve on data capture practices and capability with respect to consistency of data capture and reporting. Regional resource allocations have been provided for this action but the short and long term resourcing requirements needed to deliver on this action may vary to those presented.

Interdependencies between Action 1 and other elements of the RRR Plan are outlined below:

#### Interdependencies with Planned Actions

<b>Action 3</b>	Improved data capture and signage to be considered in the development of new facilities.
<b>Action 6</b>	Improved data capture and signage to be considered in the development of new facilities.

#### 4.4.3 Cost Benefit Analysis Outputs

Action 1 is anticipated to reduce household waste generation across all council regions. The reduction in household waste generation and associated diversion of waste from landfill may deliver the following benefits that were monetised in the CBA:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as total waste generated by households decreases.
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.
- The Action is also anticipated to deliver a range of non-monetised impacts including:
  - **Reduced long-haul transport costs** – Reduction in total waste generated means less truck loads are required to transport waste, reducing the kilometres travelled and associated transport costs,
  - **Employment and jobs** – Direct jobs will be created by the employment of additional engagement officers to deliver the regional education and marketing strategy, and
  - **Social** – The education and marketing strategy is expected to improve community engagement with resource recovery.

#### Total Regional Results

Action 1 is applicable to all councils in the region. Results at a regional level include the costs incurred by FNQROC as well as the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050. Total costs to implement the Action are around \$13 million, with the majority of costs being the ongoing staffing and material costs. Total monetised benefits are

around \$25 million. These benefits are dependent on the reduction in household waste generated resulting in a material reduction in waste disposed to landfill and associated costs.

**Table 33 Action 1 - Total Cost-Benefit analysis results (\$'000, FY2023, PV)**

	<b>FY24 - FY30</b>	<b>Total to 2050</b>	<b>Total Waste Levy annual payment reduction scenario</b>
<b>Costs</b>			
<b>Capex</b>			
Development of regional education and marketing strategy	23	23	23
<b>Opex</b>			
Regional marketing strategy updates	18	51	51
Media and materials	1,755	4,270	4,270
FTE costs	7,095	15,780	14,878
<b>Total Costs</b>	<b>8,890</b>	<b>20,124</b>	<b>19,222</b>
<b>Benefits</b>			
Avoided disposal costs	1,987	10,357	13,882
Avoided carbon costs	3,401	14,743	14,743
<b>Total Benefits</b>	<b>5,388</b>	<b>25,100</b>	<b>28,625</b>

Incorporating the alternative waste levy scenario, the avoided disposal cost increased by 34% and increased total benefits by 14% to a total of \$28.63 million.

In addition to the monetised results. Non-monetised impacts at the regional level are captured in the following Table 34.

**Table 34 Action 1 - Non-monetised impacts**

<b>Benefits</b>	<b>2030 Results</b>	<b>2050 Results</b>
<b>Direct Jobs</b>	19.5 direct jobs created.	19.5 direct jobs created.
<b>Waste reduction</b>	7.5% reduction of household waste generated.	12.5% reduction of household waste generated.
<b>Avoided Carbon</b>	63,710 tCO <sub>2</sub> e	488,000 tCO <sub>2</sub> e
<b>Environmental</b>	Reduce waste to landfill. Reduced impacts to soil, water and marine areas.	
<b>Social</b>	Improved community engagement with resource recovery and waste management.	
<b>Transport</b>	Reduced transport costs due to lower volumes of waste being transported to landfill.	

### *Council Results*

Results of the CBA were also estimated at the council level to demonstrate the potential costs for individual councils implementing the Action. It is understood that some state government funding may be available to reduce these costs for councils.

**Table 35 Action 1 - Council Cost-Benefit analysis results, FY23/24 to FY2030 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	811	811	405	811	811	405	608	405	405	405	405
Media and materials	464	303	198	219	218	90	50	60	50	53	50
<b>Total Costs</b>	<b>1,275</b>	<b>1,113</b>	<b>604</b>	<b>1,029</b>	<b>1,029</b>	<b>496</b>	<b>658</b>	<b>466</b>	<b>455</b>	<b>459</b>	<b>455</b>
<b>Benefits</b>											
Avoided disposal costs	1,426	181	55	85	185	18	5	5	14	3	11
Avoided carbon costs	1,846	435	177	469	341	55	9	12	29	5	23
<b>Total Benefits</b>	<b>3,272</b>	<b>616</b>	<b>232</b>	<b>555</b>	<b>526</b>	<b>73</b>	<b>14</b>	<b>17</b>	<b>43</b>	<b>8</b>	<b>34</b>

**Table 36 Action 1 - Council Cost-Benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	1,803	1,803	902	1,803	1,803	902	1,353	902	902	902	902
Media and materials	1,237	641	419	470	467	238	153	175	154	161	155
<b>Total Costs</b>	<b>3,040</b>	<b>2,445</b>	<b>1,321</b>	<b>2,273</b>	<b>2,270</b>	<b>1,140</b>	<b>1,506</b>	<b>1,077</b>	<b>1,056</b>	<b>1,063</b>	<b>1,056</b>
<b>Benefits</b>											
Avoided disposal costs	8,391	593	223	347	623	58	15	15	46	8	38
Avoided carbon costs	8,606	1,615	756	1,959	1,309	207	34	41	107	17	91
<b>Total Benefits</b>	<b>16,997</b>	<b>2,209</b>	<b>979</b>	<b>2,307</b>	<b>1,932</b>	<b>265</b>	<b>48</b>	<b>55</b>	<b>153</b>	<b>26</b>	<b>129</b>

For larger councils, the total monetised benefits are larger than the costs of the Action. This is because there is a relatively larger reduction in landfill waste due to significantly more households in these areas. For smaller councils, the ongoing operational costs outweigh the benefits generated due to the smaller number of households and therefore smaller absolute tonnes of landfill waste reduced. The waste recovery rate for each of the councils is, however, similar across all councils.

A small number of jobs are also expected to be created across the councils with new engagement officer and data management roles created to deliver the education and marketing strategy.



**Table 37 Action 1 - Council non-monetised impacts**

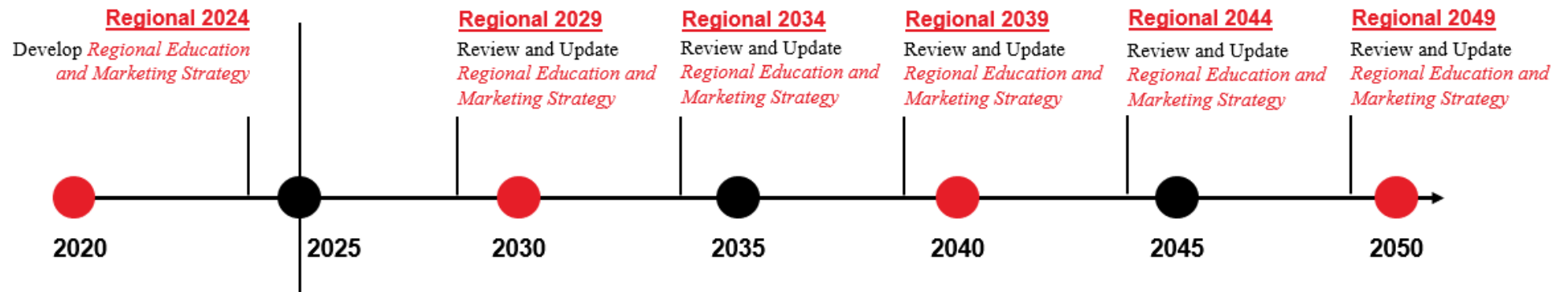
	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
<b>Direct Jobs (FTE)</b>	2.0	2.0	1.0	2.0	2.0	1.0	1.5	1.0	1.0	1.0	1.0
<b>Reduction in Waste</b>	12.5% reduction in household waste by 2050										

#### 4.4.4 Action 1 Implementation Summary

A timeline of the key tasks required both regionally and across the individual groupings and councils have been provide in Figure 21. This timeline assists in highlighting when the implementation and review periods are for each task as well as providing staging for financial assistance. Governing bodies can utilise this implementation timeline as a guide to manage resources against upcoming tasks and deliverables.

### Regional 2025

- Employ 2 x FTE Regional Educational Officers
- Employ 2 x FTE Data Management Officers
- Roll out *Customer Engagement and Behavioural Change Program*
- Regional marketing and coordination budget



### Groups 2025

#### Group 1:

- Employ 1 x FTE Engagement Officer
- 1 x FTE Data Management Officer

#### Group 2:

- Employ 3.5 x FTE Engagement Officers
- 3.5 x FTE Data Resource Officers

#### Group 3:

- Employ 1.5 x FTE Engagement Officers
- 2 x FTE Data Resource Officers

#### Group 4:

- Employ 1.5 x FTE Engagement Officers
- 1.5 x FTE Data Resource Officers

**Figure 21 Action 1 Implementation Timeline**

## 4.5 Action 2: Optimise Regional Servicing Arrangements

### 4.5.1 Proposed Outcomes of Action 2

Offering optimised regional servicing arrangements to the FNQ region is a very high priority for the more regional Groups 3 and 4 and a medium priority for Groups 1 and 2. This action stems from initiatives for implementing distributed processing technologies with local scale infrastructure, providing broker sharing and service opportunities, delivering regional and subregional kerbside collection and processing contracts and offering mobile processing technologies for enhanced recycling opportunities. The overarching outcomes for this action will:

- Enable economies of scale by optimising existing and new servicing arrangements through regional contracts,
- Provide servicing for remote communities and areas to enable improved resource recovery options,
- Enhance recovery opportunities for select problem materials, and
- Enhance product sharing and reuse.

### 4.5.2 Action Implementation

The initiatives and tasks included within **Action 2: Optimise Regional Servicing Arrangements** to achieve the objectives outlined above are outlined in Table 38.

**Table 38 Action 2 Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Development of regional servicing strategy. Review and update every 5 years.	2024	✓
	Roll out regional contract for processing and collection of tyres, crushing of concrete, and mulching of green waste on a set program.	2025	✓
	Development of a strategy for a regional approach to council procurement guidelines for recycled material including crumb rubber, recycled crushed glass and crushed concrete.	2025	No
	Employ 1 x regional part time regional coordinator to undertake: <ul style="list-style-type: none"> <li>• Contract coordination for select materials such as green waste, concrete and tyres.</li> <li>• Brokering of recyclable and hazardous material collection ad-hoc and on a sub-regional level, including coordination with other regions/regional strategies.</li> <li>• Engagement with and advocacy for product stewardship opportunities.</li> </ul>	2025	✓
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Potential to explore efficiencies of a sub-regional kerbside collection contract, potential alignment of timing at close of Bedminster. Potential collaboration with Group 2 and YASC. Longer term consideration of Electric Vehicles (EV) for fleet to reduce carbon emissions.	-	No

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
Group 2	Potential for sub-regional kerbside collection contract with Group 1.	-	No
Group 3	-	-	-
Group 4	Consider viability of sub regional kerbside collection contract to include YASC with Group 1 due to proximity to Cairns.	-	No

This action includes development and implementation of an optimised plan to service the regional and remote communities (collection, processing and bulk transport contracts) aiming to optimise logistics, minimise costs and carbon emissions. The regional servicing plan should focus on targeting investment toward larger volume waste streams, therefore based on current waste volume data and an understanding of materials that are typically difficult to recover from regional and remote locations, tyres, concrete and green waste have been as a basis for regional servicing contracts within the CBA. The regional servicing plan should also consider improvement in recovery of select problematic or hazardous waste streams, including support at a regional level for improved product stewardship outcomes for existing programs and future priority materials. Smaller, more rural councils would also benefit from regional contracts through optimization of transport routes providing opportunities to service multiple councils for various materials.

The regional servicing plan must acknowledge that different councils within the region have different waste recovery needs and therefore all arrangements do not need to include all councils. However, it is recognised that economies of scale and savings can be achieved more efficiently in contracts that include all or a majority of FNQROC councils. Regional contracts can attract more market interest due to bigger servicing arrangements and can provide cost effective management of servicing due to consolidated resourcing.

A dedicated resource within the governing body will also be required to support coordination and brokering for equitable outcomes and provide resourcing support for councils. Responsibilities would include administration of the regional servicing plan, coordinate development of contracts (including feasibility and market sounding) and manage procurement. The regional coordination office could also assist to promote service and product sharing opportunities and relationship brokering improve resource reuse and recycling within council areas and between council groups. A regional coordination officer will also provide a touch point for other regional council groups to optimise on servicing opportunities.

Development of a strategy for a regional approach to council procurement guidelines for recycled material including crumb rubber, recycled crushed glass and crushed concrete should be managed regional and undertaken at the same time as the region collection contract implementation. This strategy should include assessment of materials produced locally that can be reused in council projects, creating local markets and demand and improving the economics for recovery of this material.

Roll out of a regional contract for processing of materials locally or collection of materials such as tyres will rely on market interest. Market sounding or expressions of interest will need to be undertaken for priority strategy areas. In the event that the market is unable to fulfil the needs of the region for management of these materials, the governing body could consider purchase of mobile infrastructure (such as a crusher and shredder) to use as shared resource for servicing councils within the region. Sharing of infrastructure would need to be managed by the governing body to determine frequency of services, costs for operation and maintenance and ownership of the equipment.

The regional servicing strategy should include assessment of the viability of sub-regional kerbside collection contracts. As most councils are currently on different timing with respect to kerbside collection contract periods, an interim arrangement may need to be put in place whilst regional structures are implemented, and coordination of contract timing is aligned. Review of existing contracts should be conducted at a regional scale to enable renewal of contracts align with a strategic plan for long term management of services. This would be best supported at a regional level with direct engagement with council technical offers and leadership teams.

Sub-regional kerbside collection contracts, particularly in consideration of planned additional service roll out (such as comingled recycling and FOGO) may provide cost savings and discounts through providing a bulk order service across multiple aspects including bin infrastructure, collection and processing capabilities.

Interdependencies between Action 2 and other elements of the RRR Plan are outlined below:

#### Interdependencies with Planned Actions

<b>Action 3</b>	Transfer station sites will provide consolidation of material and a place for servicing of regional contracts.
<b>Action 4</b>	Potential alignment of kerbside collection contracts creating efficiencies for roll out of comingled services
<b>Action 5</b>	Potential alignment of kerbside collection contracts creating efficiencies for roll out of and FOGO services
<b>Action 7</b>	Potential for regional contracts to feed into long term resource recovery facility or precinct

#### 4.5.3 Cost Benefit Analysis Outputs

The aim of this action is to provide better servicing for rural and remote communities, enhance recovery opportunities of select problem waste streams and reduce the costs associated with these processes across all councils. The key impact of this action is cost efficiencies driven by improved economies of scale and the competitive tender of a single regional contract. There are also small benefits associated with improved resource recovery and diversion from landfill for those councils that do not already collect green waste and tyres for processing.

The following impacts were monetised for councils that currently do not recover all materials in the CBA:

- **Avoided disposal costs** - Costs associated with landfill disposal will reduce as green waste, tyres and concrete material that would otherwise have gone to landfill are diverted.
- **Avoided GHG emissions** - The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.
- **Resource recovery value** - The market value of the additional resources recovered through the regional contract services.
- **Cost efficiencies** – Implementing a single contract is expected to provide cost efficiencies to all councils.

The following key assumptions have guided the development of the CBA:

- All eleven councils subscribe to a regional servicing contract, that encompasses the mobile processing of green waste, tyres, and concrete.
- A cost reduction for the delivery of green waste shredding, tyre shredding and offsite transport, and concrete crushing is available to individual councils participating in the regional servicing contract and varies from 8 – 20%. This saving is in comparison to the cost incurred by a council if they were to procure these services by themselves.
- Operating costs include an annual allowance for the transport of shredded tyres to Brisbane.
- The benefits associated with improved resource recovery and diversion from landfill may be underestimated due to a number of councils already individually undertaking recovery of these materials streams.

#### Total Regional Results

Action 2 is applicable to all councils in the region. Results at a regional level include the costs incurred by FNQROC as well as the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050. Costs of this action include the FTE costs for regional contract coordination and the allowance to transport shredded tyres to Brisbane. Contractor costs are

captured under benefits, as these typically represent a cost saving to councils in comparison to what they may be charged if they contracted these services through individual contracts.

**Table 39 Action 2 - Regional Cost-Benefit analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Opex</b>			
FTE costs	203	451	451
Tyre Transport Allowance	2,517	5,597	5,597
<b>Total Costs</b>	<b>2,719</b>	<b>6,048</b>	<b>6,048</b>
<b>Benefits</b>			
Avoided contractor costs	2,290	5,600	5,600
Avoided disposal costs	10	24	50
Avoided carbon costs	14	35	35
Recovered resource value	3	8	8
<b>Total Benefits</b>	<b>2,318</b>	<b>5,667</b>	<b>5,693</b>

Incorporating the alternative waste levy scenario, the avoided disposal cost increased by approximately \$26k which had a minor effect on the total benefits.

In addition to the monetised results non-monetised impacts for the region are captured in the following Table 40.

**Table 40 Action 2 - Regional non-monetised impacts**

Benefits	2030 Results	2050 Results
<b>Direct Jobs</b>	0.5 direct jobs created	0.5 direct jobs created
<b>Waste recovery</b>	2% average increase in MSW recovery across councils impacted	2% average increase in MSW recovery across councils impacted
<b>Avoided Carbon</b>	251 tCO <sub>2</sub> e	1,000 tCO <sub>2</sub> e
<b>Environmental</b>	Reduced risks of leachate and associated soil and water impacts	
<b>Social</b>	Enhanced product sharing and reuse of materials	

### Council Results

Results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. As many councils already recover these material streams, only two councils are expected to have increased resource recovery as a result of this Action. However, the action is expected to result in a cost saving for all participating councils.

An allowance for the transport of shredded tyres to Brisbane has been included for each Council. The reduction in contractor costs is captured in the benefits. Each of the councils is expected to experience avoided contractor costs relative to the size of the council and current waste disposal costs.

**Table 41 Action 2 - Council Cost-Benefit analysis results, FY2023/24 to FY2030 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
<b>Costs</b>											
<b>Opex</b>											
FTE costs	-	-	-	-	-	-	-	-	-	-	-
Tyre Transport Allowance	438	331	331	331	331	127	127	127	125	125	125
<b>Total Costs</b>	<b>438</b>	<b>331</b>	<b>331</b>	<b>331</b>	<b>331</b>	<b>127</b>	<b>127</b>	<b>127</b>	<b>125</b>	<b>125</b>	<b>125</b>
<b>Benefits</b>											
Avoided contractor costs	1,079	450	148	203	251	102	41	9	2	1	5
Avoided disposal costs	-	-	-	-	-	-	5	-	5	-	-
Avoided carbon costs	-	-	-	-	-	-	5	-	8	-	-
Recovered resource value	-	-	-	-	-	-	2	-	1	-	-
<b>Total Benefits</b>	<b>1,079</b>	<b>450</b>	<b>148</b>	<b>203</b>	<b>251</b>	<b>102</b>	<b>54</b>	<b>9</b>	<b>17</b>	<b>1</b>	<b>5</b>

**Table 42 Action 2 - Council Cost-Benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	-	-	-	-	-	-	-	-	-	-	-
Tyre Transport Allowance	975	736	736	736	736	282	282	282	277	277	277
<b>Total Costs</b>	<b>975</b>	<b>736</b>	<b>736</b>	<b>736</b>	<b>736</b>	<b>282</b>	<b>282</b>	<b>282</b>	<b>277</b>	<b>277</b>	<b>277</b>
<b>Benefits</b>											
Avoided contractor costs	2,716	1,047	359	496	603	247	94	18	6	3	11
Avoided disposal costs	-	-	-	-	-	-	12	-	12	-	-
Avoided carbon costs	-	-	-	-	-	-	14	-	22	-	-
Recovered resource value	-	-	-	-	-	-	5	-	3	-	-
<b>Total Benefits</b>	<b>2,716</b>	<b>1,047</b>	<b>359</b>	<b>496</b>	<b>603</b>	<b>247</b>	<b>125</b>	<b>18</b>	<b>42</b>	<b>3</b>	<b>11</b>

Waste recovery rates for CrSC and HVASC are 2% and 1% respectively. This represents the percentage increase in total MSW recovered with the new regional contract in place.

**Table 43 Action 2 - Council non-monetised impacts**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
<b>Waste recovery rate</b>	N/A	N/A	N/A	N/A	N/A	N/A	2%	N/A	N/A	1%	N/A

#### 4.5.4 Action 2 Implementation Summary

A timeline of the key tasks required both regionally and across the individual groupings and councils have been provide in Figure 22. This timeline assists in highlighting when the implementation and review periods are for each task as well as providing staging for financial assistance. Governing bodies can utilise this implementation timeline as a guide to manage resources against upcoming tasks and deliverables.



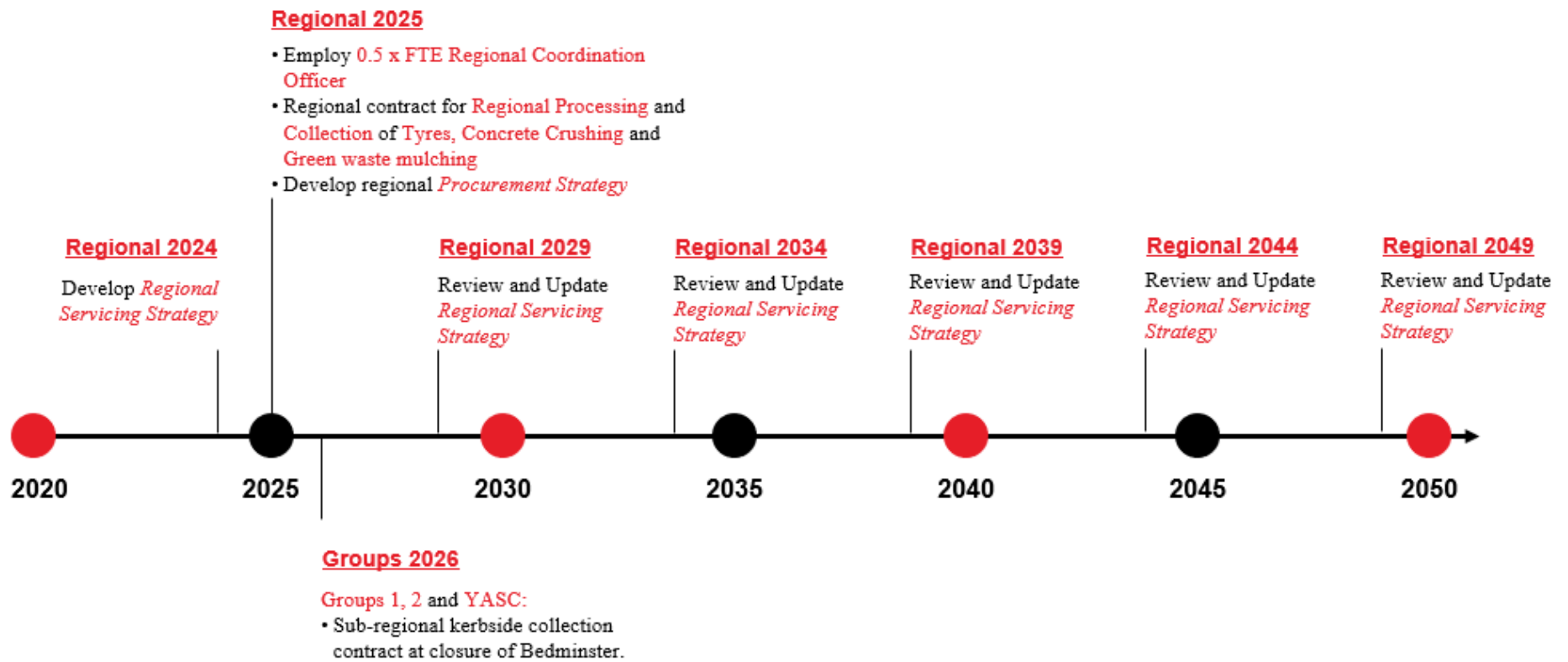


Figure 22 Action 2 Implementation Timeline

## 4.6 Action 3: New transfer station facilities and closure of facilities with regulatory or environmental issues

### 4.6.1 Proposed Outcomes of Action 3

Delivering new transfer station facilities and the closure of facilities with regulatory or environmental issues is a very high priority for the more regional Groups 3 and 4, a high priority for Group 1 and 2. This action includes development of new transfer stations on existing or closed landfill sites and consolidation of current sites. The overarching outcomes for this action include:

- Enhance social and environmental outcomes through improved facilities,
- Improve opportunities for material reuse and enrich secondary markets,
- Provide an efficient network for resource recovery through optimisation of transfer station facilities, and
- Diversion of material from landfill.

### 4.6.2 Action Implementation

To deliver on providing FNQROC with **Action 3: New transfer station facilities and closure of facilities with regulatory or environmental issues** the following activities and initiatives need to be actioned. These tasks will assist in meeting the outcomes specified in the section above.

**Table 44 Action 3 Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Regional sharing of planning, design or tender advice through technical committee to provide support for councils undertaking infrastructure upgrade or development.	-	No
	Regional body to support funding applications as required.		
	Support roll out of adequate security & monitoring provisions particularly for remote sites.		
<b><u>LOCAL INITIATIVES</u></b>			
<b>CRC (Group 1)</b>	1 x large transfer station located on the south side of Cairns. Estimates include allowance for planning and procurement design activities, completed with reference to GHD report dated October 2020. Planning and development to occur from 2025.	2025	✓
	Optimisation of current sites and upgrade based on resource recovery methodology to improve recovery of self-haul residual waste stream.	-	No
	Future upgrades to consider recovery of product stewardship materials and key material streams.		
<b>CCRC (Group 2)</b>	Continued monitoring: <ul style="list-style-type: none"> <li>• Site utilisation and consider consolidation of underutilised sites as required.</li> <li>• Optimisation of current sites and upgrade of infrastructure based on resource recovery methodology to improve recovery of self-haul residual waste stream.</li> <li>• Future upgrades to consider recovery of product stewardship materials and key material streams.</li> </ul>	-	No

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b>DSC (Group 2)</b>	Continued monitoring: <ul style="list-style-type: none"> <li>Site utilisation and consider consolidation of underutilised sites as require to reduce operational costs.</li> <li>Optimisation of current sites and upgrade of infrastructure based on resource recovery methodology to improve recovery of self-haul residual waste stream.</li> <li>Future upgrades to consider recovery of product stewardship materials and key material streams.</li> </ul>	-	No
<b>MSC (Group 2)</b>	Continued monitoring: <ul style="list-style-type: none"> <li>Site utilisation and consider consolidation of underutilised sites as required to reduce operational costs (e.g., Mt Carbine, Mt Molloy, Mutchilba &amp; Almaden).</li> <li>Optimisation of current sites and upgrade of infrastructure based on resource recovery methodology to improve recovery of self-haul residual waste stream.</li> <li>Future upgrades to consider recovery of product stewardship materials and key material streams.</li> </ul>	-	No
<b>TRC (Group 2)</b>	Continued monitoring: <ul style="list-style-type: none"> <li>Site utilisation and consider consolidation of underutilised sites as required (e.g., Mt Garnet, Millaa Milla)</li> <li>Optimisation of current sites and upgrade of infrastructure based on resource recovery methodology to improve recovery of self-haul residual waste stream.</li> <li>Future upgrades to consider recovery of product stewardship materials and key material streams.</li> </ul>	-	No
<b>CSC (Group 3)</b>	1 x medium transfer station design undertaken with reference to AECOM concept masterplan report (2019). Estimates include allowance for planning and procurement design activities. Planning and development to occur from 2025.  Cooktown TS may be a suitable future consolidation point for recycling and residual materials from WWASC and HVASC.	2025	✓
<b>CrSC (Group 3)</b>	Allowance for TS upgrade to improve recovery rate of self haul residual materials (including wheel wash, security, bunding for hazardous material storage and covered hardstand).	2026	✓
<b>ESC (Group 3)</b>	1 x small scale transfer station at the following locations: <ul style="list-style-type: none"> <li>Forsayth</li> <li>Mount Surprise</li> <li>Einasleigh</li> <li>Georgetown</li> </ul>	2024 2026 2027 2027	✓

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
	Estimates include allowance for planning and procurement design activities.		
<b>HVASC (Group 4)</b>	1 x small scale transfer station design based on documentation provided by APC. Estimates include allowance for planning and procurement design activities.	2024	✓
<b>WWASC (Group 4)</b>	1 x small scale transfer station design based on documentation provided by APC. Estimates include allowance for planning and procurement design activities.	2024	✓
<b>YASC (Group 4)</b>	1 x small scale transfer station design based on documentation provided by APC. Estimates include allowance for planning and procurement design activities.	2024	✓

The aim of this action is to address critical deficiencies in existing landfill and transfer station facilities within the region to bring all councils up to a baseline standard of service to improve social, environmental, operational and resource recovery outcomes.

It is acknowledged that for some councils that it is unlikely to be viable to transition away from landfill facilities in remote locations in the short to medium term therefore investment is required to deliver acceptable operation and opportunities for resource recovery. This action includes a focus on consolidation of existing sites, upgrade and/or construct new facilities based on identified needs by councils within the stakeholder engagement process or through supporting documentation.

Transfer station designs for new facilities must be flexible and resilient to future changes in material management and recovery. Adequate planning for future storage and additional resource recovery activities at the site should be integrated into designs to allow all councils to continue to improve resource recovery outcomes as technologies or services become available.

Designs should be undertaken based on a resource recovery methodology with a focus on user experience and promotion of material reuse and recovery options. Designs should consider incorporation of 'Buy Back' Shops or community activities (e.g., Men's Sheds) where feasible to manage public salvage areas and increase material reuse. Buyback shops are a reuse opportunity with demonstrated success in the region. Buyback shops are a great mechanism for landfill diversion, for materials that cannot be easily recycled, and offer a potential income stream for councils. Encouraging customers to donate or bring material direct to the buyback shop, reduces the requirement for recovery of disposed material by council staff. Facility operators will still need to maintain a level of quality control, to avoid customers using the buyback shop to avoid paying fees for material that will be disposed.

Facilities should also be designed to integrate with existing data capture mechanisms and allow for improved data capture and reporting for material flows.

Details of the metrics around the tasks included for further evaluation as part of the CBA will be discussed in the following section.

Interdependencies between Action 3 and other elements of the RRR Plan are outlined below:

**Interdependencies with Planned Actions**

<b>Action 1</b>	Enhanced user experience and interaction at facilities for communities, businesses, and visitors.
<b>Action 6 &amp; 7</b>	Updates undertaken to support long term hub and spoke or resource recovery precinct model.

### 4.6.3 Cost Benefit Analysis Outputs

New transfer stations and improvements to existing stations are expected to improve the ability to the communities to recover and recycle waste rather than sending it directly to landfill. This is expected to improve resource recovery rates and divert waste from landfill.

The following benefits were monetised for the councils receiving updated transfer stations:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as more waste is directed through the transfer facilities and sorted appropriately.
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.

The Action is also expected to improve resource recovery for these councils. However, given the unique nature of the solutions for each of the councils, the value of the recovered resources has not been estimated at this stage. Further investigation is required to identify the specific materials and tonnages likely to be recovered for each council area.

The following key assumptions have guided the development of the CBA:

- The Capex and Opex costs of constructing and operating a new facility is borne by an individual council.
- No costs included for closure of landfill sites.
- Repair and maintenance costs for the facility and equipment are proportional to initial Capex costs, and do not vary over time.
- New sites or facilities are assumed to be sized to meet the demands of future populations and waste generation, and therefore do not change over time.
- Staffing requirements remain constant over time.
- Materials recovered from self-haul residual streams can be appropriately stored onsite, for further recovery or recycling elsewhere; no materials that are recovered are disposed of in landfill.

### Total Regional Results

Action 3 is applicable to 7 of the 11 FNQ councils. Results at a regional level include the total costs and benefits across all applicable councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050.

**Table 45 Action 3 – Total Cost-Benefit analysis results (\$'000, FY2023, PV)**

	FY24 – FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Capex</b>			
Transfer facilities	36,340	43,010	43,010
Equipment	1,169	2,098	2,098
<b>Opex</b>			
Facility (operations and maintenance)	238	596	596
Equipment (operations and maintenance)	1,411	3,358	3,358
FTEs	3,707	9,097	9,097
<b>Total Costs</b>	<b>42,865</b>	<b>58,159</b>	<b>58,159</b>
<b>Benefits</b>			

	FY24 – FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
Avoided disposal costs	1,003	2,773	6,205
Avoided carbon costs	1,510	4,679	4,679
<b>Total Benefits</b>	<b>2,512</b>	<b>7,453</b>	<b>10,884</b>

Incorporating the alternative waste levy scenario, the avoided disposal cost increases by 124% to a total value of \$6.2m. This subsequently increased the total benefits by 46%.

In addition to the monetised results, the total non-monetised impacts for the Action are captured in the following table. Bringing all council regions up to a standard level of waste management, improving waste recovery rates and better community engagement with waste management are key non-monetised benefits. This Action also delivers the second most additional direct jobs of the Actions considered by the CBA.

**Table 46 Action 3 – Non-monetised impacts**

Benefits	2030 Results	2050 Results
<b>Direct Jobs</b>	15.5 direct jobs created	15.5 direct jobs created
<b>Waste recovery</b>	Average 1% increase in recovery of MSW across impacted councils	Average 1% increase in recovery of MSW across impacted councils
<b>Avoided Carbon</b>	27,700 tCO <sub>2</sub> e	142,000 tCO <sub>2</sub> e
<b>Environmental</b>	Reduced leachate risk. Reduced soil, water and marine impacts. Reduced windblown litter. Improved visual amenity. Reduced opportunity for scavenging.	
<b>Social</b>	Improved community engagement with waste and resource recovery. Improved health and safety for workers. Improved amenity.	

### *Council Results*

Results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. Results for the seven councils expected to be impacted by this Action are included below. Although the benefits are relatively much lower over the forecast period, the Action provides significant opportunities to improve waste management and there are important non-monetised impacts that provide broader benefits to the community.

**Table 47 Action 3 – Council Cost-Benefit analysis results, FY23/24 to FY2030 (\$'000, FY2023, PV)**

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24/25	FY24/25	FY25/26	FY23/24	FY23/24	FY23/24	FY23/24
<b>Costs</b>							
<b>Capex</b>							
Transfer facilities	24,357	7,879	392	6,451	1,840	250	1,840
Equipment	550	245	-	93	93	93	93
<b>Opex</b>							

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Facility (operations and maintenance)	120	50	2	36	13	3	13
Equipment (operations and maintenance)	561	290	-	140	140	140	140
FTE costs	2,696	419	84	127	127	127	127
<b>Total Costs</b>	<b>28,285</b>	<b>8,883</b>	<b>479</b>	<b>6,848</b>	<b>2,214</b>	<b>613</b>	<b>2,214</b>
<b>Benefits</b>							
Avoided disposal costs	845	74	3	9	16	13	43
Avoided carbon costs	1,361	80	4	13	10	19	23
<b>Total Benefits</b>	<b>2,206</b>	<b>154</b>	<b>7</b>	<b>22</b>	<b>26</b>	<b>32</b>	<b>66</b>

**Table 48 Action 3 - Council Cost-Benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24/25	FY24/25	FY25/26	FY23/24	FY23/24	FY23/24	FY23/24
<b>Costs</b>							
<b>Capex</b>							
Transfer facilities	24,357	7,879	392	6,451	1,840	250	1,840
Equipment	974	436	-	172	172	172	172
<b>Opex</b>							
Facility (operations and maintenance)	298	124	7	102	30	6	30
Equipment (operations and maintenance)	1,393	718	-	312	312	312	312
FTE costs	6,690	1,040	239	282	282	282	282
<b>Total Costs</b>	<b>33,711</b>	<b>10,197</b>	<b>638</b>	<b>7,319</b>	<b>2,636</b>	<b>1,022</b>	<b>2,636</b>
<b>Benefits</b>							
Avoided disposal costs	2,354	204	9	25	40	33	108
Avoided carbon costs	4,239	245	15	35	28	53	63
<b>Total Benefits</b>	<b>6,593</b>	<b>450</b>	<b>24</b>	<b>60</b>	<b>69</b>	<b>86</b>	<b>171</b>

Impacts on jobs and waste recovery were also estimated at the council level and are shown in Table 49. The waste recovery rate represents the total increase in MSW waste recovered as a result of the Action.

**Table 49 Action 3 - Council non-monetised impacts**

Benefits	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
<b>Direct Jobs (FTE)</b>	11.0	2.0	0.5	0.5	0.5	0.5	0.5
<b>Waste recovery</b>	2%	4%	0.2%	1%	3%	0%	1%

#### 4.6.4 Action 3 Implementation Summary

A timeline of the key tasks required both regionally and across the individual groupings and councils have been provide in Figure 23. This timeline assists in highlighting when the implementation and review periods are for each task as well as providing staging for financial assistance. Governing bodies can utilise this implementation timeline as a guide to manage resources against upcoming tasks and deliverables.



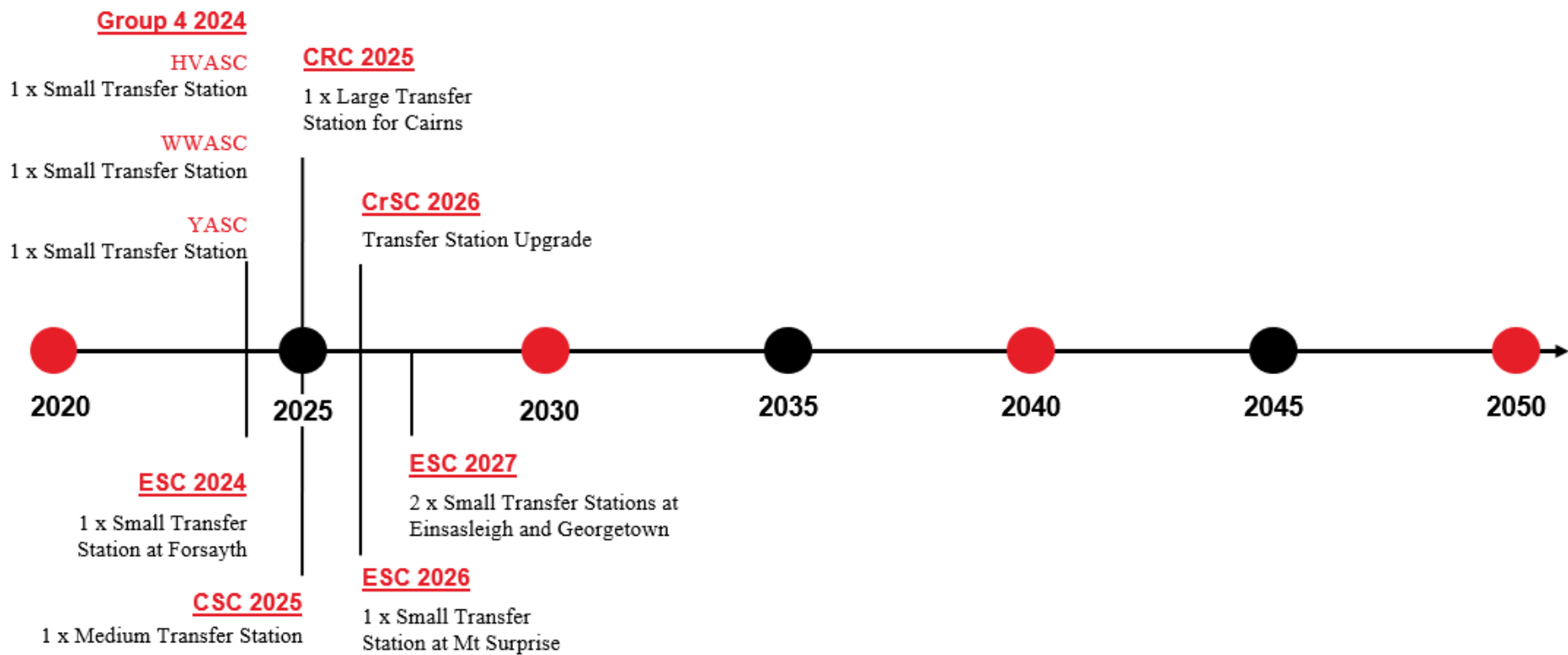


Figure 23 Action 3 Implementation Timeline

## 4.7 Action 4: Enhance Kerbside Collection Approach

### 4.7.1 Proposed Outcomes of Action 4

Enabling an enhanced kerbside collection approach is a high priority for both Groups 1 and 2, however, is only a low priority for councils within Groups 3 and 4. This action is based on the expansion of comingled recycling bins or enhancing CRS capture for regions where additional kerbside services are not feasible. The overarching outcomes for this action include:

- Increase in resource recovery of comingled recyclables from the MSW stream,
- Increased household engagement and awareness about recycling, and
- Diversion of material from landfill.

### 4.7.2 Action Implementation

To deliver on providing FNQROC with **Action 4: Enhance Kerbside Collection Approach** the following activities and initiatives need to be actioned. These tasks will assist in meeting the outcomes specified in the section above.

**Table 50 Action 4 Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Support assessment a sub-regional kerbside collection contract, potential alignment of timing at close of Bedminster. Potential collaboration with Group 2 and YASC.  Advocacy for secure and sustainable access to the CRS in remote locations.  Support resource sharing of contract specification between councils to support limitations in resourcing.	-	No
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	A comingled recycling service is already offered by CRC.  Additional kerbside recycling material collected under Action 4 is assumed to be processed at the existing Cairns MRF.	-	No
<b>Group 2</b>	A comingled recycling service is already offered by: <ul style="list-style-type: none"> <li>• DSC</li> <li>• TRC</li> </ul> For CCRC and MSC refer to individual local tasks.	-	Yes
<b>Group 3</b>	For CSC refer to individual local tasks. CSC has been included in this assessment as a comingled recycling services were previously offered within this council and many residents are supportive of increased recycling in the region. Currently materials are transported over 3hrs to Springmount WMF and so an CBA has been conducted to compare costs with transfer to the Cairns MRF, including a sensitivity on the viability if any changes to the annual payments were introduced (refer Appendix E).	-	Yes

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
	Enhance CRS capture and sustainability of service offering. Opportunity to implement vending machine style CRS capture.	-	No
<b>Group 4</b>	Enhance CRS capture and sustainability of service offering. Opportunity for councils to align with roll out of neighboring comingled collection services should it be economically viable to do so e.g., HVASC and WWASC may support kerbside comingled collection as part of a sub-regional collection contract in conjunction with roll out of services for CSC. YASC may be able to offer kerbside comingled collection service as part of a sub-regional contract with CRC.	-	No
<b><u>LOCAL INITIATIVES</u></b>			
<b>CCRC (Group 2)</b>	Roll out of comingled recycling collection (2024 in line with expiry of current collection contract).	2024	✓
<b>MSC (Group 2)</b>	Roll out of comingled recycling collection (2027 in line with expiry of current collection contract).	2027	✓
<b>CSC (Group 3)</b>	Roll out of comingled recycling collection.	2030	✓

The aim of this action is transition of all council's to unified/ consistent kerbside collection approach, supported by the regional behavioural change program. This has been undertaken on a sub-regional group basis, with the exception of CSC. This action assumes the adoption of the following minimum services (however number of bin services offered will still vary between councils):

- General waste (red lid), and
- Comingled recycling (yellow lid).

Transition of services will occur in line with expiry of current contracts and consider the opportunity to work toward regional alignment and regional kerbside collection contracts for Group 1 and 2, with inclusion of other councils as practical. The transition to a comingled collection service must be supported by an extensive education campaign and early engagement of community and businesses and council leadership prior to implementation.

Sub-regional kerbside collection contracts, particularly in consideration of planned additional service roll out such as comingled recycling may provide cost savings and discounts through providing a bulk order service across multiple aspects including bin infrastructure, collection and processing capabilities. The opportunity for alignment of contract timing for Group 1 and 2 councils should be monitored.

As most councils are currently on different timing with respect to kerbside collection contract periods, an interim arrangement may need to be put in place whilst regional structures are implemented, and coordination of contract timing is aligned. Review of existing contracts should be conducted at a regional scale to enable renewal of contracts align with a strategic plan for long term management of services.

In many council areas it may be currently uneconomical to segregate comingled material due to limited access to processing facilities, end markets and the high operational and transport costs required to manage this material. Councils with large geographic areas and low rates bases are significantly constrained in their capability to offer additional kerbside collection services.

Should roll out of comingled collection services be undertaken in Cooktown post 2030, roll out of these services within WWASC and HVASC should be considered. The Cooktown transfer station could provide a consolidation point for comingled materials prior to transport to the Cairns MRF. This may improve

economics of this initiative for WWASC and HVASC, particularly if cost of landfill disposal and levy impacts have increased for councils outside the levy zone at this time. This scenario has not been included in the CBA.

For Group 3 and 4, the roll out of comingled services is not likely to be financially viable, enhancement of the current CRS services would support increased recovery of household recyclables. Currently in some regions the CRS service is championed by local groups and therefore communities can experience some inconsistency in service availability. This action requires a sustainable service administered by the governing body to support local organisations to provide certainty of services in the event of personnel change or other barriers that cease the service offering. The CRS is effective at increasing recovery rate for materials and is also a great mechanism to improve community engagement with material recovery and provide financial incentives for local not for profit groups.

There is an opportunity to implement CRS vending machines within Group 3 councils and encourage tourists coming through these councils to recycle containers and improve capture of select materials. Implementing these vending machines within town centres will aim to drive tourism through the area along with providing support for local businesses.

The expansion of the CRS materials to wine and spirit bottles may impact the estimated tonnages that councils would hope to recovery through roll out of a kerbside comingled collection service. Detailed analysis into the impact of this expansion should be undertaken by councils as part of the feasibility study and business case for this action.

Interdependencies between Action 4 and other elements of the RRR Plan are outlined below:

#### Interdependencies with Planned Actions

<b>Action 1</b>	Transition all councils to a unified and consistent kerbside collection approach which is consistent with the regional behavioural change program.  Alignment of bin infrastructure and colours.
<b>Action 2</b>	Staging of service roll out, alignment to existing contracts, potential for collaboration between contracts.

#### 4.7.3 Cost Benefit Analysis Outputs

Comingled recyclables that would otherwise be present in kerbside general waste and sent to landfill are collected and sent to Cairns MRF for processing. This improves the recycling rates of the three councils for which this action is applicable.

The introduction of a kerbside recycling service will deliver the following benefits:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as comingled recyclables that would otherwise have gone to landfill are diverted.
- **Resource recovery value** – The market value of the additional resources recovered at the MRF.
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.

The following key assumptions have guided the development of the CBA:

- Comingled recycling services are assumed to occur every week of the year to cover all service zones within a council area. Individual households will be serviced fortnightly.
- The service area for kerbside waste collections does not change over time.
- All households who currently receive a kerbside general waste service will receive a comingled recycling bin.
- No additional waste is generated due to the introduction of a kerbside comingled recycling service.

- Costs to implement this action include the cost of new yellow lid-bins, the kerbside commingled recycling contract and the cost of processing commingled recyclables at the Cairns MRF.
- The operating costs of processing waste for individual councils are estimated using the gate fee charged by the facility.
- As there is a difference between the current gate fee and the total operating costs incurred, this additional cost is captured in the appraisal as a cost to CRC.
- Kerbside collection services are all delivered by an external contractor.
- The growth in dwellings that receive a kerbside bin service is based on the 2021 number of dwellings receiving a kerbside bin service and a forecast growth rate based on the number of separate houses built between 2016 and 201.
- All commingled recyclables are sent to the Cairns MRF for processing.

### Total Regional Results

Action 4 is applicable to 4 of the 11 FNQ councils. Results at a regional level include the total costs incurred to implement the Action as well as the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050. The Action will require purchasing of new yellow lid bins; however, the majority of the cost is driven by the ongoing servicing costs of collecting the comingled recycling from individual households. Monetised benefits are largely driven by avoided GHG emissions and carbon costs, as well as the value of recovered resources.

**Table 51 Action 4 - Total Cost-Benefit analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Opex</b>			
Servicing costs	6,260	16,308	16,308
Yellow-lid recycling bins	2,049	2,139	2,139
Recycling costs (MRF processing cost)*	3,138	8,245	8,245
<b>Total Costs</b>	<b>11,446</b>	<b>26,692</b>	<b>26,692</b>
<b>Benefits</b>			
Avoided disposal costs	594	1,650	3,449
Avoided carbon costs	833	2,693	2,693
Resource recovery value	1,233	3,239	3,239
<b>Total Benefits</b>	<b>2,660</b>	<b>7,582</b>	<b>9,382</b>

\*Operation of the MRF closer to its design capacity through increase of feedstock may realise cost savings however these have not been quantified under the CBA.

Incorporating the alternative waste levy scenario, the avoided disposal cost increased by 109% and increased total benefits to a total of \$9.4 million.

In addition to the monetised results. The total non-monetised impacts for the Action are captured in the following table. Direct jobs are generated through additional drivers required to service kerbside collection of comingled recyclables.

**Table 52 Action 4 - Non-monetised impacts**

Benefits	2030 Results	2050 Results
<b>Direct Jobs</b>	1.5 direct jobs created	1.5 direct jobs created
<b>Waste recovery</b>	4% on average across the three councils impacted	5% on average across the three councils impacted
<b>Avoided Carbon</b>	25,000 tCO <sub>2</sub> e	92,000 tCO <sub>2</sub> e
<b>Environmental</b>	Reduced leachate risk. Reduced soil, water and marine impacts.	
<b>Social</b>	Improved community engagement with resource recovery and waste management.	

*Council Results*

Results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. Results for the four councils expected to be impacted by this Action are included below. As noted above, the additional operating costs to CRC is due to the difference between the current gate fee and the operating costs at the MRF facility. As for the total results, the majority of cost is from the ongoing servicing costs associated with kerbside collection.

**Table 53 Action 4 - Council Cost-Benefit analysis results, FY23/24 to FY2030 (\$'000, FY2023, PV)**

	CRC	CCRC	MSC	CSC
Commencement Date	-	FY23/24	FY26/27	FY29/30
<b>Costs</b>				
<b>Opex</b>				
Servicing costs	-	4,753	1,441	66
Yellow-lid recycling bins	-	1,305	652	92
Recycling costs (MRF processing cost)	856	1,975	294	13
<b>Total Costs</b>	856	8,033	2,387	171
<b>Benefits</b>				
Avoided disposal costs	-	490	99	4
Avoided carbon costs	-	657	169	8
Resource recovery costs	-	1,067	159	7
<b>Total Benefits</b>	-	2,214	427	19

**Table 54 Action 4 - Council Cost-Benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	MSC	CSC
Commencement Date	-	FY23/24	FY26/27	FY29/30
<b>Costs</b>				
<b>Opex</b>				
Servicing costs	-	10,653	4,885	770
Yellow-lid recycling bins	-	1,316	731	92
Recycling costs (MRF processing cost)	2,249	4,488	1,302	206

	CRC	CCRC	MSC	CSC
<b>Total Costs</b>	<b>2,249</b>	<b>16,457</b>	<b>6,919</b>	<b>1,068</b>
<b>Benefits</b>				
Avoided disposal costs	-	1,115	461	75
Avoided carbon costs	-	1,653	892	148
Resource recovery costs	-	2,425	704	111
<b>Total Benefits</b>	<b>-</b>	<b>5,192</b>	<b>2,056</b>	<b>334</b>

Impacts on jobs and waste recovery were also estimated at the council level and are shown in Table 55. The Action is estimated to increase the total MSW recovered by these councils by 4-5%.

**Table 55 Action 4 - Council non-monetised impacts**

Benefits	CCRC	MSC	CSC
<b>Direct Jobs</b>	0.5	0.5	0.5
<b>Waste Recovery</b>	5%	4%	5%

#### 4.7.4 Action 4 Implementation Summary

A timeline of the key tasks required both regionally and across the individual groupings and councils have been provide in Figure 24. This timeline assists in highlighting when the implementation and review periods are for each task as well as providing staging for financial assistance. Governing bodies can utilise this implementation timeline as a guide to manage resources against upcoming tasks and deliverables.

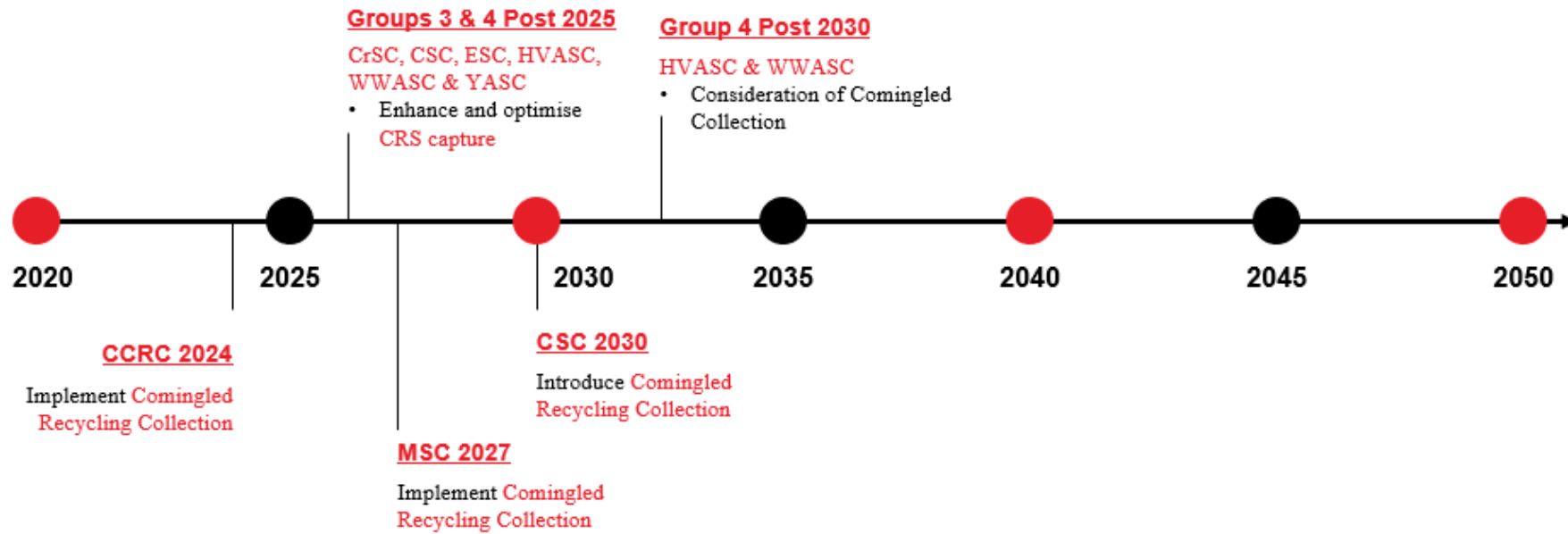


Figure 24 Action 4 Implementation Timeline



## 4.8 Action 5: Maximise diversion of organics waste from landfill

### 4.8.1 Proposed Outcomes of Action 5

Maximising diversion of organic waste from landfill is a very high priority for Cairns in Group 1 and a high priority for those councils in Group 2. Organics diversion is only a medium priority for those councils in Groups 3 and 4. This action has been developed on the basis of providing a kerbside organics collection stream, whether that be FOGO, GO or home composting, and the implementation of organics processing options and/or for improving the recovery of biosolids. The overarching outcomes for this action will enable FNQ to:

- Increase recovery of organics,
- Increase diversion of waste from landfill, and
- Enhance user engagement, social and environmental outcomes.

### 4.8.2 Action Implementation

To deliver on providing FNQROC with **Action 5: Maximise diversion of organic waste from landfill** the following activities and initiatives need to be actioned. These tasks will assist in meeting the outcomes specified in the section above.

**Table 56 Action 5 Implementation Initiatives**

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Support assessment of a sub-regional kerbside collection contract, potential alignment of timing at close of Bedminster. Support engagement with all councils in development of the regional processing facility, regardless of individual roll out timing.  Support for set up of home composting or community garden initiatives through Action 1 regional FTE resources.  Support resource sharing of contract specification between councils to support limitations in resourcing.	-	No
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Development of a regional organic processing facility located within Cairns, assumed to be IVC technology.  Roll out of kerbside FOGO service in 2026 in line with expiry of current collection contract and Bedminster closure.	2026	✓
<b>Group 2</b>	Refer to Individual Local Tasks.	-	Yes
<b>Group 3</b>	Implement fit-for-purpose approach: to enhance organics recovery, including: <ul style="list-style-type: none"> <li>• Incentivised home composting,</li> <li>• Support for community organisations/ community gardens/ community-scale composting,</li> <li>• Support for local businesses (e.g., green waste collection/ mulching/ composting/ nurseries/ etc.), and</li> <li>• Free green waste disposal at transfer stations.</li> </ul>	-	No

Geography Zone	Implementation Task Description	Commencement date	Included in CBA?
<b>Group 4</b>	Implement fit-for-purpose approach: to enhance organics recovery, including: <ul style="list-style-type: none"> <li>• Incentivised home composting,</li> <li>• Support for community organisations/ community gardens/ community-scale composting,</li> <li>• Support for local businesses (e.g., green waste collection/ mulching/ composting/ nurseries/ etc.), and</li> <li>• Free green waste disposal at transfer stations.</li> </ul>	-	No
<b><u>LOCAL INITIATIVES</u></b>			
<b>DSC</b> (Group 2)	Roll out of kerbside FOGO service (2028 in line with collection contract expiry).	2028	✓
<b>TRC</b> (Group 2)	Roll out of kerbside FOGO service (assuming new collection contract is 8 + 2 years, and FOGO provisions included within current contract)	2028	✓
<b>MSC</b> (Group 2)	Roll out of FOGO new contract in 2027.	2028	✓
<b>CCRC</b> (Group 2)	Roll out of kerbside FOGO service (new contract set to commence in 2024 for comingled services, assume current contract includes provision for future FOGO collection).	2028	✓

Action 5 takes a multi-pronged approach to organics recovery which is tailored to the specific needs and drivers for councils within each group. Most prominently closure of the Bedminster facility and reduction of annual payments provides a strong immediate imperative for CRC to implementation an organics recovery solution in the short term.

This action strongly considers the need for staging and expandability during the planning, design and delivery of a centralised facility that:

- Commences with Group 1 by implementing a large-scale organics processing facility which can accept a ‘third bin’ kerbside collection as soon as possible. Will also need to plan for future stages.
- Plans for Group 2 councils progressively added where financially viable, contractually reasonable and supported by the community. This will require planning for and implementation of an organics collection and centralised processing facility over a longer timeframe.
- Has the potential to accept organics from Groups 3 & 4 councils should they come online in the future, with due consideration of financial viability. An alternative implementation of a fit-for-purpose approach may instead be undertaken, and material processed locally.

Enhancement of organics collection for the region could be undertaken as a phased approach.

### Phase 1 - GO

A phased approach to enhanced organics collection could include roll out of GO kerbside collection for residents in the first instance, prior to undertaking FOGO collection. Material collected from a GO collection can be processed within open window composting facility, which has a significantly reduced capital cost compared to other organics processing technologies such as In-Vessel Composting. The risks associated with open windrow composting include increased odour, particularly if food waste is included as a feedstock. To accommodate potential future expansion of kerbside services into FOGO, the open window composting facility should be situated within a rural area (in either Cairns or Mareeba) to reduce the risk of impact to

sensitive receptors. This would mitigate the need for a new facility should FOGO kerbside collection be introduced at a later stage.

Existing facilities may be suitable for acceptance of this material. For example, Shark Recyclers is a private facility within Mareeba that currently undertakes large scale open windrow composting for agricultural and commercial waste. A detailed assessment into the local capacity for existing facilities to accept kerbside organic material and the need for a new processing facility would be required as part of the next steps for Action 5.

## Phase 2 - FOGO

Phase 2 of enhanced organics collection would include roll out of FOGO kerbside collection services; this scenario has been assessed in the CBA.

For the CBA the central processing facility has been specified as an IVC unit with the ability for expansion as additional material volumes come online. The facility will need to be sized based on expected seasonal fluctuations, given the tropical environment, and expected increase in feedstock during the wet season. Careful consideration of expected volumes should be preceded by a comprehensive audit at various times of the year of waste streams in participating areas and which should be planned for in advance.

As with GO collection, the transition to a FOGO collection service must be supported by extensive education campaigns.

The above timing of contract date implementation has been selected based on current collection contract end dates and acknowledging the future potential to align with other councils in regional kerbside collection contract. Implementation of FOGO collection for all participating councils has been scheduled prior to 2030 for a number of key reasons:

- To minimise potential policy impacts such as:
  - Reduction in the local government annual payments and subsequent levy payment on waste to landfill.
  - Introduction of ban of organics to landfill.
  - Move to low carbon waste management techniques.
- To support national policy targets for diversion of organics from landfill.

It is understood this timing may vary based on contract administration, internal council appetite and community sentiments.

Each group of councils will progress on the same trajectory to achieve the outcomes stipulated above, however, the timing will vary between councils within each group. Engagement of all councils anticipated to utilise the central organics processing facility should be undertaken early in development and design stages regardless of timing for FOGO roll out of each council. The regional governing body can support communication and engagement during this process.

The transition to a GO or FOGO collection service must be supported by extensive education campaigns, and consider early engagement of community, businesses, and council leadership. Roll out of additional services must be in line with regional messaging regarding bin infrastructure and signage and include an extensive education campaign.

Improvement to regional organics recovery can also be achieved through mandating commercial businesses who do not use kerbside services to undertake organics separation, collection and processing. Supported at a regional level, mandating of organics recycling for commercial businesses would contribute to moving toward organic waste targets and see an improvement in organics recovery within the C&I sector. Collected C&I organic material may provide the opportunity for additional feedstock for the local organics processing facility.

Additional regulatory certainty and support is required within the organics space, including clarity regarding the impact of emerging contaminants such as PFAS on future facilities and processes.

Interdependencies between Action 5 and other elements of the RRR Plan are outlined below:

#### Interdependencies with Planned Actions

<b>Action 1</b>	Transition all councils to a unified and consistent kerbside collection approach which is consistent with the regional behavioural change program.  Alignment of bin infrastructure and colours.
<b>Action 2</b>	Improved regional servicing arrangements.

#### 4.8.3 Cost Benefit Analysis Outputs

Collection of food and organic waste from households can be processed at the new organics processing facility in Cairns to create high quality compost. This waste would otherwise have made its way to landfills, therefore, the Action can also result in a reduction in landfill waste and associated carbon impacts.

The introduction of a FOGO kerbside service is expected to deliver the following monetised benefits:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as food and organic waste that would otherwise have gone to landfill is diverted.
- **Recovered resource value** – The market value of the compost produced at the new organics processing facility.
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill through composting can reduce GHG emissions overall in comparison to the base case.

#### Total Regional Results

Action 5 is applicable to 5 of the 11 FNQ councils. Results at a regional level include the total costs incurred to implement the Action including the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050.

This Action involves significant start-up costs to construct the new organics processing facility and introduce new green-lid organics bins across the five councils. Ongoing servicing costs across the forecast period to 2050 account for almost half the total costs to implement the Action. The majority of benefits come from avoided disposal costs and reduced GHG emissions. There is a small disbenefit from the GHGs emitted through the composting process, however, this is offset by the benefit delivered by diverting waste from landfill. A full list of assumptions for the proposed organics processing facility is provided in Appendix C.

**Table 57 Action 5 – Total Cost-Benefit analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy Scenario
<b>Costs</b>			
<b>Capex</b>			
New organics processing facility	29,391	29,391	29,391
Processing equipment	3,057	6,633	6,633
<b>Opex</b>			
Servicing costs (kerbside collection)	22,899	71,736	71,736
Green-lid organics bins	10,241	10,397	10,397
Facility (operations and maintenance)	2,479	7,059	7,059
Equipment (operations and maintenance)	2,507	7,125	7,125
FTEs	1,146	3,256	3,256
<b>Total Costs</b>	<b>71,721</b>	<b>135,598</b>	<b>135,598</b>

	FY24 - FY30	Total to 2050	Total Waste Levy Scenario
<b>Benefits</b>			
Avoided disposal costs	8,266	37,287	47,262
Avoided carbon costs	8,513	34,611	34,611
Carbon Cost Disbenefit (compost processing)	(73)	(299)	(299)
Resource recovery value (compost)	2,519	9,099	9,099
<b>Total Benefits</b>	<b>19,225</b>	<b>80,698</b>	<b>90,673</b>

Incorporating the alternative waste levy scenario, the avoided disposal cost increased by 27% and increased total benefits to a total over \$90 million.

In addition to the monetised results. The total non-monetised impacts for the Action are captured in the following table. Direct jobs include additional jobs created at the processing facility and operators/admin staff required to provide the kerbside collection service.

**Table 58 Action 5 - Non-monetised impacts**

Benefits	2030 Results	2050 Results
<b>Direct Jobs</b>	9.5 direct jobs created	9.5 direct jobs created
<b>Waste recovery</b>	12% average recovery rate across impacted councils.	12% average recovery rate across impacted councils.
<b>Avoided Carbon</b>	162,000 tCO <sub>2e</sub>	1,092,000 tCO <sub>2e</sub>
<b>Environmental</b>	Reduced risk of leachate. Reduced soil, water and marine impacts. Compost benefits through improved soil and agricultural outcomes.	
<b>Social</b>	Increase opportunities for household engagement in waste management activities.	

### Council Results

Results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. Results for the seven councils expected to be impacted by this Action are included below.

Cairns has significantly higher costs under this option as it bears the costs of delivering and running the new organics processing facility. Operating costs for the facility and equipment for processing organic waste from other councils are assumed to be borne by the respective council through gate fee charges.

For most councils the largest portion of benefits comes from reduced greenhouse gas emissions from diverted landfill. For Cairns the largest driver of benefits is avoided disposal costs due to higher waste levy benefits from diverting waste from landfill.

**Table 59 Action 5 - Council Cost-Benefit analysis results, FY23/24 to FY2030 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC
Commencement Date	FY25/26	FY27/28	FY27/28	FY27/28	FY27/28
<b>Costs</b>					
<b>Capex</b>					
New organics processing facility	29,391	-	-	-	-

	CRC	CCRC	DSC	MSC	TRC
Processing equipment	3,057	-	-	-	-
<b>Opex</b>					
Servicing costs (kerbside collection)	16,324	2,443	2,273	1,441	418
Green-lid organics bins	7,118	1,066	719	628	711
Facility (operations and maintenance)	1,767	233	109	88	283
Equipment (operations and maintenance)	1,787	236	110	89	286
FTEs	817	108	50	41	131
<b>Total Costs</b>	<b>60,260</b>	<b>4,086</b>	<b>3,260</b>	<b>2,286</b>	<b>1,828</b>
<b>Benefits</b>					
Avoided disposal costs	7,315	282	132	125	412
Avoided carbon costs	7,021	481	226	214	570
Carbon Cost Disbenefit (compost processing)	(61)	(4)	(2)	(2)	(5)
Resource recovery costs (compost)	2,083	141	66	62	167
<b>Total Benefits</b>	<b>16,359</b>	<b>899</b>	<b>423</b>	<b>399</b>	<b>1,145</b>

**Table 60 Action 5 - Council Cost-Benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC
Commencement Date	FY25/26	FY27/28	FY27/28	FY27/28	FY27/28
<b>Costs</b>					
<b>Capex</b>					
New organics processing facility	29,391	-	-	-	-
Processing equipment	6,633	-	-	-	-
<b>Opex</b>					
Servicing costs (kerbside collection)	47,097	8,343	6,559	4,885	4,852
Green-lid organics bins	7,246	1,078	732	629	712
Facility (operations and maintenance)	5,031	664	309	250	805
Equipment (operations and maintenance)	5,078	670	312	253	813
FTEs	2,321	306	143	115	371
<b>Total Costs</b>	<b>102,798</b>	<b>11,061</b>	<b>8,053</b>	<b>6,133</b>	<b>7,553</b>
<b>Benefits</b>					

	CRC	CCRC	DSC	MSC	TRC
Avoided disposal costs	32,638	1,344	668	615	2,022
Avoided carbon costs	26,414	2,579	1,287	1,184	3,147
Carbon Cost Disbenefit (compost processing)	(228)	(22)	(11)	(10)	(27)
Resource recovery costs (compost)	6,969	671	334	307	817
<b>Total Benefits</b>	<b>65,793</b>	<b>4,572</b>	<b>2,278</b>	<b>2,095</b>	<b>5,959</b>

Impacts on jobs and waste recovery were also estimated at the council level and are shown in Table 61.

**Table 61 Action 5 - Council non-monetised impacts**

Benefits	CRC	CCRC	DSC	MSC	TRC
<b>Direct Jobs</b>	7.5	0.5	0.5	0.5	0.5
<b>Waste recovery</b>	17%	11%	11%	5%	17%

#### 4.8.4 Action 5 Implementation Summary

A timeline of the key tasks required both regionally and across the individual groupings and councils have been provide in Figure 25. This timeline assists in highlighting when the implementation and review periods are for each task as well as providing staging for financial assistance. Governing bodies can utilise this implementation timeline as a guide to manage resources against upcoming tasks and deliverables.

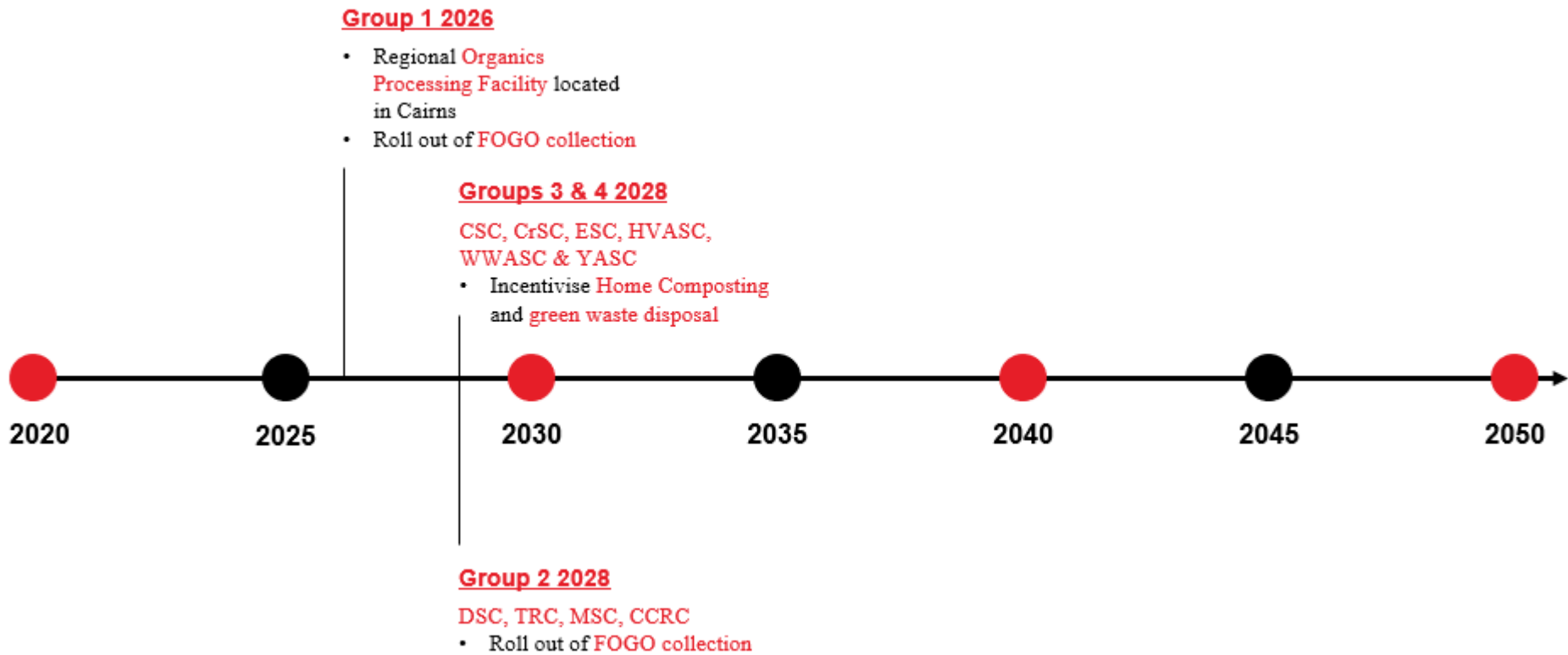


Figure 25 Action 5 Implementation Timeline



## 4.9 Action 6: Optimise regional network of resource recovery facilities

### 4.9.1 Proposed Outcomes of Action 6

Optimising the regional network of resource recovery facilities is a high or very high priority across all four groups for FNQ. This comprises implementing a hub and spoke transfer station network, utilising existing and new facilities, and the expansion into new recovery and processing facilities in the region. The overarching outcomes for this action include:

- Increase processing capacity,
- Improve economies of scale,
- Increase local market development,
- Reduce transportation costs, and
- Optimise regional networks and support precinct development.

### 4.9.2 Action Implementation

To deliver on providing FNQROC with **Action 6: Optimise regional network of resource recovery facilities** the following activities and initiatives need to be undertaken. These tasks will assist in meeting the outcomes specified in the section above.

**Table 62 Action 6 Implementation Initiatives**

Geography Zone	Implementation Task Description	Timeframe	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	This action assumes that Action 2 and 3 have been completed and all councils to have transfer station network capable of segregating major waste streams, suitable long-term capacity & <i>interfacing</i> with regional waste system.	-	-
	Regional review and gap analysis to be undertaken in the medium term to identify need for regional hub and spoke model and increased local processing capacity. High volume of value streams targeted for recovery. Regional governing body to facilitate review and outcomes.	2028	No
<b><u>POTENTIAL GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Regional consolidation and processing points within Group 1 due to large proportion of waste generated within CRC and access to rail and road transport routes.	-	-
<b>Group 2</b>	Consider consolidation points within Group 2 to support movement of material and reduce transport distances for northern and western councils.	-	-
<b>Group 3</b>	Potential to optimise transport of recovered materials through a hub and spoke model utilizing consolidation points within Group 2.	-	-
<b>Group 4</b>	Potential to optimise transport of recovered materials through a hub and spoke model utilizing consolidation points within Group 1 and 2.	-	-
<b><u>POTENTIAL LOCAL INITIATIVES</u></b>			
<b>CRC (Group 1)</b>	Potential central processing point and area to establish new resource recovery facilities.	-	-

Geography Zone	Implementation Task Description	Timeframe	Included in CBA?
<b>CCRC (Group 2)</b>	Potential consolidation points for recovered material from ESC, CrSC and TRC. Palmerstone highway potentially more suitable for transport of materials rather than the Kuranda range.	-	-
<b>DSC (Group 2)</b>	Transport of materials to CRC for disposal or consolidation.	-	-
<b>MSC (Group 2)</b>	Potential consolidation points for recovered material from ESC, CrSC and CSC (potentially TRC). Limitations include transport via Kuranda range to Cairns for processing.	-	-
<b>TRC (Group 2)</b>	Transport of recovered materials to MSC or CCRC for consolidation.	-	-
<b>CSC (Group 3)</b>	Potential processing hub within Lakeland, optimising on connect with local with agricultural industry. Transport of materials to MSC for disposal or consolidation.	-	-
<b>CrSC (Group 3)</b>	Transport of recovered materials to MSC or CCRC for consolidation. Consider alignment with NWQ and NQ regional plans and uptake of opportunities with neighbouring councils to increase economies of scale.	-	-
<b>ESC (Group 3)</b>	Transport of recovered materials to MSC or CCRC for consolidation. Consider alignment with NWQ and NQ regional plans and uptake of opportunities with neighbouring councils to increase economies of scale.	-	-
<b>HVASC (Group 4)</b>	Transport of materials to MSC for consolidation.	-	-
<b>WWASC (Group 4)</b>	Transport of materials to MSC for consolidation.	-	-
<b>YASC (Group 4)</b>	Transport of materials to CRC for consolidation and processing.	-	-

A regional review and gap analysis will be required in the medium term (potentially aligned with review of the RRR Plan in 2028) to identify need for regional hub and spoke model and increased local processing infrastructure. Hub infrastructure capability should be concentrated at higher population centres/on existing transport routes, with the ability to segregate and consolidate emerging waste streams. The review will need to consider:

- Emerging infrastructure gaps for processing of high value, hazardous or volume streams,
- Changes to market dynamics and viability of local processing,
- Suitable storage capacity at current facilities that aligns with sensible regional service contracts, and
- Infrastructure gaps to accommodate emerging and increasing material volumes.

In the interim consideration of planning and zoning for waste and resource recovery infrastructure, particularly during development of new transfer station facilities (Action 3) is one of the best ways to support economic development and local businesses to undertake resources recovery.

Fit-for-purpose and well managed facilities operating locally within zones, designed to facilitate expansion and development, provide good incentive for businesses to collocate within existing infrastructure spaces. Providing suitable facilities as a key anchor point will support subsequent development of local businesses, creating value and economic opportunities. In development of new transfer stations, the consideration of

additional space to accommodate management of future waste streams such as mattresses and solar, and modular storage can incentivise investment in local processing capacity. Design of future facilities based on known needs and future proofing must be considered at the planning and design stage and during funding applications. The design life for these facilities is likely to span the 2050 target horizon so infrastructure must be able to deliver now and in the future.

The development of additional processing infrastructure should be selected based on capacity gaps and material volumes. Currently there is a large volume of material managed in the private space, particularly for the following streams:

- C&D recycling,
- C&I recycling,
- Organics,
- Scrap metal, and
- Biosolids.

Changes to the private offering of these services locally may increase the viability for councils to develop resource recovery and processing capacity in this space.

Potential emerging material streams are likely to include those listed on the minister’s priority list for product stewardship and may need resource recovery solutions in the coming years. These materials include:

- Mattresses,
- Photovoltaic systems,
- Electronic products,
- Plastics, and
- Textiles.

Other key material streams to note for potential future processing capacity gaps include elements of renewable energy developments such as wind farms.

Interdependencies between Action 6 and other elements of the RRR Plan are outlined below:

**Interdependencies with Planned Actions**

<b>Action 2</b>	Utilisation of regional servicing contracts to obtain feedstock material and identify resource recovery facility gaps
<b>Action 3</b>	Integration with established transfer station network
<b>Action 7</b>	Feed in points or colocation with precinct development

## 4.10 Action 7: Develop centralised resource recovery precinct

### 4.10.1 Proposed Outcomes of Action 7

Providing a centralised resource recovery precinct to FNQ is a very high priority for councils in both Groups 1 and 2 and a high priority for Groups 3 and 4. Whilst this is a high priority action for all councils, this is a medium-term priority for implementation against the other actions presented for the region. The following are key outcomes for this action in the region, including:

- Increase processing capacity,
- Increase market development,
- Reduce transportation costs, and
- Optimise regional networks and precinct development.

### 4.10.2 Action Implementation

To deliver on providing FNQROC with **Action 7: Develop centralised resource recovery precinct** the following activities and initiatives need to be actioned. These tasks will assist in meeting the outcomes specified in the section above.

**Table 63 Action 7 Implementation Initiatives**

Geography Zone	Implementation Task Description	Timeframe	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Monitor alignment between delivery of the RRR Plan and other associated pieces of work to optimize on opportunities for resource recovery and infrastructure development.	Post 2030	No
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Potential ‘transform’ precinct in Cairns with a focus on organics and C&D waste.	-	-
<b>Group 2</b>	Potential ‘prepare’ precinct in Mareeba.	-	-
<b>Group 3</b>	Feed into developed precincts based on established transfer station network. CrSC and ESC to consider efficiencies to feed into transformation precinct located with Townsville if more economically viable.	-	-
<b>Group 4</b>	Feed into developed precincts based on established transfer station network.	-	-

The Department of State Development, Infrastructure, Local Government and Planning is currently investigating how the establishment of resource recovery precincts may assist in the transition towards a system where waste is a valuable eco-industrial resource to create new products, industries, and jobs. The establishment of precincts can assist in supporting energy reuse, generation of new products and development of secondary markets for recyclable materials. The *Recycling Enterprise Precinct Location Strategy*, developed in 2022 by E3 Advisory on behalf of the QLD Department of State Development, Infrastructure, Local Government and Planning Precinct has been released which highlights the following:

- Potential ‘transform’ precinct in Cairns with a focus on organics and C&D waste,
- Potential ‘prepare’ precinct in Mareeba, and
- Transformation of a large range of materials in Townsville.

Precinct development must identify a suitable site with sufficient space, appropriate zoning, and access to transport infrastructure to support the development of new resource recovery infrastructure and associated

secondary industries, based on regional needs. Development of a precinct would focus on promoting secondary industries, circular economy initiatives and local market development. Local processing of materials would decrease transportation costs for recovered resources and improve viability of recycling.

A State Development Area is located between Edmonton and Gordonvale, south of Cairns city. This site may be suitable for development of a resource recovery precinct. The CRC Portsmouth transfer station site has an adjacent rail line, should a regional arrangement be secured whereby waste is accumulated at this regional hub (or nearby), this rail infrastructure could perhaps be utilised for waste transport. Such a solution could have positive impacts on transport carbon emissions.

The precinct would be an aggregation/ processing point for recyclable materials recovered through the regional hub and spoke infrastructure, developed as part of Action 3 and 6.

The aim of the precinct should include support for processing of problematic waste materials and product stewardship scheme materials (tyres, photovoltaic (Pv) systems, textiles, batteries, e-waste, soft plastics) to maximise reuse, processing and secondary recovery opportunities from regional aggregation and proximity to other processing infrastructure.

Development of all new infrastructure should encourage investment in data technologies and innovative technologies to leverage opportunities for accurate and consistent measurement and reporting given single point of capture at entry/exit to precinct.

Interdependencies between Action 7 and other elements of the RRR Plan are outlined below:

**Interdependencies with Planned Actions**

<b>Action 3</b>	Setting up of transfer stations suitable for feeding into a hub and spoke model.
<b>Action 6</b>	Support for new processing facilities within precinct.
<b>Action 8</b>	Potential aggregation point for EfW.

## 4.11 Action 8: Develop long term alternatives to landfill for residual waste.

### 4.11.1 Proposed Outcomes of Action 8

Development of long-term alternatives to landfill for residual waste streams is a medium priority for both Groups 1 and 2 and a low priority for Groups 3 and 4. This action is built on providing an energy from waste facility with potential incineration capacity for the FNQ region. The overarching outcomes include:

- Long term security for disposal of residual waste, and
- Improved resource recovery rates.

### 4.11.2 Action Implementation

To deliver on providing FNQROC with **Action 8: Develop alternatives to landfill for residual waste** the following activities and initiatives need to be actioned. These tasks will assist in meeting the outcomes specified in the section above.

**Table 64 Action 8 Implementation Tasks**

Geography Zone	Implementation Task Description	Timeframe	Included in CBA?
<b><u>REGIONAL INITIATIVES</u></b>			
<b>REGIONAL</b>	Regional governing body and council technical officers to monitor opportunities for multi-sector collaboration (e.g., with agricultural industry) and inter-regional collaboration.	2024	No
	Short term – regional assessment of risks associated with reliance on one private landfill facility for 8 councils within the region into the need to develop additional landfill capacity resilience within the region.		
	Medium term – regional review and gap analysis to be undertaken to identify residual waste management risks and opportunities, including plan to transition away from landfill (where feasible). Assess potential for local collaboration and feasibility of local facility development and utilisation of outside region facilities.	2030	
	This action assumes that Action 2 and 3 have been completed and all councils to have transfer station network capable of segregating major waste streams, suitable long-term capacity & <i>interfacing</i> with regional waste system.		
<b><u>GROUP INITIATIVES</u></b>			
<b>Group 1</b>	Final feedstock consolidation point in Cairns, potentially in close proximity to a rail line. Opportunity to produce Refuse Derived Fuel within centralized precinct.  Assess viability of EfW facility to be located within CRC.	-	-
<b>Group 2</b>	Group 2 councils to feed into consolidation point within CRC for transport to EfW precinct.	-	-
<b>Group 3</b>	Optimise management of existing local landfill capacity within ESC and CrSC.  ESC to assess need for long term residual management capacity, options include: <ul style="list-style-type: none"> <li>• New landfill site locally.</li> <li>• Transport of waste to outside shire landfill (e.g., Springmount WMF).</li> </ul>	-	-

Geography Zone	Implementation Task Description	Timeframe	Included in CBA?
	<ul style="list-style-type: none"> <li>Transport of residual waste to EfW facility located in nearby regional centre (e.g., Cairns or Townsville).</li> </ul> <p>ESC and CrSC to consider viability to transport directly to Townsville, potential collaboration opportunity with NQROC Plan should local landfill disposal become restricted.</p> <p>CSC to consider viability to feed into consolidation point within CRC for transport to EfW precinct.</p>		
<b>Group 4</b>	<p>Optimize management of existing local landfill capacity for HVASC.</p> <p>Group 4 councils to feed into consolidation point for transport to EfW precinct.</p>	-	-

The majority of councils within FNQROC are reliant, at least in part, on the Springmount WMF for disposal of residual waste. There is a vulnerability in the region due to reliance on one private facility, particularly with predicted increase to the landfill levy, decrease in annual payments (for CRC) and uncertainty regarding increases to gate fees. While landfill capacity in the region is understood to not be an imminent risk, the need for other avenues for residual waste management is driven in this instance by a need to mitigate risk associated with reliance, predominantly on one landfill.

An assessment into the expansion of the MSC landfill to provide resilience and additional disposal capacity for the region should be undertaken in the short term. This assessment should not only consider ongoing landfill capacity requirements, cost impacts, risk mitigation and long-term resilience for disposal of residual waste.

The region needs to review long term management of residual waste and find a stable and sustainable solution that does not depend on landfill for management of residual waste. Acknowledging that there will always be a need for some residual waste to go to landfill, the region should consider developing a long-term plan to transition to alternative methods of residual waste management.

Options for landfill disposal of residual waste may always be required in some council areas, in particular for those communities to which services and access are restricted in the wet season.

It is likely that recovery of residual waste through an EfW facility will form part of an ultimate long-term solution to manage residual waste within the region. Streams that could be accommodated within an EfW facility include:

- MSW kerbside residual,
- MSW self-haul residual,
- C&I residual,
- Timber, and
- Biosolids.

Depending upon the required or available technology, a precursor to the direct processing of residual waste is the manufacture of SRF (Solid Recovered Fuel) or RDF (Refuse Derived Fuel). Through a series of controlled crushing, shredding, drying, and/or pelletising, residual materials can be processed to produce a consistent solid fuel stream. This stream generally includes dry, non-hazardous wastes such as cardboard, timber and plastic that are not recyclable through other processing solutions. SRF or RDF are a high-yield source of energy for producing heat and electricity through combustion in cement kilns, coal-fired power plants, lime kilns, industrial boilers and combined heat and power plants.

Other EfW technologies are capable of directly processing residual waste that has not been transformed into a controlled material stream. These can include pyrolysis, which is a thermal treatment process that heats the

feedstock, (e.g., tyres), without any presence of reactive gases such as air or oxygen and is typically used for waste tyres or plastics. Gasification is a similar thermal treatment process which does require a low level of oxygen present. An example of such technology is the Wastewater Treatment Plant Gasification facility recently developed by Logan Water Partnership, which treats biosolids through a gasification process. Biochar and syngas are produced from the process, where biochar has potential application in soil amendment, water filtration, and other applications in accordance with the End of Waste code for biosolids, whilst syngas is reused internally to dry sewage sludge.

Energy from waste facilities that utilise incineration are an alternative to the disposal of mixed residual waste that cannot otherwise be recycled or separated. The incineration process reduces the incoming waste stream feedstock by approximately 80% in volume, however, also produces a bottom ash and fly ash product which will require identification of opportunities for reuse or recycling to avoid disposal in landfill. While incineration is not a carbon neutral process it can have less emissions comparable to landfill, depending on the gas capture rate of the avoided landfill disposal site.

The region is unlikely to have economy of scale for EfW to be economically viable in short term (low volumes/ high transport distances), however opportunities for multi-sector collaboration (e.g., with agricultural industry) and inter-regional collaboration between regional groups should be monitored.

Interdependencies between Action 8 and other elements of the RRR Plan are outlined below:

**Interdependencies with Planned Actions**

<b>Action 1</b>	Engagement with community and education regarding EfW.
<b>Action 3</b>	Setting up of transfer stations suitable for feeding into a hub and spoke model.
<b>Action 6</b>	Support for new processing facilities within precinct.



## 5. RRR Plan Implementation Roadmap

The RRR Plan initiatives and timing as outlined for Actions 1 to 8 are provided as a RRR Roadmap, refer Figure 26.

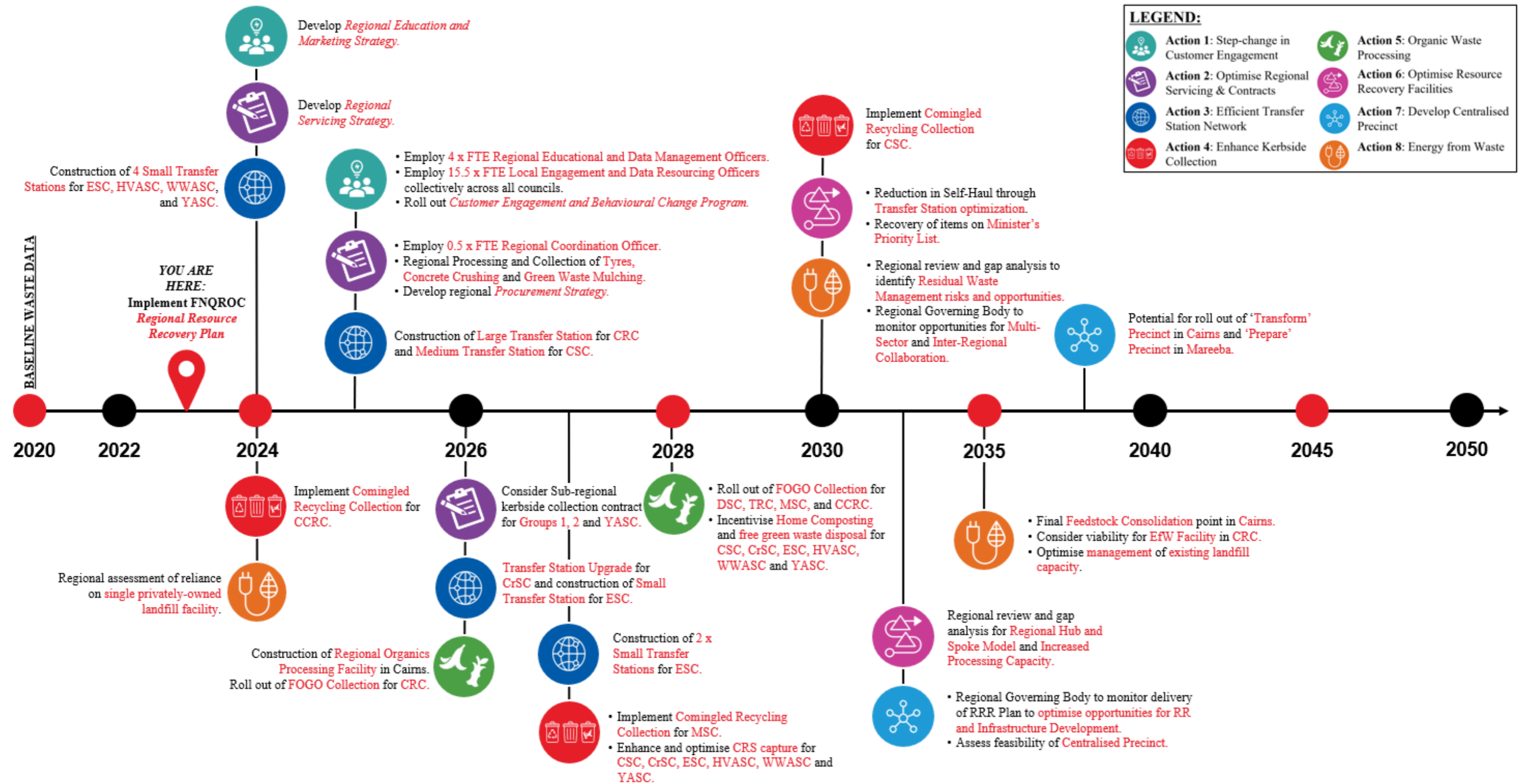


Figure 26 The FNQROC Regional Resource Recovery Roadmap

## 6. RRR Plan Outcome Results

### 6.1 Cumulative effect of RRR Roadmap implementation

The actions outlined in the RRR Roadmap aim to provide each council with multiple mechanisms to improve resource recovery and diversion from landfill. The following sections provide a summary of the estimated total material diverted from landfill and diversion rate potentially achievable for each council based on the implementation of the eight key actions outlined above. The results provided below are based on data obtained for each council and key assumptions. Any changes to waste generation or recovery rates would impact the values presented below. Further detail on the assumptions that underpin these results including modelled outcomes and assumptions of the Waste Flow Model are provided in Appendix C.

#### 6.1.1 Material volumes diverted from landfill

The following tables provide a breakdown of waste material estimated to be diverted from landfill for each council and across the three key headline waste streams. These estimates are based on council handled waste and assume roll out of all initiatives covered in Actions 1 to 8 at the nominated timeframes, refer Table 65, Table 66 and Table 67.

**Table 65 MSW Diverted from Landfill achieved per Council**

Council	MSW diverted from Landfill (Tonnes)				
	2021	2025	2030	2040	2050
CRC	59,355	60,325	55,108	91,143	96,853
CCRC	6,286	7,471	9,477	14,575	14,092
CSC	1,181	1,178	1,283	1,294	1,263
CrSC	198	186	191	180	170
DSC	5,433	5,170	4,655	7,787	7,911
ESC	85	90	88	79	70
HVASC	90	145	140	137	134
MSC	6,313	5,941	5,704	15,185	15,618
TRC	4,478	4,152	6,581	11,364	11,379
WWASC	237	213	202	178	153
YASC	43	71	90	93	96

It is noted that for a number of councils there is a significant improvement of material diverted from landfill between 2030 and 2040. The basis of this change is due to an assumption that EfW will be viable as a long-term alternative to landfill by 2035 for some councils. Utilisation of EfW for management of residual waste has been assumed suitable for CRC, CCRC, DSC, MSC, and TRC.

For ESC, HVASC, and WWASC, the tonnes of MSW diverted from landfill decrease over time. This is because the Roadmap initiatives which these three councils are assumed to implement all occur prior to 2030, and once implemented, the recovery of MSW achieved through these initiatives does not change. As total tonnes of MSW generated continues to grow over time, but recovery rates remain fixed, a decline in the tonnes of MSW diverted from landfill is observed. In reality, it is likely that this diversion would continue to increase as more opportunities for more hub and spoke transfer station networks, resource recovery facilities and precincts are brought online post 2030.

**Table 66 C&I Diverted from Landfill achieved per Council**

Council	C&I diverted from Landfill (Tonnes)				
	2021	2025	2030	2040	2050
CRC	5,092	6,302	7,294	9,648	11,686
CCRC	1,447	1,574	3,279	5,679	6,597

Council	C&I diverted from Landfill (Tonnes)				
	2021	2025	2030	2040	2050
CSC	946	1,333	1,478	1,768	2,054
CrSC	-	-	12	14	16
DSC	1,940	3,056	3,388	4,817	5,597
ESC	-	17	19	23	27
HVASC	-	12	14	16	19
MSC	2,503	2,724	4,900	8,011	9,307
TRC	1,298	1,412	2,415	3,861	4,486
WWASC	-	12	13	15	18
YASC	-	25	27	33	38

**Table 67 C&D Diverted from Landfill achieved per Council**

Council	C&D diverted from Landfill (Tonnes)				
	2021	2025	2030	2040	2050
CRC	9,083	10,305	11,926	15,133	18,331
CCRC	-	-	344	1,078	1,252
CSC	88	335	372	445	516
CrSC	-	5	6	7	8
DSC	1,794	5,775	6,402	6,759	7,852
ESC	-	-	6	7	8
HVASC	30	57	63	75	88
MSC	1,211	1,318	1,615	2,082	2,419
TRC	-	-	1,049	2,283	2,653
WWASC	-	21	24	28	33
YASC	-	81	89	107	124

### 6.1.2 Diversion Rate Achieved

The following Table 68 provides the overall landfill diversion rate for MSW for key milestone years which can be used to compare against the Queensland state targets for landfill diversion. By 2050, the target for waste diversion from landfill for MSW is 95%. This table underlines when state targets are met by any of the individual councils.

For MSW only three councils achieve the state target for waste diversion by 2025, however all councils continually move towards meeting these targets through to 2050, refer Table 68. The decline in recovery for CRC, MSC and DSC in 2030 is attributed to the closure of the Bedminster facility in 2026. These results also include the assumption that EfW will be viable as a long-term alternative to landfill by 2035 for some councils. Utilisation of EfW for management of residual waste has been assumed for CRC, CCRC, DSC, MSC, and TRC which significantly improves the diversion rate for these councils.

**Table 68 MSW Diversion Rate achieved per Council**

Council	MSW Diversion Rate (%)				
	2021	2025	2030	2040	2050
<b>STATE TARGET</b>	-	<u>55%</u>	<u>70%</u>	<u>90%</u>	<u>95%</u>
CRC	62%	<u>66%</u>	59%	89%	89%
CCRC	32%	42%	55%	87%	87%
CSC	41%	45%	51%	52%	52%
CrSC	41%	42%	47%	47%	47%
DSC	60%	<u>58%</u>	52%	85%	85%

Council	MSW Diversion Rate (%)				
	2021	2025	2030	2040	2050
ESC	17%	20%	21%	21%	21%
HVASC	9%	16%	16%	16%	16%
MSC	34%	34%	33%	85%	85%
TRC	31%	31%	52%	89%	89%
WWASC	58%	60%	63%	63%	63%
YASC	6%	10%	13%	13%	13%

Diversion rates have not been included for C&I and C&D material as council only handle a portion of this material for the region. Therefore, reporting against the targets for these streams would be misleading as councils generally recover a majority of C&I and C&D material within their control. This high recovery rate however is not necessarily representative of the greater industry management of C&I and C&D.

The results above are based on data provided by each council and changes to material quantities or flows may alter these results. The development of the waste flow model has been underpinned with assumptions based on stakeholder feedback or industry standards and changes to these assumptions may alter results presented. A summary of key assumptions is provided in Appendix C.

## 6.2 Infrastructure Capacity Assessment

An infrastructure capacity assessment has been undertaken for key identified infrastructure under the RRR Plan. Capacity requirements of key regional infrastructure was assessed based on the implementation roadmap and considered impact of sensitivity analysis, which was conducted to consider the impact of the following scenarios:

- Impact to MSW generation based on variation in population – utilising Australian Bureau of Statistics (ABS) low and high projections.
- Impact to C&I waste generation based on fluctuations in tourism – high and low scenario modelled.

### 6.2.1 CRC MRF

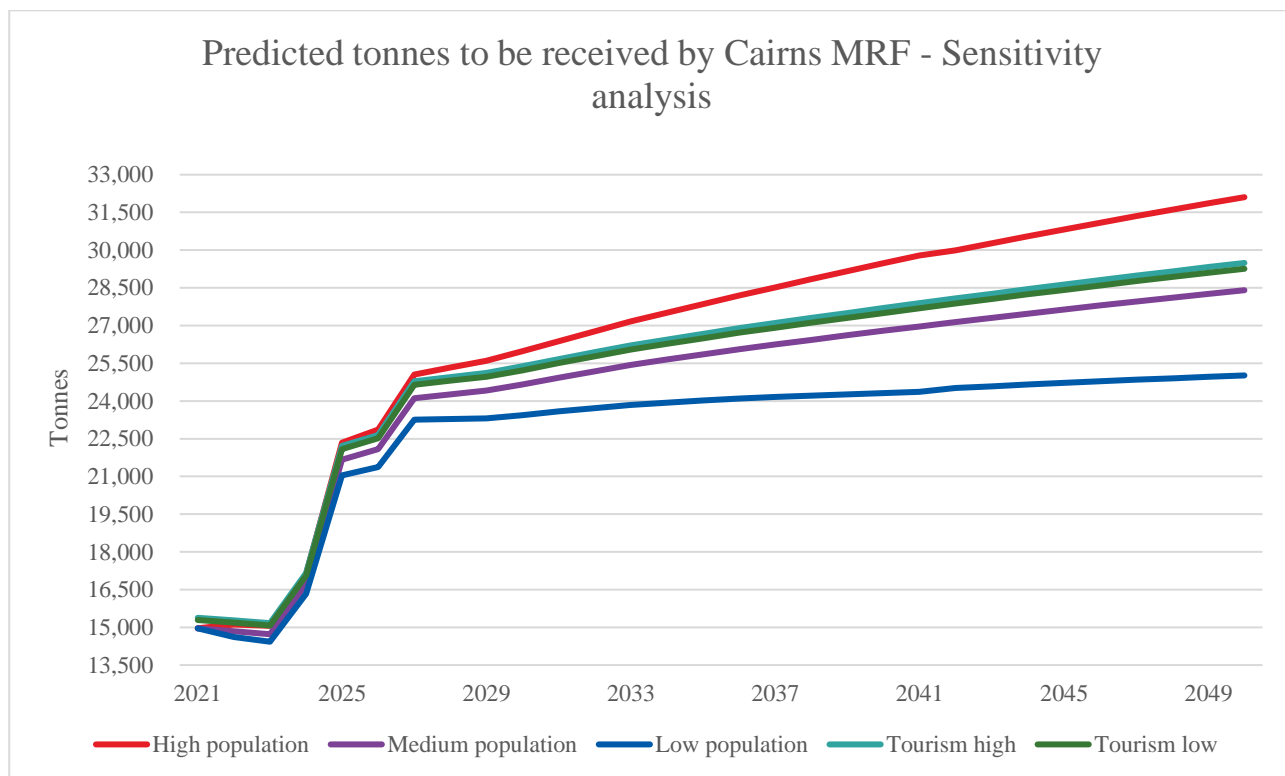
Based on the roll out of regional actions outlined above, an assessment of the required MRF capacity from 2023 to 2050 has been undertaken. The results of this assessment are provided in Table 69.

**Table 69 MRF capacity assessment**

Facility	Current capacity	Design life	Future capacity requirements (base case)	Timing of new infrastructure (base case)
MRF (Cairns)	30,000tpa	10-15years	30,000tpa	Throughput of current facility not exceeded before 2050 in base case.  Upgrade required after normal design life (between 2030-2035).

A sensitivity analysis was undertaken to assess impact on changing population or tourism numbers on the capacity requirements for the MRF. Figure 27 demonstrates shows high, medium and low population projections, plus tourism uplift/downlift (based upon medium-series population projection). The implementation of all actions has been assumed within the output of these results, therefore the additional tonnes sent to the Cairns MRF are a result of both future waste generation, the rollout of new commingled recycling services (2024, 2027, 2030, note the uplift in the trends), and small tonnes of recyclables recovered from self-haul residual streams). Tourism fluctuations is noted as having only a minor impact as this

predominately affected C&I waste streams, of which only a small volume of C&I is modelled as being received by the MRF.



**Figure 27 Sensitivity assessment for MRF capacity**

Additional feedstock may be available from comingled recycling material within the C&I stream that is currently handled by private facilities. It is estimated that should council seek to process this material at the MRF an additional 30%-50% capacity may be required.

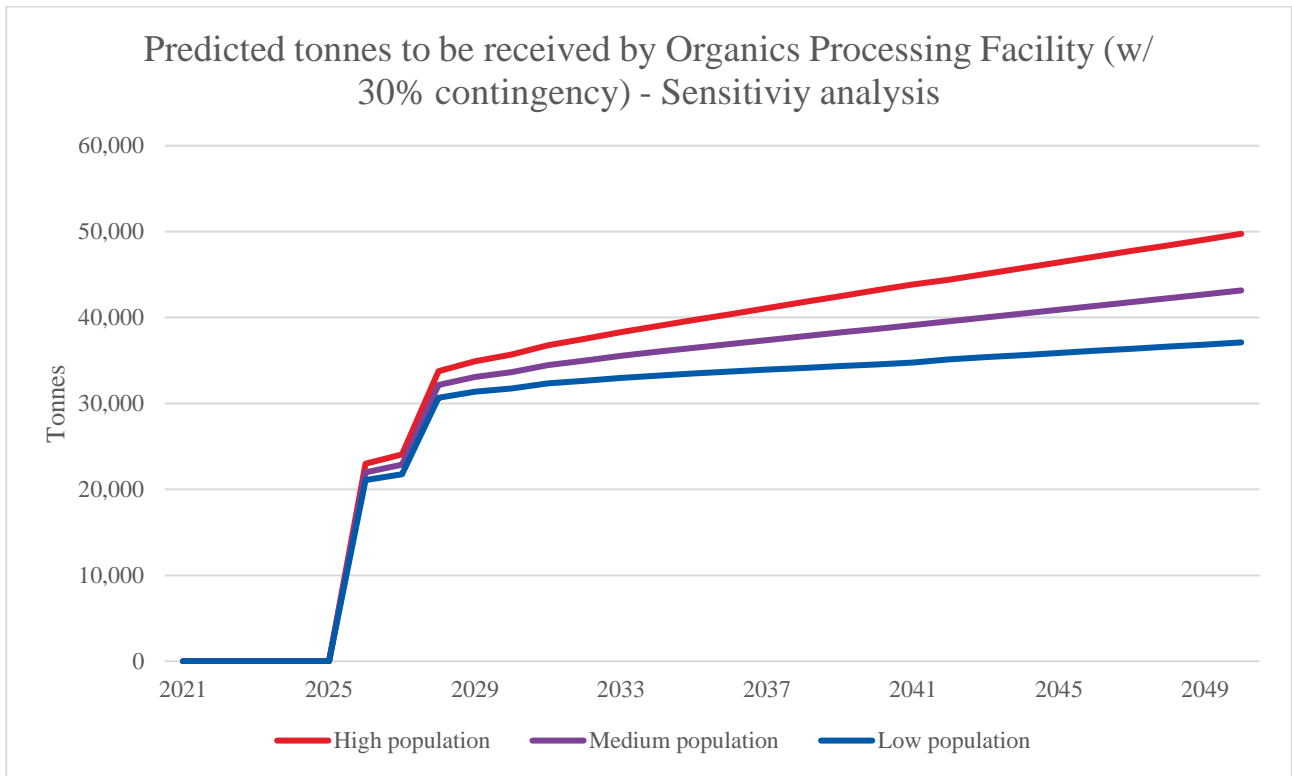
### 6.2.2 Organics Processing Facility

Based on the roll out of regional actions outlined above, an assessment of the required Organics facility capacity until 2050 has been undertaken. The results of this assessment are provided in Table 70.

**Table 70 Organics facility capacity assessment**

Facility	Current capacity	Design life	Future capacity requirements (base case)	Timing of new infrastructure (base case)
<b>ICV organics processing facility (Cairns)</b>	-	25 years	39,000tpa	2026
			45,500tpa	2041

A sensitivity analysis was undertaken to assess impact on changing population or tourism numbers on the capacity requirements for the Organics facility. Figure 28 shows high, medium and low population projections (facility not assumed to receive FOGO from C&I or C&D sources as part of this assessment, so tourism uplift/downlift has not been applied). The implementation of all actions has been assumed within the output of these results, therefore the additional tonnes sent to the facility are a result of both future waste generation and the rollout of new kerbside FOGO services (2026, and then 2028, note the uplift in the trends).



**Figure 28 Sensitivity analysis of organics facility capacity**

### 6.2.3 EfW feedstock availability

Based on the roll out of regional actions outlined above, an assessment of potential EfW feedstock until 2050 has been undertaken for the region. The results of this assessment are provided in Table 71.

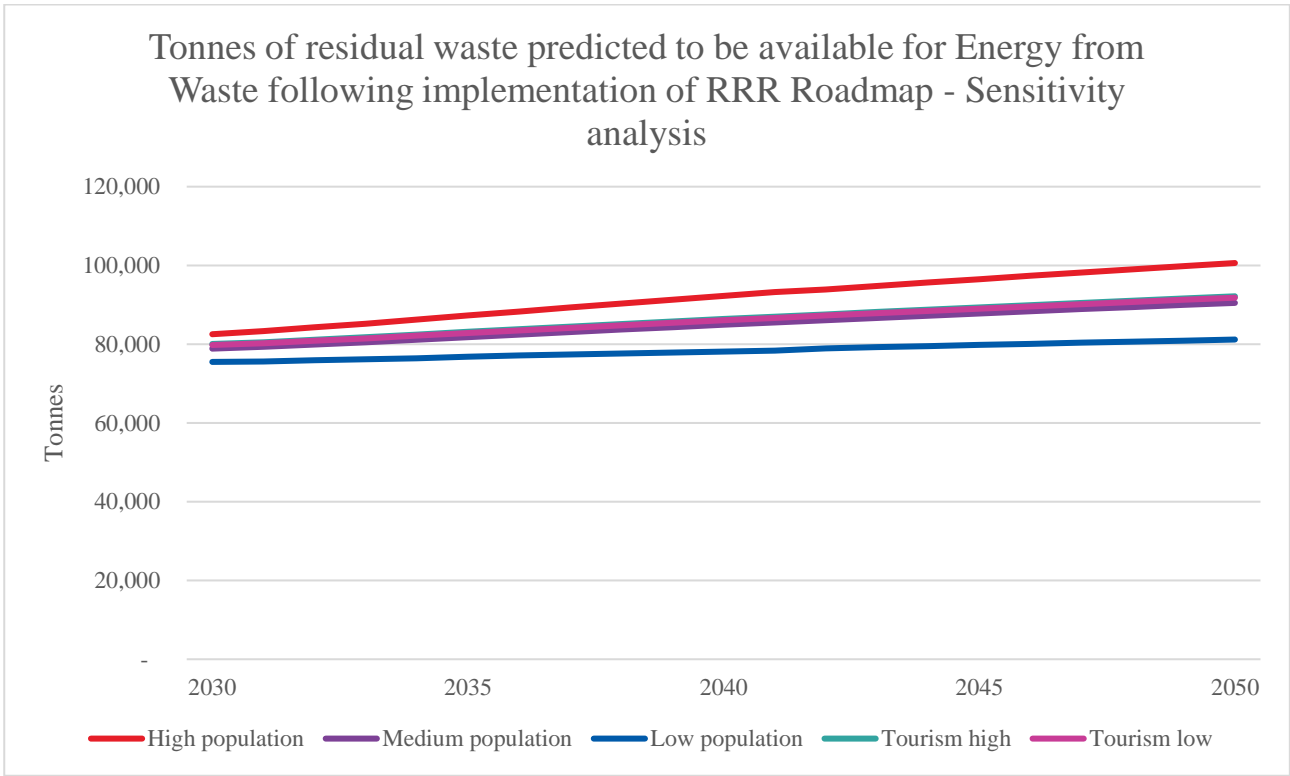
**Table 71 EfW feedstock availability**

Facility	Available feedstock	Timing of new infrastructure (base case)
EfW facility	MSW Kerbside general waste.	2035
	MSW Self haul residual waste.	
	C&I Self haul residual waste.	
	C&D Self haul residual waste.	

EfW feedstock is assumed to be sourced from CRC, CCRC, DSC, MSC and TRC. Feedstock represents remainder of MSW kerbside waste (following diversion of commingled recyclables or FOGO from the red lid bin), and portion of MSW, C&I and C&D self-haul residual streams (from which some materials have already been recovered).

A sensitivity analysis was undertaken to assess impact on changing population or tourism numbers on the available feedstock for an EfW facility. This analysis is provided in Figure 29 and includes high, medium and low population projections, as well as tourism uplift/downlift (relative to medium-series population projection) (tourism uplift occurs from 2021 and effects only C&I waste tonnes).

Additional material from privately handled C&I residual and unrecoverable tonnages within CRC may also be suitable as a EfW feedstock, however the quantity of this material is not expected to significantly increase the volumes outlined in Figure 29.



**Figure 29 Sensitivity analysis on EfW feedstock potential**

## 7. Financial and Regulatory Support

### 7.1 Funding need

The outputs of the CBA for each action make it clear that for the region to work toward the state targets, councils are going to need a large amount of funding support to achieve these goals. For many of the actions outlined above, particularly large investments in infrastructure and ongoing operations are required, however, are not economically viable for all councils without contribution of funding support. The Queensland State government has clearly outlined targets for improvements to resources recovery and waste generation, and while it is recognised that South East Queensland will contribute a large portion of heavy lifting towards these targets, if the Queensland State government is committed to improving resource recovery practices within the regions, they will need to financially support regional and remote councils to do so.

Substantial investment is required for the region to achieve key outcomes outlined within this RRR Plan, move toward state targets, and improve overall resources recovery practices. For FNQ councils, this cost of transition will need to be heavily supported by funding levers from the State and Federal Governments.

Communities within FNQ have a limited ability and willingness to pay for waste services, and low-rate bases (or no rate bases in the case of First Nation councils) which reduces the funding available within councils to invest in improved waste and resource recovery services. Therefore, to minimise the pass on of costs to the rate payer and provide a FNQ councils with the opportunity to improve resource recovery, a large amount of funding support will be required by State and Federal governments to achieve the RRR Plan outcomes.

Large investments in new infrastructure, are not economically viable for all councils without sustained funding support for the planning, development, design, construction and operational phases, and transportation costs of materials. Funding should be allocated to support resource recovery outcomes identified within the RRR Plan, both in the immediate and longer term.

### 7.2 Funding sources and levers

Funding can be provided to the region through a number of sources, including: public, private and/or low interest/no interest loans from either private or public funding bodies.

The Department of Environment and Science has previously announced that the regional resource recovery plans are one of their key focus areas and will have access to funding, however details of this process have not been determined.

It is important that a clear pathway is established by the Queensland Government to progress initiatives developed by regional governing bodies under the regional resource recovery plans. This pathway must consider support for regional collaboration and not create competition between councils when bidding for available funding. Funding should be allocated to support resource recovery outcomes identified within the regional resource recovery plans. As the timing for roll out of initiatives will vary across the regions due to timing of regional resource recovery plans finalisation, existing contracts, and regional readiness, the funding opportunities should not include opening and closing dates, rather allocated funding that will run continuously. It is expected that to some extent waste levy revenue will be utilised to support the transition to improved resource recovery for councils.

Funding criteria should include demonstration of alignment of proposed initiatives against objectives within the regional resource recovery plans and required input should be tailored in accordance with the size and scale of the initiative. For all projects, criteria should demonstrate alignment with regional resource recovery plans outcomes, regional collaboration assessment, and value for money.

A summary of current funding sources for current programs are known and are detailed in Table 72 below. However, there is limited information on future funding programs from State and Federal Governments.

The programs noted within Table 72 illustrate the variety of different programs that may be available to councils, however noting some are nearing completion. It is highly likely that both State and Federal Governments will continue similar programs into the future, and it is hoped that both levels of government



will recognise the significant contribution they will provide in assisting regions to improve resource recovery practices.

**Table 72 Existing funding sources**

<b>Administering body</b>	<b>Program Names</b>	<b>Program funding</b>
<b>Department of Environment and Science, QLD</b>	<ul style="list-style-type: none"> <li>2022-24 Local Government Levy Ready Grant Program Round 3 (LGLRGP)</li> <li>Waste package (including Recycling and Jobs Fund)</li> </ul>	<ul style="list-style-type: none"> <li>\$5,000,000</li> <li>\$2.1 billion (\$1.1 billion)</li> </ul>
<b>State Development, Infrastructure, Local Government and Planning, QLD</b>	<ul style="list-style-type: none"> <li>2022-24 local Government Grants and Subsidies Program</li> <li>Works for Queensland Program 2021-24</li> <li>2022-23 State Government Financial Aid</li> <li>2022-23 Indigenous Economic Development Grant</li> <li>Indigenous Councils Critical Infrastructure Program (ICCIP)</li> </ul>	<ul style="list-style-type: none"> <li>\$86,000,000</li> <li>\$200,000,00</li> <li>Not disclosed</li> <li>Not disclosed</li> <li>\$120,000,000</li> </ul>
<b>Department of Climate Change, Energy, the Environment and Water, AUS</b>	<ul style="list-style-type: none"> <li>Recycling Modernisation Fund</li> <li>National Product Stewardship Investment Fund</li> </ul>	<ul style="list-style-type: none"> <li>\$190,000,000</li> <li>\$20,000,000</li> </ul>
<b>Australian Government</b>	<ul style="list-style-type: none"> <li>Cooperative Research Centres Grants</li> </ul>	<ul style="list-style-type: none"> <li>\$20,000,000</li> </ul>
<b>Clean Energy Finance Corporation</b>	<ul style="list-style-type: none"> <li>Australian Recycling Investment Fund</li> </ul>	<ul style="list-style-type: none"> <li>\$100,000,000</li> </ul>

The Queensland Government election is scheduled for 26 October 2024 and the Federal election is anticipated between August 2024 and May 2025. Revamped and/or new funding programs are likely to commence following both State and Federal elections. Additionally, the regional resource recovery plans will provide a solid foundation to promote the need for funding opportunities to both levels of government for assistance with the delivery of the Regional Resource Recovery actions.

It is worth noting that there may also be funding opportunities for project initiatives and/or infrastructure delivery from the private sector through collaborative or partnership arrangements, such as public/private partnership (PPPs), which could be explored further as part of procurement planning processes.

The economic analysis has been prepared to support strategic planning for waste management in the region. The cost-benefit analysis is intended to support a strategic understanding of the timing and order of magnitude of potential investment pathways. Further analysis is required to support feasibility studies and inform investment decisions.

### **7.3 Regulatory support**

The roll out of the eight RRR Plan actions demonstrate that it currently not possible for the region to meet current State 2050 targets and that while funding support is important for transition to improved resource recovery, additional and timely regulatory and policy reform will be critical to make further progress toward achieving the State and Federal targets, including:

## Federal

- Expansion of existing, and introduction of new product stewardship schemes for problematic materials.
- Federal support for increased and effective data capture across the nation.
- Support for targets driven by the National Waste Policy to significantly increase the use of recycled content.

## State

- Product Stewardship schemes expansion.
- Harmonisation of bin colours and consistent messaging of education.
- Support for a generator pays model or consistency in charging across the state.
- Standardisation for MSW waste and recycling stream classification and reporting.
- Allocation of waste levy funds to grow and support the waste management and resource recovery industry.

## 8. Monitoring and Reporting Framework

### 8.1 Monitoring and Reporting

The actions administered under the RRR Plan will need a clear pathway for reporting, to capture progress and provide accountability of the governing body to deliver against the program. Monitoring and reporting are essential to assess progress over time, in alignment with the RRR Plan and implementation roadmap.

The monitoring and reporting framework is recommended to be undertaken on two separate levels as provided in Table 73.

**Table 73 RRR Plan Monitoring and Reporting Frequencies**

Aspect	Reporting frequency
<b>Implementation assessment</b>	Annual reporting of progress against the RRR Plan would assess projects complete and identify key limitations or barriers for any actions not undertaken. This reporting structure will provide a mechanism for regional tracking and reporting on progress and outcomes. Annual reporting requirements would seek to create internal accountability for progress and program decisions.
<b>Review of the RRR Plan</b>	The RRR Plan should be agile and able to be updated to incorporate changes in policy, materials and local capability or needs. Criteria should be established to trigger review of the plan and undertake update of implementation actions and timings to capture of changes to infrastructure capacity, community needs, technology, and material streams.

The governing body will be responsible for an annual review to report on the RRR Plan progress. The review should include reporting against the key performance indicators (KPIs) for the project. The annual review of the roadmap and implementation timing would assess projects complete and identify key limitations or barriers for any actions not undertaken in line with the RRR Plan timing. This will provide a mechanism for regional tracking and reporting on progress and outcomes. It is understood that gathering of data for key metrics will be a journey and immediate capacity may be low to report on some items. However, with the roll out of the RRR Plan actions it is anticipated that this data capture capacity will improve over time. Annual reporting requirements would seek to create internal accountability for progress and program decisions.

In order to include key metrics within the annual report, metrics for tracking, monitoring and the evaluation capacity of these metrics would need to be considered as part of each project role out. For metrics to be included there must be a mechanism to capture information at either a regional or council level, depending on the particular project. The program coordinator should be clear about reporting requirements at the start of each project, so councils can be informed and discuss their capacity to measure metrics now and over time as initiatives and actions are implemented. Data gathering processes might be different for different sub-regional groups which may be able to converge over time as capacity and technology improves. The annual report would aim to capture information and measure the effectiveness of the roll out and would start to build a picture for the region over time.

The responsibility for the annual report would need to sit at the level of the governing body, managed by the metrics required and timing for key inputs. This process would be set up early so not to create a burden to councils with additional or unforeseen reporting requirements. The governing body would need to support councils to provide information as required. It is suggested that a regular check in by the program coordinator is established with councils to make sure people are on track and not experiencing issues with data collection.

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# Appendix

# Appendix A - Levers Long List

## FNQROC - Initiatives Refinement

ID	Initiative	ILM Category	Waste Hierachy Category	Included in MCA	Notes	MCA ID
<b>ILM</b>						
1	Advocate to ensure Statutory Regional Plan reflects the Regional Resource Recovery Strategy	Reform	Governance	No	-	NA
2	FNQROC to assess regional capacity and supporting agile strategic planning and investment framework to implement identified solutions	Reform	Governance	No	-	NA
3	Frameworks are refreshed for procurements and process alignment	Reform	Governance	No	Frameworks would be considered governance and not subject to the MCA but regional and sub regional servicing contracts could include procurements and process alignment.	1
4	Review Levels of Service for the community	Reform	Governance	No	-	NA
5	Advocate with individual state agencies and local government entities to adopt practices for and compliance with resource recovery	Reform	Governance	No	-	NA
6	Conduct data audits, gap analysis process improvements, material flow analysis and asset condition assessments	Better Use	Governance	No	Improved data capture included in soft infrastructure initiative.	2
7	Review monitoring and enforcement requirements, capabilities and capacity	Better Use	Governance	No	-	NA
8	Embrace the use of technology to assist waste monitoring, compliance and behavioural change	Better Use	Governance	Yes	Refined to include: <i>Implement soft infrastructure including education programs across residents and businesses, agricultural and tourism industry, standardisation of signage, data capture, waste monitoring/tracking technologies, for use in reporting, compliance, behaviour change programs, and tracking against targets.</i>	2
9	Undertake a regional workforce plan to understand capability challenges and identify options to address these	Better Use	Governance	No	-	NA
10	Consider consolidation of current sites, optimising latent capacity and process efficiency	Better Use	Recycle and Compost	Yes	Refined to include: <i>Consolidation of current sites, optimising latent capacity and increase process efficiency to leverage existing assets and maximise resource recovery and operational efficiency (e.g. minor improvements to optimise transport connections, traffic flows, increased volumes or site material flows).</i>	7
11	Define options for reduced reliance on single landfill asset	Improve Existing	Recycle and Compost	Yes	This initiative is covered within a range of initiatives listed and will be an outcome of the assessment process.	13,14,15
12	Identify potential risks (i.e., Climate change, urban heat, cyclone, fire etc) to managing waste and recovery in the region and develop/amend contingency/disaster management plans accordingly	Improve Existing	Governance	No	-	NA
13	Brownfield extensions – reconfigure transport connections, optimising traffic flows, site material flow analysis	Improve Existing	Recycle and Compost	Yes	Refined to include: <i>Consolidation of current sites, optimising latent capacity and increase process efficiency to leverage existing assets and maximise resource recovery and operational efficiency (e.g. minor improvements to optimise transport connections, traffic flows, increased volumes or site material flows).</i>	7
14	Investigate options for organic resource recovery solutions'	Improve Existing	Recycle and Compost	Yes	Refined to include: <i>Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g. processing of organic waste through EIW Bioenergy precincts integrated with existing facilities in the region).</i>	13
15	Identify waste streams and their volumes now and into the future (2050) to design and implement appropriate right sized systems and assets for resource recovery (and fleet for mobile processing options)	New Build	Recycle and Compost	Yes	Defining waste stream and volumes will be an outcome of this project, identification of systems, assets and mobile infrastructure are included in a number of the initiatives.	8, 10,13
16	Explore options for resource recovery precinct hubs	New Build	Reuse Materials	Yes	Refined to include: <i>Development of a new centralised resource recovery precinct .</i>	6
<b>I&amp;O Paper</b>						
17	Federal Govt - expansion of existing, and introduction of new product stewardship schemes and mechanisms		Governance	No	Local management of problematic wastes addressed within 9 and 4.	NA



## FNQROC - Initiatives Refinement

ID	Initiative	ILM Category	Waste Hierarchy Category	Included in MCA	Notes	MCA ID
18	Federal support for increased and effective data capture across the nation		Governance	No	Local data capture addressed within 2.	NA
19	Targets driven by the National Waste Policy to significantly increase the use of recycled content		Governance	No	-	NA
20	State Govt - Product Stewardship schemes expansion through the <i>Waste Reduction and Recycling Act 2011</i> administered by DES.		Governance	No	Local management of problematic wastes addressed within 9 and 4.	NA
21	State Govt - Education and Messaging: Standardisation of bin colours for collection services and material capture (i.e., what material is and is not accepted within a recycling bin) within QLD would reduce confusion		Governance	No	Local education and messaging addressed with 2.	NA
22	Consistent messaging and support for a generator pays model or consistency in charging across the state driven by State government		Governance	No	Local messaging addressed within 2.	NA
23	Queensland Government should introduce standardisation for MSW waste and recycling stream classification and reporting		Governance	No	Local education and messaging addressed with 2.	NA
24	State Government must allocate funding to grow and support the waste management and resource recovery industry		Governance	No	-	NA
25	State Government should support industry and peak bodies to develop modules for waste management accreditation.		Governance	No	-	NA
26	The local administering body must be supported by the State Government.		Governance	No	-	NA
27	Local Governance - Education and awareness including consistent signage and services offered at facilities that will also assist people travelling through or moving around the region		Governance	Yes	Refined to include: <i>Implement soft infrastructure including education programs across residents and businesses, agricultural and tourism industry, standardisation of signage, data capture, waste monitoring/tracking technologies, for use in reporting, compliance, behaviour change programs, and tracking against targets.</i>	2
28	Standardisation and consistency of waste acceptance and disposal pricing between councils, and alignment to the state level		Governance	No	-	NA
29	Regional or subregional kerbside collection contracts		Governance	Yes	Refined to include: <i>Roll out regional and subregional kerbside collection and processing contracts to improve economies of scale and management of existing infrastructure.</i>	1
30	Regional processing contracts		Governance	Yes	Refined to include: <i>Roll out regional and subregional kerbside collection and processing contracts to improve economies of scale and management of existing infrastructure.</i>	1
31	Regional collection contracts for problematic waste streams where materials can be quantified and drivers/limitations in the current markets established		Governance	Yes	Refined to include: <i>Roll out regional and subregional kerbside collection and processing contracts to improve economies of scale and management of existing infrastructure.</i>	1
32	Funding support for councils		Governance	No	-	NA
33	Implement Education Programs across residents and businesses, agricultural and tourism industry for waste reduction.		Avoid and Reduce	Yes	Refined to include: <i>Implement soft infrastructure including education programs across residents and businesses, agricultural and tourism industry, standardisation of signage, data capture, waste monitoring/tracking technologies, for use in reporting, compliance, behaviour change programs, and tracking against targets.</i>	2
34	Generator pays and regional consistency of charges for waste and recycling.		Governance	No	-	NA
35	Set up Buyback Shops		Reuse Materials	Yes	Refined to include: <i>Establishment of buy back shops at existing transfer station facilities.</i>	5
36	Sharing and Service Opportunities - B2B, Opportunistic Recycling, Product Reuse, Sharing and leasing models		Reuse Materials	Yes	Refined to include: <i>Broker sharing and service opportunities - B2B, opportunistic recycling, product reuse, sharing and leasing models within the community and businesses.</i>	3

## FNQROC - Initiatives Refinement

ID	Initiative	ILM Category	Waste Hierarchy Category	Included in MCA	Notes	MCA ID
37	Distributed Processing Technologies		Reuse Materials	Yes	Refined to include: <i>Implement distributed processing technologies with local scale infrastructure to improve remote/rural resource reuse efficiency of problematic waste streams.</i>	4
38	Resource Recovery Precincts		Reuse Materials	Yes	Refined to include: <i>Development of a new centralised resource recovery precinct .</i>	6
39	Local govt policies and planning for recycled materials to replace virgin resources.		Governance	No	-	NA
40	Market Development for secondary products.		Governance	No	This will be covered as a MCA criteria	NA
41	Review Kerbside Bin Infrastructure - Comingled Collection, Kerbside FOGO/GO		Recycle and Compost	Yes	Refined to include: <i>Expansion of comingled recycling bins to councils without this service. Where this isn't possible there may be options to enhance CDS (or similar product return schemes) to improve recovery.</i>	11 & 12
42	Organics Processing Options - Open Windrow, Aerated Static Pile, In-vessel composting, Vermicomposting, Wet & Dry Anaerobic Digestion, Mulching, Fermentation		Recycle and Compost	Yes	Refined to include: <i>Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g. processing of organic waste through EfW Bioenergy precincts integrated with existing facilities in the region).</i>	13
42.1	EfW Bioenergy precincts integrated with existing facilities		Recycle and Compost	Yes	Refined to include: <i>Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g. processing of organic waste through EfW Bioenergy precincts integrated with existing facilities in the region).</i>	13
43	Integration of Biosolids		Recycle and Compost	Yes	Refined to include: <i>Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g. processing of organic waste through EfW Bioenergy precincts integrated with existing facilities in the region).</i>	13
44	Closure of Transfer Stations and Landfills with development of new facilities to support resource recovery and recycling capture.		Recycle and Compost	Yes	Refined to include: <i>Development of new transfer station and recovery facilities to provide the opportunity to design sites focused on resource recovery and recycling capture.</i>	8
44.1	Review and modification of existing facilities and sites provides an opportunity to leverage existing assets and improve recovery and diversion rates.		Recycle and Compost	Yes	Refined to include: <i>Consolidation of current sites, optimising latent capacity and increase process efficiency to leverage existing assets and maximise resource recovery and operational efficiency (e.g. minor improvements to optimise transport connections, traffic flows, increased volumes or site material flows).</i>	7
45	Product Stewardship for collection and reprocessing of consumer products. Industry-led voluntary schemes, Co-regulatory arrangements, mandatory schemes. (Tyres, Mattresses, Batteries, Bulka Bag Scheme, DrumMuster, RedCycle etc.)		Recycle and Compost	Yes	Refined to include: <i>Maximise collection of recyclables and problematic wastes by regional approach to consolidating waste streams using hub and spoke transfer station network.</i>	9
46	Residual Materials		Residual Waste Mangement	No	This item is covered in the below items.	
46.1	Recovery of Fuel (EfW Physical/Chemical)		Residual Waste Mangement	Yes	Refined to include: <i>Management of residual waste through development of an EfW facility which utilises physical and/or chemical mechanisms or incineration to recover energy.</i>	14
46.2	Recovery of Energy (EfW Incineration)		Residual Waste Mangement	Yes	Refined to include: <i>Management of residual waste through development of an EfW facility which utilises physical and/or chemical mechanisms or incineration to recover energy.</i>	14

## FNQROC - Initiatives Refinement

ID	Initiative	ILM Category	Waste Hierachy Category	Included in MCA	Notes	MCA ID
46.3	Landfill Disposal (LFG Capture and Energy Recovery)		Residual Waste Mangement	Yes	Refinied to include: <i>Management of residual waste through disposal to new or existing landfill facilities (with or without LFG capture and energy recovery).</i>	15
46.4	Landfill Disposal (No LFG Capture)		Residual Waste Mangement	Yes	Refinied to include: <i>Management of residual waste through disposal to new or existing landfill facilities (with or without LFG capture and energy recovery).</i>	15

# Appendix B - Eastern Cape Regional Waste Management Plan



2022

# Eastern Cape Regional Waste Management Plan



A.Prince Consulting  
ABN 96 077 504 226  
TH 4 / 28 West Street  
Nth Sydney NSW 2060  
P: +61 2 9907 0994  
E: [admin@aprince.com.au](mailto:admin@aprince.com.au)  
W: [www.aprince.com.au](http://www.aprince.com.au)

This report was researched and prepared by



A.Prince Consulting Pty Ltd  
ABN 96 077 504 226  
TH 4/28 West St  
North Sydney NSW 2060  
Phone: (02) 9907 0994  
Email : admin@aprince.com.au  
Web : www.aprince.com.au

for:

Robert Ferguson  
Lead – Public Health and Waste  
Local Government Association Queensland  
PO Box 2230 Fortitude Valley BC QLD 4006  
Phone: +61 7 3000 2212 Mobile: 0458 802 120  
Email: Robert\_Ferguson@lgaq.asn.au

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## ACRONYMS

<b>APC</b>	A. Prince Consulting
<b>ABS</b>	Australian Bureau of Statistics (Cth.)
<b>C&amp;I</b>	commercial and industrial
<b>C&amp;D</b>	construction and demolition
<b>CEQ</b>	Community Enterprise Queensland
<b>COEX</b>	Product Responsibility Organisation for Containers for Change
<b>CRP</b>	container refund point
<b>CRC</b>	community recycling centre
<b>CRS</b>	container refund scheme
<b>DCHDE</b>	Department of Communities, Housing and Digital Economy
<b>DEPW</b>	Department of Energy and Public Works
<b>DES</b>	Department of Environment and Science
<b>DOGIT</b>	Deed of Grant in Trust
<b>DSDSATSIP</b>	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships
<b>DSDILGP</b>	Department of State Development, Infrastructure, Local Government and Planning
<b>EA</b>	environmental authority
<b>ERA</b>	environmentally relevant activities
<b>FNQ</b>	Far Northern Queensland
<b>FNQROC</b>	Far Northern Queensland Region of Councils
<b>HVASC</b>	Hope Vale Aboriginal Shire Council
<b>ICCIP</b>	Indigenous Councils Critical Infrastructure Program
<b>ILUA</b>	Indigenous Land Use Agreement
<b>LGAQ</b>	Local Government Association of Queensland
<b>MGB</b>	mobile garbage bin/wheelie bin
<b>MOCs</b>	model operating conditions
<b>MRF</b>	material recovery facility
<b>MSW</b>	municipal solid waste
<b>PCG</b>	project control group
<b>PLA</b>	Primary Living Areas
<b>QIPP</b>	Queensland Indigenous Procurement Policy
<b>RISA</b>	regional interest development approvals
<b>RWIP</b>	Regional Waste Infrastructure Plan
<b>RWMP</b>	Regional Waste Management Plan
<b>RWSG</b>	Regional Waste Strategy Group
<b>SPP</b>	<i>State Planning Policy</i>
<b>TCICA</b>	Torres Cape Indigenous Council Alliance
<b>TS</b>	transfer station
<b>WWASC</b>	Wujal Wujal Aboriginal Shire Council
<b>YASC</b>	Yarrabah Aboriginal Shire Council

## EXECUTIVE SUMMARY

This Regional Waste Management Plan (RWMP) is one of a series of regional plans being developed for First Nations councils across Queensland, as an action arising from the *Respecting Country, A Sustainable Waste Strategy for First Nations Communities* (2021). The strategy acknowledges the different circumstances of First Nation communities compared with other councils in Queensland, calling for self-sustaining management practices to be introduced in collaboration with local communities and their cultural practices.

This RWMP is for the Eastern Cape communities of Queensland – known as the Eastern Cape Region (ECR) – and covers the local government areas of Hope Vale Aboriginal Shire Council (HVASC), Wujal Wujal Aboriginal Shire Council (WWASC) and Yarrabah Aboriginal Shire Council (YASC). This plan aims to articulate the most appropriate long-term sustainable solution for improved waste management, resource recovery while transitioning to regulatory compliance that will benefit both current and future generations.

The region is not considered to be a significant waste generator, with the entire region currently producing an estimated 2,806 tonnes of waste per annum, comprising 83% household (MSW) waste, 3.6% commercial and industrial (C&I) and 8.6% construction and demolition (C&D) waste. The current regional landfill diversion rate is 3.9% achieved by the annual removal of scrap metal, processing of garden wastes and recycling of used lead acid batteries.

**Table 1 Total reported waste generation 2021 DES survey (tonnes)**

Waste Fast facts	HVASC	WWASC	YASC	Total
No. of households with kerbside service	293	134	474	901
Total MSW	859	162.4	1298	2,319.00
Total C&I	-	-	100	100
Total C&D	99	50	91	240
Other bulky wastes / Biosolids	36.5	0	0	36.5
Total recycled	100	10.25	0	110.25
<b>Total waste generated</b>	<b>1,094.5</b>	<b>222.65</b>	<b>1,489</b>	<b>2,805.75</b>
<b>Diversion rate</b>	<b>9.1%</b>	<b>4.6%</b>	<b>0%</b>	<b>3.9%</b>

Each council has unique challenges and opportunities and requires tailored solutions as agreed by each council as the most suitable within the bounds of current and appropriate technology, skills and resources. Regional opportunities exist by changing practices to address current challenges for waste management by enhancing recycling and resource recovery for all councils.

To deliver long term sustainable solutions across the region and all three First Nation communities the major waste management improvement projects entail:

1. Establish a permanent COEX Container Refund Point (CRP) in townships and provide mobile services if appropriate

2. Plan to eventually close current landfills and use for disaster / overflow wastes only and/or rehabilitate former landfill sites
3. Establish new transfer stations with 24-hour access and Community Recycling Centres for source separation of problematic and household hazardous wastes
4. Establish a reuse or tip shed where items can be salvaged for reuse or waste to art at all communities
5. Prepare tender documents to outsource kerbside waste collections with expiration dates linked to neighbouring council collection contracts to allow for future joint procurement on a sub-regional basis
6. Install mobile bulky waste skips at dumping 'hot spots' or where needed to service isolated or tourist areas like Elim Beach.
7. Continue to participate in the FNQROC regional collection contract for scrap metals, end of life vehicles and whitegoods
8. Establish new regional contracts to manage other bulky and problematic wastes including tyres, E-waste, paints, waste oil, smoke detectors, gas cylinders and fire extinguishers through FNQROC or TCICA
9. Establish regional processing contracts for chipping garden waste and crushing concrete
10. Seek Department of Energy and Public Works (DEPW) / QBuild to include in all works contracts a requirement for construction and demolition wastes to NOT be disposed of at community waste disposal facilities and all contractors required to remove construction and demolition wastes out of community as part of their contractual obligations
11. Support and deliver local co-designed community waste education programs

With these improvements in place there should be a significant reduction in waste destined for landfill, and a solid basis established for longer-term recycling and resource recovery initiatives.

The formation of a Regional Waste Strategy Group would greatly assist the region, given the commonality of issues and challenges faced by the three councils at both a policy and operational level (including staff turnover). Such a group, supported by a secretariat such as the Torres Cape Indigenous Council Alliance (TCICA), could provide a forum to share knowledge and experience, ascertain end markets, develop regional or sub – regional contracts, share contacts, co-design community/tourist awareness information and conduct mutually beneficial research. A budget allocation of \$50,000 is recommended to engage a dedicated TCICA shared resource to support not only this region but also the Straits, and Western Cape York and the Gulf regional waste management groups, as these four regions share many common issues and the need for similar regional solutions to current challenges.

Fundamentally, this RWMP is a “roadmap to recycling and recovery” for the Eastern Cape councils, moving to contemporary standards and practices for waste management across the region. This transition is decades overdue and essential to meet not only regulatory compliance but to improve environmental outcomes and social benefits of job creation with enhanced skills and social inclusiveness.

Waste management is an essential service and if poorly managed has significant public health consequences, particularly in hot climates. Without a true commitment to implementing this report's recommendations, the current status quo will remain. The capital and operational budget required to fund and deliver improved public health, ongoing waste-compliance practices and sustainable resource-recovery outcomes are beyond First Nation councils.

The three councils rely almost exclusively on government funding, with various State and Federal government programs supporting their capital requirements. However, this transfers operating costs to councils with no rateable income and many conflicting priorities with limited and unreliable external funding. We have identified many opportunities for collaborative benefit across the region and between other regions. However, this relies on external funding to implement the plan in perpetuity. Ongoing financial certainty is imperative to support the transition to improved practices

This project has identified the need for a capital budget of \$3.93 million over the next one to five years with a significant proportion of funds required to upgrade waste receipt and transfer station facilities. In addition, an annual operating budget of \$1.59 million is required to be funded in perpetuity as detailed below to enable the infrastructure to be used and achieve its stated objective of improving waste management. The cumulative expenditure for the first 5 years of the plan will total \$11.88 million.

**Table 2 RWMP funding required (ex GST)**

<b>Budget required</b>	<b>Total</b>
Hope Vale ASC	\$1,834,369
Wujal Wujal ASC	\$385,920
Yarrabah ASC	\$1,710,416
<b>Capital sub total</b>	<b>\$3,930,705</b>
Hope Vale ASC	\$537,168
Wujal Wujal ASC	\$279,360
Yarrabah ASC	\$642,720
Regional Waste Strategy Group	\$130,000
<b>Operating sub total</b>	<b>\$1,589,248</b>
<b>Total CapEx + OpEx Yrs 1-5</b>	<b>\$11,876,945</b>

With these improvements in place there should be a significant short-term reduction in waste going to landfill, and a solid basis established for longer-term recycling and resource recovery initiatives. This RWMP is a “roadmap to recycling and recovery” for the Eastern Cape councils, providing equity and access for residents and transitioning to contemporary waste management standards and practices across the region. It is also important that delivery of this RWMP is integrated with the Far North Queensland Regional Organisation of Councils (FNQROC) Regional Waste and Resource Recovery Plan that is currently being developed separately.

The APC project team acknowledges the enormous support and co-operation afforded to us by council staff and elected representatives. In addition, we acknowledge staff from agencies of the Queensland Government, neighbouring local councils and other stakeholders that gave freely of their time and shared expertise. It greatly assisted in the preparation of this plan.

## 1. INTRODUCTION

While much progress has been made in many areas of First Nations communities, waste management often significantly lags other essential services such as power, water and sewerage. There are significant public health ramifications if solid waste is not well managed. Hot tropical climates amplify these

challenges, with waste piles providing breeding grounds for disease vectors, vermin and snakes. Higher occupancy rates per household, limited landfill capacity or no landfills, tyranny of distance, limited finances, skills and equipment present additional challenges.

The State Government released the Queensland Waste Management and Resource Recovery Strategy (WMRR) on 1 July 2019. The Strategy aims to transition Queensland to a circular economy in which wastes are retained and circulated in the economy at the highest values for as long as possible. The Strategy includes actions for state and local governments, business, and industry to collaborate in developing coherent plans for waste management, incorporating requirements for remote, regional and metropolitan areas. The Strategy identifies three strategic priorities:

- Reducing the impact of waste on the environment and communities
- Transitioning to a circular economy
- Building economic opportunity.

As with all other local government authorities, Queensland's 17 First Nation local governments are required to plan, operate and maintain waste management infrastructure and services for their communities in accordance with state legislation, relevant strategies and policies. As a framework for this planning, the Local Government Association of Queensland (LGAQ), in partnership with the Department of Environment and Science (DES), published a separate waste strategy for First Nation councils entitled *Respecting Country, A Sustainable Waste Strategy for First Nations Communities*, which was launched in May 2021 – referred to hereafter as *Respecting Country*.

That strategy is complementary to the state waste strategy and empowers First Nations councils to deliver appropriate, tailored waste management solutions that create economic opportunities through innovative new enterprises and employment within their communities. Its guiding principles are:

- Respect rights and responsibilities to govern and manage healthy Country
- Respect self-determination by empowering rather than mandating
- Keep solutions practical, implementable and suited to local circumstances
- Co-design and deliver through strengthened regional partnerships
- Build education, awareness and community support
- Create local employment and business enterprise opportunities.

It is recognised that there are many common themes faced by councils in relation to waste and resource recovery but there are also many differing needs, challenges and opportunities. For planning purposes councils have been grouped regionally to promote greater sharing of resources, knowledge and experience while promoting new regional opportunities previously beyond the capabilities of a single council.

Each region is to develop a Regional Waste Management Plan (RWMP) to document a roadmap on how each council and the region will achieve the overarching principles of the *Respecting Country* strategy while providing fit-for-purpose solutions that consider the unique regional challenges of each council and the First Nation communities they serve.

## 1.1 Purpose and Scope

*Respecting Country* identifies that local council and community ownership remains the cornerstone of delivering successful outcomes. To quantify the opportunities and needs, each council is encouraged to develop a RWMP, which outlines fit-for-purpose solutions, timeframe and budget that considers the unique regional challenges of First Nation communities.

*Respecting Country* sets broad outcomes for local delivery through RWMPs, including First Nation councils:

- planning and operating regionally via existing and new networks
- creating value from wastes through local jobs and new enterprises and partnerships
- continuously improving waste collections and infrastructure, including the rationalisation and/or regionalisation of existing landfills
- removing legacy wastes (e.g. old cars and waste metals) via regional collection and disposal programs
- controlling litter and dumping by targeting 'hot spots' and high-use areas
- improving procurement, compliance and reporting practices.

Each RWMP is to provide:

- a detailed snapshot of waste flows and existing infrastructure for each council
- identification of actions and data collection exercises to inform investment decisions and innovative solutions for waste management and resource recovery
- analyses of constraints and opportunities
- identification of potential solutions across the region
- an action plan based on priority and an accompanying budget
- clear priorities for future funding and investment over the short, medium, and long term
- detailed recommendations for sustainable waste management and resource recovery.

These plans identify the needs of individual councils in relation to specific policies, programs, projects, resources and budgets and identify common or similar opportunities across multiple councils that could be developed and delivered more efficiently on a regional basis.

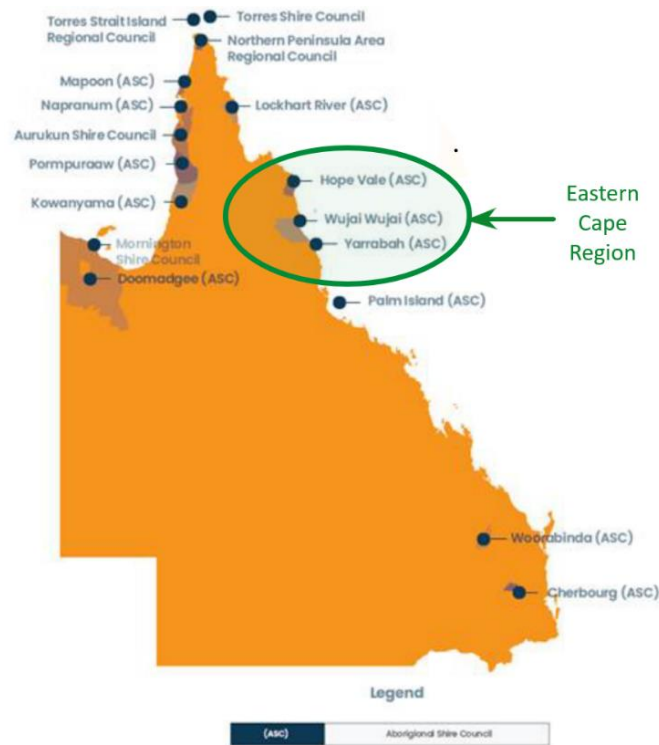
This plan is for the First Nation communities of Far North Queensland in the Eastern Cape Region (ECRR), covering the local government areas of:

- Hope Vale Aboriginal Shire Council (HVASC),
- Wujal Wujal Aboriginal Shire Council (WWASC)
- Yarrabah Aboriginal Shire Council (YASC).

The region is home to more than 3,800 people located across the three communities of Hope Vale, Wujal Wujal and Yarrabah.

Figure 1 shows the general location of the region relative to the Queensland mainland and the other First Nation councils.

**Figure 1 Eastern Cape Region**



The Eastern Cape region is surrounded by the larger, more populous local government areas of Cook Shire, Douglas Shire and Cairns Regional Council.

This RWMP was developed in close collaboration with the three First Nations councils, both elected representatives and technical officers. Engagement with council elected representatives, senior staff and a range of related stakeholders - including adjoining local governments of both Cairns Regional Council and Cook Shire - was critical to the development of this plan.

## 1.2 Policy & Legislative Context

### 1.2.1 Commonwealth Legislation

While many Commonwealth statutes affect councils' operations and the community, there are two specific areas that interact directly with First Nations councils' waste management

#### 1.2.1.1 . The National Agreement on Closing the Gap

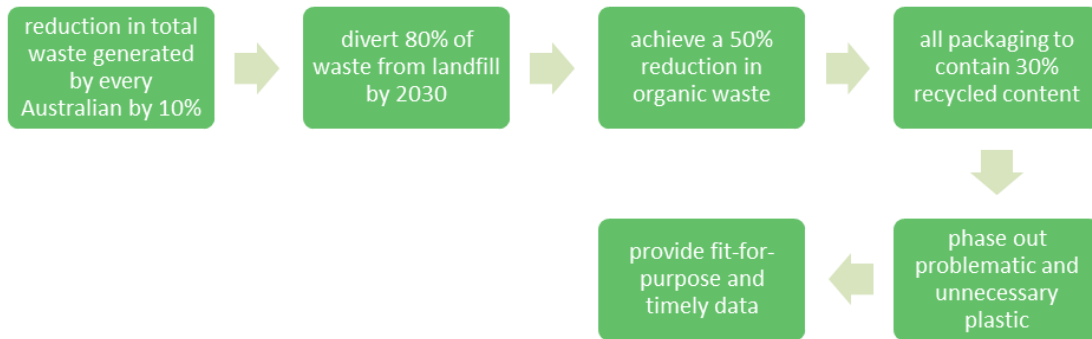
This statement has 17 national socio-economic targets across areas that impact life outcomes for Aboriginal and Torres Strait Islander people. Of relevance to this project is *Target 8: Strong economic participation and development of people and their communities.*

#### 1.2.1.2. National waste policy

In late 2018, the federal government released an updated national waste policy with key targets to be achieved by 2030.

Figure 2 National waste policy key targets by 2030





## 1.2.2 Queensland legislation

### 1.2.2.1 Environmental Protection

Under the Queensland *Environmental Protection Act 1994* (EP Act), there are general duties to not cause environmental harm and to notify when environmental harm has occurred. It is an offence to cause serious or material environmental harm. Certain industrial, natural resource/land-based activities that have potential environmental risks are regulated by the Act as environmentally relevant activities (ERAs) and may require an environmental authority (EA), for example, chemical manufacturing, sewage treatment, cement manufacturing, or mining.

The *Environmental Protection Regulation 2019* (EP Regulation) made under the EP Act then prescribes a range of ERAs that *inter alia* apply to waste management activities. ERA 60 applies to the operation of waste disposal facilities by local authorities, and primarily landfills. Other related waste activities are also covered by separate ERAs, namely materials recycling/reprocessing, the transport, storage and treatment of regulated wastes, waste incineration, and the operation of resource-recovery and waste transfer facilities.

*ERA 60 Waste disposal* applies to a facility for disposing of regulated waste, or for general waste of more than 50 tonnes p.a., and for maintaining a waste disposal facility in post closure care. Model operating conditions (MOCs) apply to new EAs under ERA 60 with a wide range of general conditions that may also be adapted for specific site circumstances.

The issues covered by the MOCs include:

- Permitted and prohibited wastes
- Landfill liner systems
- Prohibitions on waste burning
- Leachate collection and treatment
- Stormwater and groundwater management
- Landfill closure and site rehabilitation.

For this RWMP, all three councils have current environmental approvals for their waste management facilities. While the councils' waste disposal facilities currently operate under a variety of conditions (many of them inherited from previous licensing regimes), any new landfill facilities would be required to conform to the current regulations.

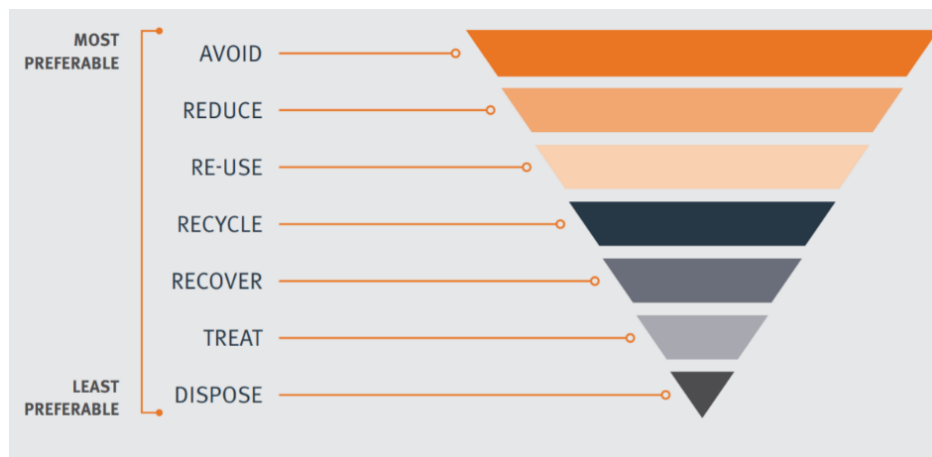
Another ERA relevant to the Eastern Cape councils, and possibly required for any new facilities, is *ERA 62 Waste transfer and resource recovery facility*, which covers waste transfer stations that receive waste for

sorting, dismantling, baling or temporary storage, but does not include storing waste in transit, or local government operated facilities accepting not more than 2500t or 2500m<sup>3</sup> of waste per year.

### 1.2.2.2 Waste reduction and recycling

The Queensland *Waste Reduction and Recycling Act 2011 (WRR Act)* and accompanying *Waste Reduction and Recycling Regulation 2011* include a range of state-wide measures to reduce waste generation and landfill disposal, and to encourage recycling based on the waste management hierarchy (avoid – reduce – reuse – recycle – recover – treat – dispose) and the waste management principles (polluter pays + user pays + proximity + product stewardship).

Figure 3 The Waste Hierarchy



In response to the legislation, a range of waste management initiatives have been introduced including:

- **Waste Management and Resource Recovery Strategy July 2019:** Outlines a vision for a zero-waste society and strives for a circular system that keeps materials in use longer, extracts maximum use from these materials, diverts as much as possible away from landfill and creates economic opportunities from waste. Interim targets are set from the present to five, 10, 20 and 30 years into the future for specific waste classes (such as MSW, C&I, C&D) and a requirement for action plans for each strategic priority to be prepared. Actions under each of the 3 strategic priorities are apportioned to the state government, local governments and the waste industry.

Those particularly relevant to this RWMP include:

- Assistance for alternative arrangements where landfill facilities are to be progressively closed
- Improve or close redundant landfill facilities
- Support delivery of waste education through existing networks
- Optimise waste collection services
- Improve community understanding about recycling and waste avoidance
- Collaborate with state government planning on provisions to optimise land use and transport planning
- Avoid and minimise the long-distance transport of waste where practicable.
- Take a regional approach to infrastructure planning and collaboration

- Collaborate across councils to create economies of scale and meet multiple infrastructure needs. Invest in improved infrastructure and standards for council run facilities

**Figure 4 Queensland state waste targets by 2050**



- **Waste disposal levy commenced 1 July 2019:** The levy applies in 39 of the 77 local government areas, covering approximately 90% of Queensland’s population where the majority of waste is generated and disposed. Waste liable for this levy is waste disposed of in the levy zone or waste that originates in the levy zone or interstate in the non-levy zone. The levy rate varies depending on the nature of the waste. The rate is set by regulation and will increase by \$5 per year over the first four years. For this financial year (2022), the rates are \$88 per tonne<sup>1</sup>.

First Nation councils are exempt from the levy unless their wastes are transported to within the levy zone (e.g. Cairns, Cooktown or Mareeba) for disposal. Currently Wujal Wujal and Yarrabah are impacted by the levy as both council’s deposit waste at a regional landfill within the levy area. Should Hopevale close their current landfill and establish a transfer station it will also be impacted.

- **Single-use plastics ban:** This ban was introduced from 1 July 2018 for shopping bags and extended to a range of single-use plastics items. Feedback from councils is that this policy is proving effective in the region, especially at supermarkets and is much needed in communities near the marine environment where plastic can have a detrimental impact on marine life.

**Container Refund Scheme (CRS):** Introduced from 1 November 2018 for recycling of beverage containers, a state-wide CRS known as *Containers for Change* aims to both reduce littering of used drink containers and increase Queensland’s recycling rate. The scheme provides an incentive to collect and return specified used beverage containers for recycling in exchange for a 10-cent refund payment. The scheme also provides benefits to social enterprises, communities, and regional and remote areas by creating new jobs, recycling and fundraising opportunities. More than 230 container refund points operate across the state but limited options are available to First Nations councils. This program has been partially rolled out in the Eastern Cape region although some *ad hoc* approaches have been undertaken. Hope Vale has a mobile Container Refund Point (CRP); Wujal Wujal has a Council-operated CRP; and a CRP is planned and funding allocated but yet to be established in Yarrabah.

- **Keeping Queensland Clean – Litter and Illegal Dumping Plan 2021:** This plan sets a clear direction and provides actions for sustainable, long-term change. It uses a combination of compliance and enforcement, community engagement, education, partnership-building and

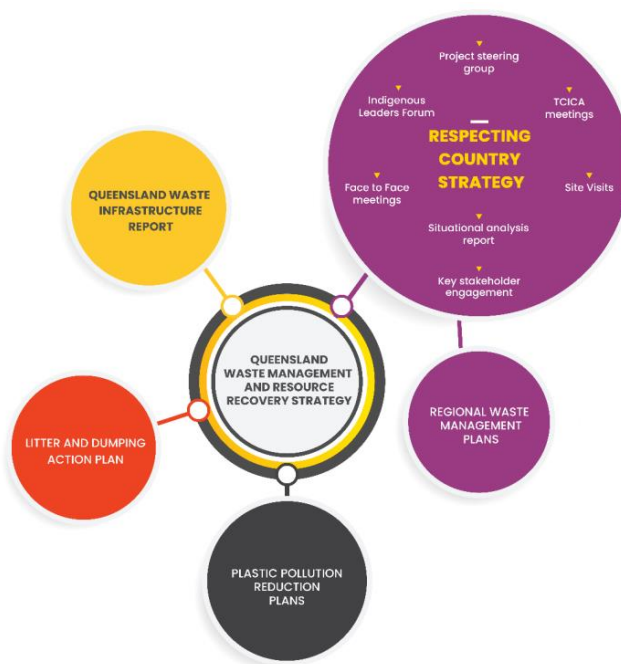
<sup>1</sup> <https://www.qld.gov.au/environment/management/waste/recovery/disposal-levy/about/levy-rates>

program development to reduce litter and illegal dumping in Queensland. The councils in this RWMP are critical stakeholders for implementing the new plan in relation to public litter and bulk waste bins and education and awareness raising.

### 1.2.1.3 The Respecting Country Strategy

While the *Waste Management and Resource Recovery Strategy* applies to the entire state, it was deemed that a more specific waste strategy was needed to transition First Nations councils to improved waste management and resource-recovery outcomes, and to provide a set of community-centric principles, targets, actions and a timeline. The *Respecting Country* was released by the Queensland Government in May 2021.

**Figure 5 Conceptual relationship between Respecting Country and other waste initiatives**



The guiding principles of *Respecting Country* are:

- Respect rights and responsibilities to govern and manage healthy Country
- Respect self-determination, by empowering, rather than mandating
- Keep solutions practical, implementable, and suited to local circumstances
- Co-design and deliver through strengthened regional partnerships
- Build education, awareness and community support
- Create local employment and business enterprise opportunities.

It contains the following performance measures for the First Nations councils to which it applies seeking transition to improved more equitable practices with main-stream council counterparts and improved regulatory compliance.

**Table 3 Respecting Country Performance Measures**

Performance outcome	Number of councils/timeframes
---------------------	-------------------------------

	Short-term (1–2 years)	Medium-term (3–4 years)	Long-term (5+ years)
1. Active participation in the Indigenous Waste Strategy Group	12 councils	14 councils	All councils
2. Establishment of new or expanded business and employment opportunities delivering new waste management and resource-recovery solutions	8 councils	14 councils	All councils
3. Councils developing and implementing regional waste management plans	11 councils	All councils	All councils
4. Councils with a container refund point	All councils	All councils	All councils
5. Councils offering regular bulky waste solutions	12 councils	15 councils	All councils
6. Councils able to report accurately on waste data and budgets (operating and capital)	All councils	All councils	All councils
7. Councils implementing waste education program(s)	12 councils	All councils	All councils
8. Councils operating landfills, transfer stations and other operations compliant with their environmental authorities (EAs)	5 councils	10 councils	All councils
9. Councils implementing litter and dumping avoidance and management strategies	12 councils	All councils	All councils

This Eastern Cape RWMP is developed within the conceptual framework and principles of *Respecting Country*.

### 1.2.2.3 Planning frameworks

Planning and development across Queensland are administered under the *Planning Act 2016* (the Planning Act) accompanied by the *Planning Regulation 2017* and subsidiary instruments such as the *Minister's Guidelines and Rules*. Planning is affected at three levels, as discussed below.

**State planning** – The *State Planning Policy* (SPP), initially made in July 2017, expresses the state interests in land-use planning and development. The SPP sits above regional plans and local planning instruments and outlines the guiding principles that should underpin the subsidiary plan-making processes and development decisions. The SPP applies primarily to state and local governments. Rather than mandate prescriptive processes, the SPP has a strong emphasis on finding solutions that are regional, local and site appropriate.

**Regional planning** - The Planning Act and the *Regional Planning Interests Act 2014* (RPI Act) are the current pieces of legislation driving regional planning. They work together to protect areas of regional interest from inappropriate development and assist with resolving land-use conflict between activities which contribute to Queensland's economy. The RPI Act introduces a land-use planning framework for resource activities and regulated activities through regional interest development approvals (RIDAs) assessed by the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP). The main residential areas in the respective plans are generally listed as Primary Living Areas (PLAs) in the plans. A PLA is an area that includes the settlement area, associated rural residential areas and generally a 2-kilometre buffer area around the settlement within which only those resource activities that are acceptable to the community may locate and may be subject to RIDA requirements.

A range of regional plans have been prepared for various parts of Queensland over the past two decades to help better coordinate planning and development across multiple LGAs. Waste management is not a consistent feature of the plans, however there are some intersections with infrastructure planning (e.g. road and transport development), waste facilities and environmental protection. The current regional plans relevant to this report are as follows:

The *Cape York Regional Plan 2014* covers the whole of the peninsula northwards of Wujal Wujal and includes the communities at Hope Vale and Wujal Wujal. Most of its emphasis is on the regional centres of Cooktown and Weipa, though it does cover seven First Nations councils. Its main function is to regulate resource activities in areas of significant natural and cultural value designated as Strategic Environmental Areas (SEAs). Neither HVASC nor WWASC are within an SEA.

It also designates both Hope Vale and Wujal Wujal and their environs as PLAs and recognises that:

- economic opportunities and growth are expected to emerge in Hope Vale due to the benefits of mining, plantations and agriculture expansion; and
- that while Wujal Wujal is expected to grow in the next 20 years, in part due to its proximity to Cairns, the town is constrained by flood-prone lands and steep slopes, limiting suitable land for development.

Beyond these recognitions there are no specific provisions relating to waste management.

The *Far North Queensland Regional Plan 2009-2031* covers the coast and hinterlands from Wujal Wujal in the north to Cardwell in the south. It is broad in its planning topics and concentrates mostly on the main regional centres of Cairns, Mareeba and Cardwell. The RP recognises both Wujal Wujal and Yarrabah as minor urban centres, though few specific provisions relate to either. Of relevance to this RWMP, it does note that the preferred location for any future landfill facilities in the region is the western side of the Great Dividing Range, removed from the Wet Tropics, the coastline and Great Barrier Reef. Any future landfills should be located in geologically stable areas that are not flood prone or adjacent to areas of high ecological significance. It also notes Springmount landfill near Mareeba as a regional facility expected to last (as at 2009) for 50 years.

Both of these regional plans are now over 8-10 years old, and their provision and strategic intent need updating.

**Local planning** – Local governments, including First Nation councils, are the primary local planning authorities and enable planning and development across Queensland through their planning schemes adopted under the *Planning Act 2016*. These schemes outline the land-use aspirations for that community and are performance-based for the processing of development applications. A council assesses a development application lodged, even if the application is inconsistent with the expectations outlined in the planning scheme. The system has built-in mechanisms for dealing with non-compliance and for appealing development decisions. As local planning authorities within their administrative boundaries, all three councils have prepared and adopted local planning schemes and are required to operate them in the same way as all other local councils in Queensland. Most of the planning schemes include infrastructure and services sections within which waste management strategies and development controls are referenced. A ‘Local Government Infrastructure Plan’ may also be part of the planning

scheme, although these do not always cover waste management facilities. Development applications for new waste management facilities, as they are planned, assessed and approved by the local councils, need to be able to meet the 'acceptable outcomes' stipulated for the planning zone in which they are sited. For the councils, this is often (but not always) within the planning scheme's Township Zone.

In conjunction with their local planning schemes, First Nations Councils also prepare masterplans as part of a program coordinated by the Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDSATSIP). Masterplans are non-statutory plans that help the councils and their communities with strategic planning for their future growth and development. This includes forecasting future land supply and municipal infrastructure needs, including the expansion or relocation of their current waste management facilities. Masterplans have been developed for the 3 councils in this RWMP, usually with some reference back to their local planning schemes.

Relevant waste management extracts from these local plans for the 3 Eastern Cape councils include:

**Hope Vale Planning Scheme 2014**

**3.6 Services infrastructure**

**3.6.1 Strategic outcomes**

*(1) The provision of water, waste treatment, rubbish disposal and access are achieved in a manner that does not damage the natural environment or cause harm to Country*

**3.6.3.1 Specific outcomes**

*(a) Development is provided with waste management facilities. The type and capacity meet the needs of the intended occupier or user.*

**3.6.3.2 Land use strategies**

*(a) Undertake a review of the existing tip site with the aim of improving its function and extending its life.*

*(b) Conduct study and investigation into land for the future provision of waste disposal outside of the township and ensure that the appropriate land use zone is applied to enable future development of the land without administrative delays.*

**Zoning map**

The current landfill and adjacent quarry areas and STP are in a Community Purposes precinct within the Township Zone.

**Masterplan 2017** The Hope Vale Masterplan shows an area designated for expansion of the existing Council landfill, as well as recognition of the 2 nearby former quarry sites on which some bulky wastes are currently stockpiled.

**Wujal Wujal Planning Scheme 2013**

**3.8 Infrastructure**

**3.8.2.1 Specific outcomes**

*(4) Due to limited areas for urban development, and recognising the environmental values of Wujal Wujal, waste management facilities are not established in the local government area, with waste to continue to be being transported to adjacent shires.*

**Zoning map**

The Council Depot that provides short-term storage and reprocessing for some waste materials is in a Business precinct within the Township Zone. In the Code table A for this zone an acceptable outcome is that development in the zone is provided with infrastructure that includes *inter alia* ... (e) refuse and recycling activities.

**Masterplan 2017 (draft)** A Community Facilities – waste transfer and recycling centre designation covers the current Council Depot land parcel. The former landfill site is now shown as a future residential area.

### **Yarrabah Planning Scheme 2017**

#### **3.5.4 Waste Management**

##### **3.5.4.1 Specific outcomes**

*(1) Waste is managed to minimise environmental, economic and social impacts and to meet the expectations of the community.*

*(2) Waste is managed in the following hierarchy:*

*(a) avoidance of creating waste; (b) recycling of waste; (c) waste disposal.*

*(3) A waste recycling and disposal facility is located in Workshop Street.*

*(4) Disposal of waste by land fill does not occur in Yarrabah due to the physical constraints of the land including highly permeable soils and high ground water levels. All waste is transported outside the local government area for safe disposal at a suitable location.*

#### **Zoning Map**

The current Council waste facility (former landfill) on Workshop Rd is in a Special Purpose zone for public purposes operated by public authorities (including Council) for public utilities and related purposes. This is an appropriate zone for the waste facility. The land and buildings (Carpenters Sheds) immediately to the west of the waste facility is in the Industry Zone. Waste-related activities are acceptable in this zone, though there are waste collection outcomes prescribed to protect land and waters from spills and contamination.

#### **Masterplan 2019**

Solid Waste - Council provides a weekly household waste collection service. Solid waste is delivered to a waste recycling and disposal facility located at the commencement of King Beach Road, east of the township. Landfill, as a form of waste disposal, does not occur in Yarrabah due to the highly permeable soils and high ground water levels. All waste is transferred outside the local government area for safe disposal at a suitable location.

### **1.2.2.4 Local and regional waste management planning**

As mentioned previously, the *Waste Reduction and Recycling Act 2011* contains requirements for all local councils, including all First Nation councils, to prepare a Waste Reduction and Recycling Plan. These plans are required to include waste reduction and recycling targets, actions to be taken to improve waste reduction and recycling, and performance monitoring measures. Adjoining councils also have the option to develop regional plans.

The Far North Queensland Region of Councils (FNQROC) includes as members the 3 Eastern Cape region councils in this plan. Under FNQROC a Regional Waste Management Group (RWMG) comprises representatives from member councils and meets regularly to consider opportunities in terms of waste management and resource recovery solutions.



In mid-2022 the RWMG has commenced the development of a FNQROC Regional Waste Management Plan. Given the overlap in timing of the preparation of both the FNQROC and Eastern Cape plans, there are good prospects for collaboration and integrated waste solutions. Both consultancies have participated in discussions in relation to preparation of RWMP and the need for complementarity. This RWMP is approximately six months ahead of the FNQROC and it is expected that this subregional plan will be incorporated into the broader regional plan. It will be a stand alone plan to attract funding and investment while more broadly reinforcing the FNQ regional plan.

#### **1.2.2.5 Related policies and programs**

##### **1.2.2.5.1 Climate change/alternative energies/carbon reduction**

The Queensland Climate Change Response was released in 2017 and involves strategies for a transition to a zero net-carbon emissions future by 2050 and adaptation strategies that reduce the risks to and increase the resilience of communities to the impacts of climate change. There is a broad range of programs and initiatives in place, and those most related to the councils include:

- renewable energy targets and (large- and small-scale) solar power facilities
- funds to support and expand carbon farming and related land restoration, including benefits for First Nation communities
- funds to assist local councils deal with coastal hazards and the impacts of sea-level rise
- solar panel installations that reduce remote communities' use of diesel power
- purchasing high-quality carbon credits generated from First nation-run land/carbon-farming products.

Some of these initiatives can intersect with council waste management operations, for example use of biofuels produced from organic wastes instead of diesel, use of green wastes as compost and/or carbon sinks in food production.

##### **1.2.2.5.2 Moving Ahead Strategy 2016–2022**

This whole-of-government state strategy released in 2016 involves 27 coordinated actions to increase the participation of Aboriginal people and Torres Strait Islander people in Queensland's economy. The range of actions includes direct employment initiatives within the public sector; improving transitions for young people from education to employment, including in 'jobs of the future'; partnerships with industry, especially in building, tourism, resources and land management; and supporting First Nation entrepreneurs and small businesses. A new strategy is due for release in late 2022.

Waste management industries are not specifically identified as a target sector for First Nation business development in this strategy. Nevertheless, when viewed together with the various waste initiatives outlined above, and especially in areas such as resource recovery and recycling at a local scale, or carbon farming, there could be synergies to be explored and unique opportunities offered by the First Nation councils for new or existing Indigenous businesses.

##### **1.2.2.5.3 Indigenous Procurement Policy**

The Queensland Indigenous Procurement Policy (QIPP) 2017 has a focus on the government buyer looking for the best opportunity to procure with an Indigenous business. It sets a target that procurement with Indigenous businesses will be 3% of the value of Government's eligible spend by 2022.

The apparent simplicity of this target is qualified by it applying to 'addressable' spending in sectors where there are known to be capable Indigenous businesses to supply. This is complemented by the use of 'set-asides' that reserve certain Government procurement contracts for specified businesses in remote or discrete Indigenous communities, or to target the needs of a specific cohort of Aboriginal and Torres Strait Islander people.

The QIPP is linked conceptually to *Moving Ahead* but targets state government agencies' procurement. For the procurement target to be met, the *Moving Ahead* initiatives must also succeed in developing and expanding the range of Indigenous business enterprises.

Image 1 Local artwork



## 2. REGIONAL SNAPSHOT

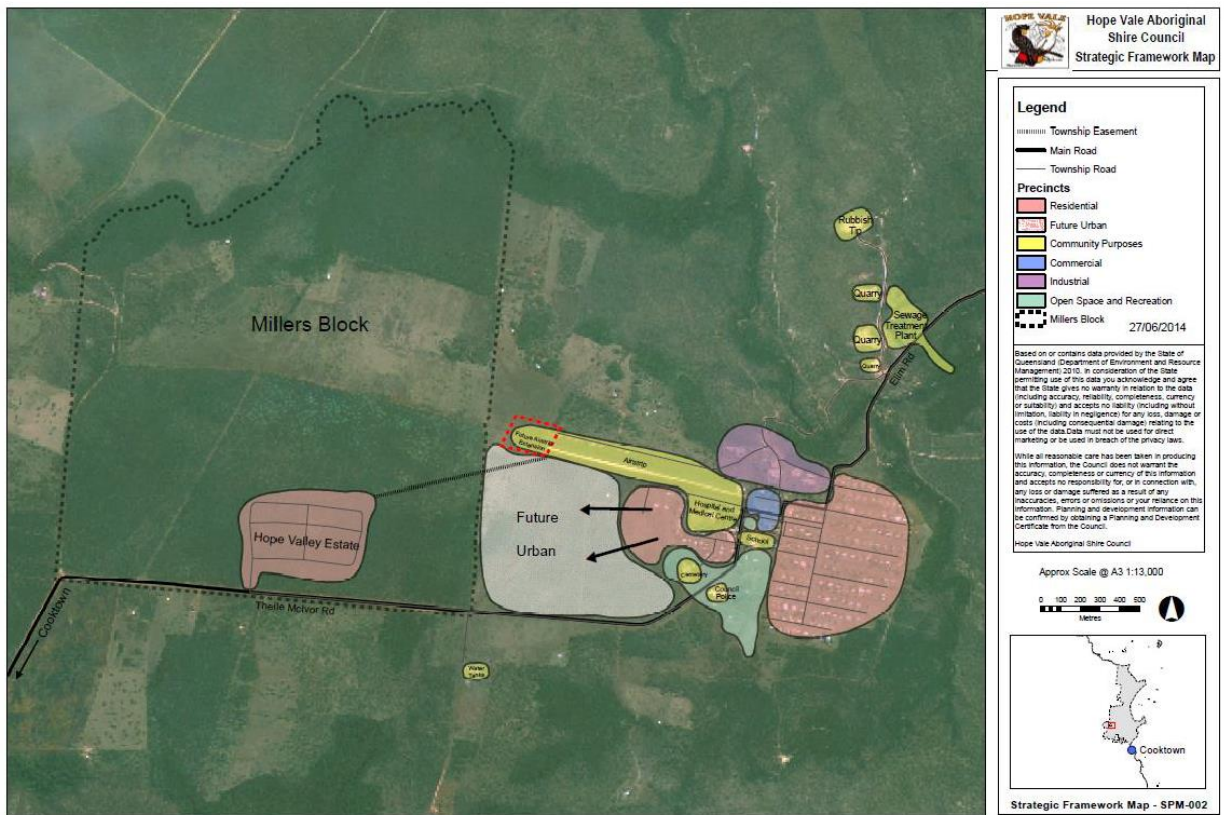
The Eastern Cape region lies in the south-eastern corner of the Cape York Peninsula in Far Northern Queensland (FNQ). It accommodates three First Nation councils – Hope Vale Aboriginal Shire Council (HVASC), Wujal Wujal Aboriginal Shire Council (WWASC) and Yarrabah Aboriginal Shire Council (YASC). These three council areas have shared cultural connections between their discrete First Nation communities with connections to land and sea Country. Collaboration between these councils on many common matters already takes place.

### 2.1 Population and demographics

This section provides details for the 3 main settlement areas in the Eastern Cape Region.

**2.1.1 Hope Vale** (976 population – 347 private dwellings – 3.1 persons/household: ABS 2021) is located 46 km north-west of Cooktown on the traditional Country of thirteen clan groups of the Guugu Yimithirr Warra Nation. The town proper is the main settlement, with new residential lots being developed at Hope Valley Estate 1 km to the west of town. Land is available for further growth between the township and Hope Valley Estate that would connect the two settlement areas. Across the broader council area is a series of larger rural residential blocks on traditional owner titles.

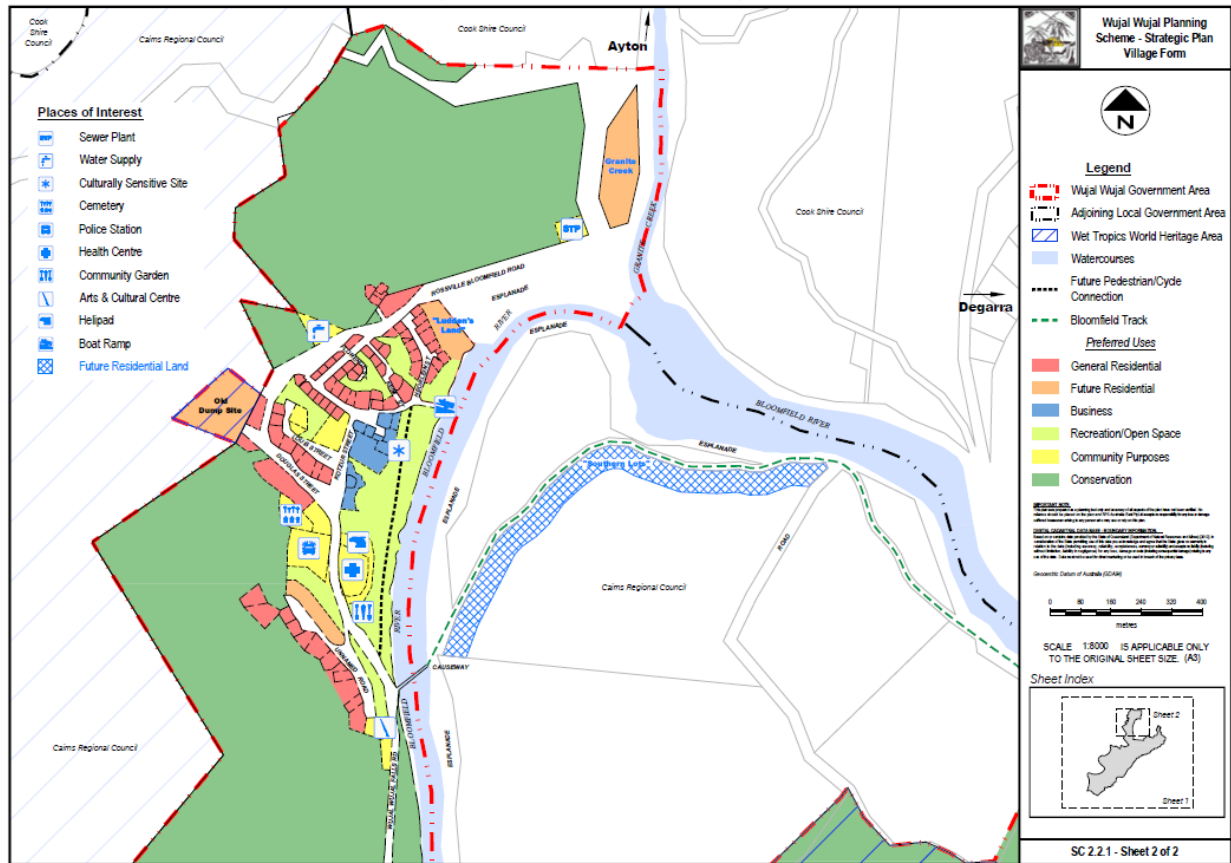
Figure 6 Hope Vale Strategic Plan



(Source: Hope Vale Planning Scheme 2014)

**2.1.2 Wujal Wujal** (276 population – 93 private dwellings – 3.2 persons/household: ABS 2021) is located 50 km south of Cooktown, on the traditional Country of the Kuku Yalanji, Kuku Nyungal and Jalunji peoples. The urban area is c. 35 hectares in size, extending from Rossville Bloomfield Road in the north and Cape Tribulation Bloomfield Road in the south. The functional extent of the community is somewhat broader, extending east from the Bloomfield River along Cape Tribulation Bloomfield Road within Douglas Shire.

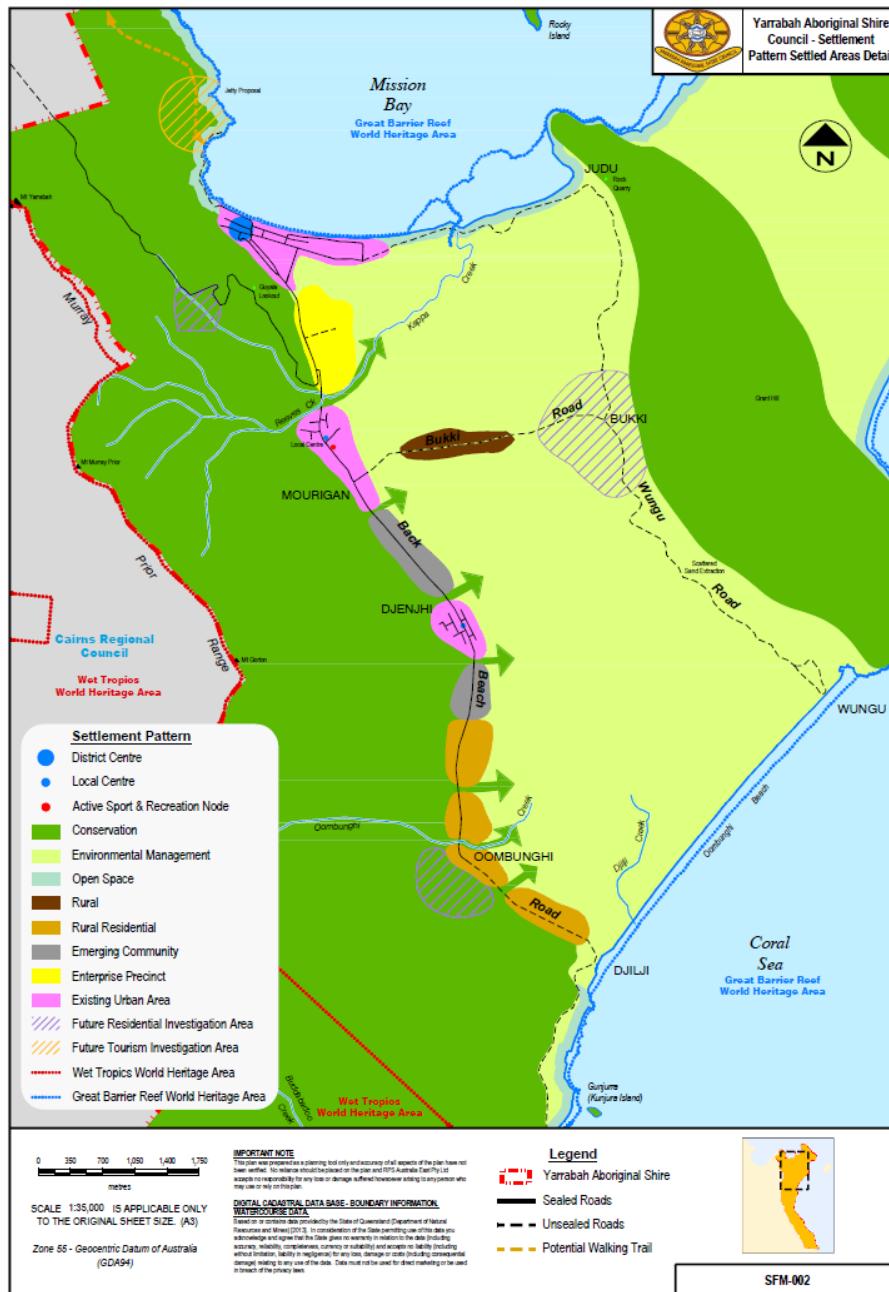
**Figure 7 Wujal Wujal Strategic Plan**



(Source: Wujal Wujal Planning Scheme 2013)

**2.1.3 Yarrabah** (2,505 population – 521 private dwellings – 4.5 persons/household: ABS 2021) is located 53 km south-east of Cairns on the traditional Country of the Gunggandji and Mandingalbay Yidinji peoples. The shire has a number of small townships – Yarrabah, Reeves Creek, Mourigan and Djenghi all within a 7 km stretch of road and along the southern corridor. There are also a number of smaller housing settlements spread throughout the shire – Bukki, Oombunghi, Wungu, Jilji, Judil, Woikinu, Kunjurra and Buddabadoo.

**Figure 8 Yarrabah Settlement Areas**



(Source: Yarrabah Planning Scheme 2019)

The 2021 ABS Census records a combined population of 3,757 people (an often-under-reported figure) for the three Council areas and noting that cultural activities and seasonal movement of residents can see this figure vary widely. The population is spread across three discrete communities, accommodated in 961 dwellings with an average of 3.6 persons per house. Most houses (84.2%) are rented compared to a Queensland average of 33.1%.

**Table 4 Home ownership / rental %**

Tenure	Hope Vale %	Wujal Wujal%	Yarrabah %	QLD average
Own outright	5.7	0	10.5	29.1
Own with mortgage	2.1	0	0.6	34.4
Rental	81.5	92.4	78.6	33.1
Other	6.0	6.3	5.8	1.9

Source: ABS 2021 census

The median age in the region is 27 years compared to the state average of 38 years. People over 60 years make up 9.1% of the regional population, significantly fewer than the Queensland figure of 22.8%. Overall, this indicates a predominantly younger regional population compared to the rest of Queensland.

**Table 5 Age Distribution – Eastern Cape region compared to Queensland**

Age (years)	Hope Vale	Wujal Wujal	Yarrabah	E Cape %	QLD %
Median age	(28)	(29)	(25)	(27)	(38)
0-19	360	85	1,015	39.1	24.8
20-39	307	87	765	31.0	26.8
40-59	207	60	508	20.7	25.6
60-79	80	26	205	8.3	18.8
80 and over	14	0	16	0.8	4.0

Source: ABS 2021 census

Education is often linked to employment outcomes (see Table 6). Reflecting its relatively younger population, the Eastern Cape Region has a higher proportion of young people in primary school compared to the rest of Queensland, and significantly less people in tertiary education. Some figures for secondary and tertiary education may not, however, reflect that student in these sectors have to travel out of area to attend their educational institutions.

**Table 6 Current % attendance at educational sectors**

Academic level	Hope Vale	Wujal Wujal	Yarrabah	QLD average
Pre-school	7.9	9.9	6.7	5.4
Primary	40.9	38.3	45.2	27.1
Secondary	20.3	8.6	29.8	22.4
Tertiary (uni/TAFE)	1.7	3.7	3.3	21.3

Source: ABS 2021 census

## 2.2 Economy and regional setting

The Eastern Cape region is a relatively remote and sparsely populated region of Australia. Economic challenges for the region's communities include:

- high costs of basic goods and services, including food and domestic products
- infrastructure shortfalls
- high unemployment and welfare dependency
- limited new business opportunities.

Hope Vale and Wujal Wujal have strong ties to Cooktown and further afield to Cairns, and Yarrabah to Cairns more directly, where residents travel constantly between these towns for family, medical, employment, education and essential goods and services.

The broader area of Far North Queensland, including the whole of the Cape York Peninsula communities and the regional centres of Weipa, Cooktown, Cairns and Mareeba, has key industries in tourism, agriculture, mining, health, education, marine, aviation and construction.

As a subset of this broader area, the Eastern Cape region in this RWMP has unemployment levels ranging from 3.9% in the Cairns statistical sub-region (which includes Yarrabah) to 12.8% in the Queensland outback statistical sub-region (that includes Hope Vale and Wujal Wujal). This compares to the Queensland state average of 3.9% (ABS April 2022).

While 2022 unemployment data is not yet available for the 3 specific communities of Hope Vale, Wujal Wujal and Yarrabah, historical data indicates that unemployment rates within them are many times higher than the surrounding LGAs. This may also partly account for the median weekly household incomes in Hope Vale and Wujal Wujal being up to half that of the state average (see Table 7), whereas the somewhat higher rate for Yarrabah reflecting the larger size households as well as its relative proximity to Cairn's better employment prospects.

**Table 7 Median weekly household income**

	Hope Vale	Wujal Wujal	Yarrabah	QLD average
Household Income	\$836	\$840	\$1,254	\$1,675

Source: ABS 2021 census

Public administration, health care and social assistance, education and training services account for the bulk of the region's employment and effectively drive the local and regional economies. Within the three communities in this plan, the local First Nation councils are their major employers.

**Table 8 Key occupations in region and compared to Queensland average**

Type	Hope Vale	Wujal Wujal	Yarrabah	QLD average
Labourers	18.4%	20.0%	14.4%	10.5%
Community and personal service workers	19.1%	24.3%	26.7%	11.3%
Clerical and admin. workers	8.6%	12.9%	12.1%	13.6%
Professionals	16.0%	12.9%	17.2%	19.8%
Technicians and trades workers	10.2%	10.0%	10.1%	14.3%
Managers	7.0%	10.0%	6.0%	12.1%
Machinery operators/drivers	13.7%	10.0%	2.9%	6.9%
Sales	2.3%	0%	2.3%	9.7%

Source: ABS Census 2016

The region is heavily reliant on external funding. Some of the major funding programs include:

- Commonwealth Major Infrastructure Program (MIP) – administered by TSRA
- Queensland Transport Infrastructure Development Scheme (TIDS) – administered by Queensland Department of Transport and Main Roads (TMR)
- Building Better Regions (BBRF)
- Works for Queensland Program (W4Q)
- Covid Works for Queensland
- 2020–21 Indigenous Economic Development Fund
- Indigenous Councils Critical Infrastructure Program (ICCIP).

With their proximity to the Great Barrier Reef and Wet Tropics world heritage listed conservation reserves, and varying levels of co-management with related public land managers, the Eastern Cape communities are expected to see continuing employment and commercial opportunities in cultural and eco-tourism.

### **2.3 Transport infrastructure**

The major transport mode for the Eastern Cape communities in the region is via road transport. All communities are connected to regional centres by all-weather sealed roads.

The road distance from Hope Vale to Cooktown is 46 km, and to Cairns 372 km. The Wujal Wujal to Cooktown sealed road distance is 50 km, and 347 km to Cairns via the Mulligan Highway. (A shorter 160 km road route to Cairns via the Bloomfield Track to Daintree includes an unsealed section that is impassable in the wet season). Yarrabah is 52 km from Cairn’s centre via sealed road.

Road freight is the primary way in which goods enter the communities, usually sourced from Cairns and Cooktown. There are commercial airports at Cooktown and at Cairns with regular passenger flights to other centres, including the gulf and northern peninsula.

Though not directly connected to any of the Eastern Cape communities, the ongoing improvements to the Peninsula Development Road (PDR) are likely to attract growing tourist traffic into the broader Cape region. This may see increased side-journeys or day trips by tourists through the communities of Hope Vale and Wujal Wujal. Plans are well advanced to introduce a passenger ferry service between Yarrabah and Cairns Port that would improve local resident and tourist transport services.

### **2.4 Environmental setting**

Lying at the south-eastern corner of the Cape York Peninsula, the Eastern Cape Region generally has the Great Dividing Range (GDR) spine to its west and the Coral Sea coast and its share of the Great Barrier Reef to its east. The area is home to parts of the marine reefs and mountainous rainforests designated as World Heritage areas denoting the global significance and environmental sensitivity of the whole region.

With the low rising ridges of the start of the GDR to its west, HVASC – covering a large area of approx. 1,112 km<sup>2</sup> - lies within the Endeavour River basin draining eastwards to the sea at Cooktown. The north-eastern sections of the council area are bordered by the ancient, silica rich sand dune systems between



Cape Flattery and Cape Bedford that give way south and westwards to coastal mangroves and the low heathland environments in which lie the main channels of the Endeavour River.

Further south, WWASC is a much smaller area covering c. 12 km<sup>2</sup> lying along the edges of the Bloomfield River that drains also to the Coral Sea coast and reefs c. 10 km to the east. The township is surrounded to the north, south and west by the rugged mountain rainforests of the Wet Tropics World Heritage Area.

YASC – an area of 159 km<sup>2</sup> – as the southern section of the Eastern Cape region also contains a diversity of environments including grassy coastal plains, freshwater wetlands, beaches, mangroves, salt pans and rocky headlands. The rainforest-covered slopes of the Murray Prior Range dominate the Yarrabah Peninsula - also known as Cape Grafton – physically separating the council area from the regional city of Cairns and environs.

The whole region's climate is truly tropical, vulnerable to tropical cyclones and heavy rains between October and April each year. Flooding caused by runoff from the bounding ranges and flash flooding of inland waterways also affect the communities throughout the year.

## 2.5 Waste and recycling services

The range of waste services provided throughout the Eastern Cape Region are detailed below.

### 2.5.1 Kerbside waste collection

All communities in the region have regular municipal solid waste (MSW) collections to residences and businesses. Currently, the region provides 901 kerbside services, with collections undertaken by either council staff or contractors using mostly mini-compactor side-loading trucks. The condition of vehicles is similar to other councils where equipment is bought second hand and all vehicles have shorter lifespans due to the highly corrosive actions of salt and moisture in the atmosphere. Vehicles are serviced locally or in the nearby regional centres. Road networks are usually good and well maintained, with mostly sealed roads within the communities.

The standard mobile garbage bin (MGB) size is 240 litres with bin condition highly variable. Timely replacement of damaged bins is an issue for all councils. All waste collection vehicles have variable lifecycle issues regarding maintenance and capital replacement and are operating in heat, humidity and hostile marine environments. The specific service numbers per council are shown in Table 9.

**Table 9 Number of households with kerbside service by council and region**

	Hope Vale	Wujal Wujal	Yarrabah	Total
Kerbside services	293	134	474	901

Source: DES annual waste returns 2021

**Hope Vale** - Council collects waste from 293 household and commercial premises twice per week (or more if needed) using Council's mini-compactor. One to four bins are provided based on household size. Out of town blocks are serviced weekly. Collected wastes are taken to Council's landfill. The supermarket and health clinic take their wastes directly to Councils' landfill. Nearby Elim Beach commercial camp wastes are collected by the site operator, separated into their own mobile trailers and taken to Council's landfill. Hut owners at Elim Beach also need a collection service as informal disposal currently occurs in transient pits. Council is considering outsourcing their kerbside

collections as the current compactor used was purchased for litter bin collection and is both aging and under sized for the work it now performs. It is challenging for council to justify the investment in new equipment.

**Wujal Wujal** - Council engages Cooktown-based Gungarde Aboriginal Corporation to service the town with weekly kerbside waste collection to 134 premises with between 1 to 4 bins per house subject to occupancy, plus the health clinic, store, café, police station and Art Centre. The collected MSW (8.5 – 9 tonnes/month) is then transported by Gungarde to Springmount landfill at Mareeba, a 280km trip each way. Current household collection services are delivered week-to-week by Gungarde Corporation with no fixed-term contract in place.

**Yarrabah** - Council engages Cleanaway, Cairns for twice weekly kerbside collections to 474 residential (2 bins per house) and commercial premises. Six bulky waste skip bins throughout town areas are also collected fortnightly by Cleanaway. All collected wastes are taken by Cleanaway to Springmount landfill. Council has had preliminary discussions with Cairns Regional Council regarding the potential to integrate all MSW kerbside, bulky waste and separated materials collections with the next Cairns Regional Council collection services contract.

The current contract does not expire till late 2026 and to undertake a variation would require state procurement approval. All households MGBs are owned by Council and are maintained by the contractor JJ Richards.

#### **2.5.1.1 Recycling**

There are no kerbside recycling services across the three First Nation communities, however all councils express interest in eventually introducing such services.

**Hope Vale** - No kerbside recycling service is offered and there are no immediate plans to introduce a service. The supermarket does not recycle its cardboard wastes which has been observed to be burnt at the landfill.

**Wujal Wujal** - There is no current kerbside recycling service. Council has secured a new shredder and conveyor belt gained through grant funds and have been trialling the reprocessing of some non-MSW waste materials including tyres and wooden pallets but have identified the need for a tyre de-beader and maybe other equipment for quality outputs. Council has ambitious plans to extend the recycling operations but have limited storage space, for pre- and post-processed materials and are currently financially constrained with a reduced labour force. Given the Council geographic location, at the end of the bitumen, the economics of the logistics work will be challenging.

**Yarrabah** - There is no household recycling service. The supermarket does not bale or recycle cardboard. There is partial separation of non-MSW recyclable wastes at Council's Waste Facility with intermingled waste streams in each of the lay down areas. Council notes the potential to eventually integrate with Cairns Regional Council household recycling collections if also integrated with contract collection of households MSW. Cairns Regional Council expressed concern about potential contamination issues in any kerbside service as that council owns and operates their own MRF. With access to overseas export markets closing due to the Commonwealth govt export bans processed material quality has never been more important.

### 2.5.1.2 Container Refund Scheme (CRS)

Litter reduction is already noticeable in all councils with the state-wide introduction of the CRS, though not all Eastern Cape Region councils enjoy the same level of service, equity or ease of access to Container Refund Points (CRPs). Regulations requires that a CRP is provided in each council area. To support the rollout of refund points, the Queensland Government provides funding specifically for First Nations Councils to establish CRPs and associated container collection and storage infrastructure.

Permanent, locally operated CRPs can ensure that financial benefits remain in the local community and can also assist the community's transition to other waste recycling initiatives as well as reducing litter and improving local amenity.

**Hope Vale** - A mobile, trailer-based CRP is operated weekly by AusWaste from Cooktown and is well supported by the local community. Council supports establishment of a permanent town-based, locally operated CRP and two sites have been identified as suitable.

**Wujal Wujal** - Council now operates a walk-in/drive-in Container Refund Point (CRP) at Council's Works Depot / Recycling Centre two days/week and plans to soon extend this to four days/week. Council operates a vertical baler and baled containers are collected regularly by Auswaste and taken to Cooktown.

Image 2 Container Refund Point and vertical baler



As finances and materials allow, Council is also making / purchasing small metal baskets for householders to store used beverage containers (and other recyclable items). Council plans to introduce a mobile CRS collection service within the region to residents at Ayton, Bloomfield, Rossville as well as a service a number of tourist facilities including Lions' Den Hotel to the North and Cape Tribulation and Daintree to the south.

**Yarrabah** - Residents currently take eligible containers to external CRPs in nearby Gordonvale, Edmonton or Cairns (c 50+ kms). Council, DES and COEX discussions are currently underway to establish a Council-operated CRP at/or adjacent to the Waste Facility. Council has a signed contract with COEX for the new CRP, assisted by DES funding for design, fit-out and initial operation. Future options being considered

include a can crusher and plastics baler, subject to being able to meet COEX container auditing requirements.

### **2.5.1.3 Garden and organic wastes**

Currently none of the councils offer a green waste kerbside service. All councils in the region have separate green wastes stockpiles that divert garden wastes from landfill. Shredding and chipping of stockpiles occurs when contractors and budget are available with the mulch materials re-used in the community by Council.

All councils provide pre- and post-cyclone season green waste clean-ups that also generates much of the stockpiled material.

Community fishing and pig hunting also generates animal carcasses that, unless properly disposed at landfills, can attract vermin and cause odour nuisances. Dugong carcasses and turtle shells can be a seasonal issue.

**Hope Vale** - Green waste is stockpiled by Council at a dedicated old quarry area on the road to the existing landfill. Council contracts a tub-grinder / shredder and reuses the mulch on council gardens.

**Image 3 Green waste site at old quarry on way to landfill**



Animal wastes - turtle, dugong, and annual wild pig cull (c.150+ carcasses) - are not separated from other unsorted wastes at the landfill.

**Wujal Wujal** - Green wastes from community and Council are stockpiled by Council, shredded by a contractor (arborist) and left to compost. Mulch is available for residents and Council re-use and used on the community market garden and farms.

**Yarrabah** - Green waste is stockpiled by Council at the Waste Facility, chipped (except for large pieces of tree trunks) and left to compost. Mulch is available for re-use by residents. Council notes the possibility of it being used for future community market gardens and household vegetable gardens. Some stockpiled shredded green wastes remain unused at a site near the Council Pound however this has now been covered with vegetation. Some animal carcasses (e.g., turtle, pigs and other hunted species) can cause odour and pest nuisance when disposed of unsupervised at the Waste Facility.

#### 2.5.1.4 *Bulky wastes, legacy and scrap metal collections*

All councils operate two bulky waste clean-ups per year for all premises – one in pre-cyclone and one in the post-cyclone periods - that includes collection of accumulated household bulky wastes (e.g., disused whitegoods, tyres, motor vehicles, used bulk containers, etc). The FNQROC scrap metal collection regional contract with Sims Metal includes the Eastern Cape councils and has largely dealt with all contemporary scrap metal issues, but this does not include disused gas bottles and fire extinguishers. Some historical / former landfills may still have residual / unsorted legacy wastes.

**Hope Vale** - Council operates two bulky waste clean-ups per year for all premises. Scrap metals are collected bi-annually via the FNQROC contract. Disused tyres are stockpiled (250+) near the entrance to the landfill and frequently illegally burned.

**Wujal Wujal** – Bulk metals (cars / whitegoods / scrap) are stockpiled at the old landfill site and collected via FNQROC contract. Some residents may also take some bulky wastes to the nearby Ayton Transfer Station (operated by Cook Shire Council), though it has limited opening times and high waste disposal fees. Council is experimenting shredding tyres at the Workshop Depot with new shredder and conveyor. Council is currently trialling the re-processing of used tyres and wooden pallets using the new equipment.

**Image 4 New shredder chipped tyres and timber**



**Yarrabah** - Six bulky waste skip bins are provided throughout town areas and collected fortnightly by Cleanaway. Bulk metals (mainly dis-used cars) are also collected annually through the FNQROC contract.

#### 2.5.1.5 *Household hazardous and problematic materials*

While bulky waste collections are regular in all councils, the storage and transport of some problematic waste materials to reprocessing destinations remains challenging. This includes motor vehicle / cooking oils, paints, car batteries, fire extinguishers, empty gas bottles, E-waste, smoke detectors and toner cartridges. These waste streams are difficult to manage due to their complexity, toxicity, small volumes, and lack of economies of scale. While some segregation of these materials occurs at waste facilities, their storage areas require improved containment from weather events and spills by bunding. Expanded regional collections and confirmed reprocessing destinations can ensure many of these materials do not end up in landfills.

**Hope Vale** - A private contractor regularly collects used motor oils from Councils workshops. There is no dedicated receptacle for household oils at the landfill. Car batteries are collected and sold by residents in Cooktown.

**Wujal Wujal** – lead acid batteries are stored in the works depot.

**Yarrabah** – no formalised collection systems in place.

#### **2.5.1.6 Construction and demolition (C&D) wastes**

Typically, there is no C&D recycling in the region. Despite requests to QBuild (a business unit of the Department of Energy and Public Works) are reluctant to include C&D waste disposal costs in works contracts and builders currently dispose of builder’s waste and demolition material at Council waste facilities transferring the management cost to each council.

**Hope Vale** - Council is Principal Contractor for its works and disposes of all C&D waste at Council landfill. Large amounts of concrete and fencing are stockpiled at landfill from Council’s own activities. QBuild are reluctant to include C&D disposal costs in works contracts so the end-of-life management costs are transferred to Council.

**Image 5 Concrete discarded at the green waste stockpile**



**Wujal Wujal** - Council is the Principal Contractor for its public works projects. Until recently, Council had to bear the disposal costs of C&D and non-MSW wastes at the Springmount landfill at considerable cost to Council. Council tender documents and new works contracts now place this cost on sub-contractors.

**Yarrabah** - C&D wastes are generally taken to the Council’s waste facility with some separation of material types. Commercial (non-resident) C&D wastes attract a \$22/m<sup>3</sup> disposal fee, and Council is increasing its policing of builders’ skip bins to maximise diversion of C&D wastes from the waste facility. There is minimal re-use or recycling of C&D wastes.

## **2.6 Education programs**

While education programs in these communities do not focus specifically on waste education, all councils report the need for external support to develop culturally appropriate programs tailored to their communities in relation to the correct use of current waste services. Anti-littering and dumping messaging are also required. Opportunities to partner with others to co-design resources would be welcomed by all.

**Hope Vale** - No established community education programs regarding waste. Council supports future education targeting litter and dumping behaviours, and incorrect disposal practices at and near the landfill. In the longer-term, Council sees education extending to household recycling and waste reduction possibilities.

**Wujal Wujal** - Council's existing waste messaging systems within the community include via local newsletters, social media (Council's Facebook page), community radio station, and door-to-door programs by Environmental Health Workers as required. CRS services are now well received and used in community. The River Guardian and Jabulbina Ranger programs also are active in the community.

**Yarrabah** – Council signage around the township targets littering and dumping activities but there are no waste education programs to the community at present. Council is supportive of future education targeting litter and dumping behaviours, and incorrect disposal practices at and near the landfill (e.g. further signage at shops, Junior Ranger programs). Council sees education extending to household recycling and waste reduction.

**Image 6 Yarrabah community litter messaging**



## 2.7 Waste generation, flows and forecasts

All councils prepare and submit an Annual Waste Return to DES, which seeks information in relation to waste generation, recovery, treatment and disposal via an extensive survey. The 2021 return results were provided to the consultants and provide the most current information about waste generation. Note this annual survey and data is self-reported.

None of the current waste facilities in the Eastern Cape Region have a weighbridge to verify the data. Therefore, reporting of waste stream tonnages is an estimation at best. The level of accuracy cannot be verified and is likely to be highly variable. Waste is generated from four key areas or activities:

1. Household (MSW)
2. Litter and dumping
3. Commercial and industrial (C&I)
4. Construction and demolition (C&D)

The first three sources of waste remain relatively static, with some increases associated with population growth and minor seasonal influences due to festivities and climatic impacts (wet/dry seasons). The table below indicates the amount of waste by stream reported by councils. Based on the DES 2021 annual waste survey of all councils, we estimate the entire region currently generates 2,806.15 tonnes of waste per annum. The breakdown of this figure into waste types for each council is presented in Table 10.

**Table 10 Total reported waste generation 2021 DES survey (tonnes)**

Waste Fast facts	HVASC	WWASC	YASC	Total
No. of households with kerbside service	293	134	474	901
<b>Waste generation (tonnes)</b>				
Household waste collected	710	140.4	594	1444
Street and other public-place bins	30	-	-	30
Litter and illegal dumping	19	16	128	163
Bulky waste (normal)	10	3	500	513
Other	90	3	76	169
<b>Total MSW received</b>	<b>859</b>	<b>162.4</b>	<b>1298</b>	<b>2,319.00</b>
<b>Total C&amp;I received</b>	<b>-</b>	<b>-</b>	<b>100</b>	<b>100</b>
<b>Total C&amp;D received</b>	<b>99</b>	<b>50</b>	<b>91</b>	<b>240</b>
Biosolids	35	-	-	35
Tyres	1.5	-	-	1.5
<b>Sub-total</b>	<b>994.5</b>	<b>212.4</b>	<b>1489</b>	<b>2,695.50</b>
<b>Recycling and resource recovery (tonnes)</b>				
Lead-acid batteries	-	.25	-	.25
Scrap metal	90	8	-	98
Green waste	10	2	-	12
<b>Sub total</b>	<b>100</b>	<b>10.25</b>	<b>0</b>	<b>110.25</b>
<b>Total waste generated</b>	<b>1,094.5</b>	<b>222.65</b>	<b>1,489</b>	<b>2,805.75</b>
<b>Diversion rate</b>	<b>9.1%</b>	<b>4.6%</b>	<b>0%</b>	<b>3.9%</b>

Source: DES annual waste returns 2021

There is limited / incomplete information on the waste composition profiles of the household waste streams reported. Table 11 shows the percentage of MSW reported as being diverted from landfill disposal for each council. The regional MSW diversion average of 3.9% for 2021 is low when compared with the Queensland state diversion rate for MSW of 28.4%, noting that state-wide diversion target intends to achieve 55% by 2025. The low rate for the Eastern Cape region probably can be attributed in part to the region's isolation from end markets, absence of household recycling services and waste separation facilities.



### **2.7.1 Waste flows – household waste**

For the Eastern Cape Region, average household wastes are reported as 2.5 tonnes per capita for 2021 (based on an MSW annual total of 2,331 tonnes for 961 households), compared to the Queensland average of 514 kg, which includes waste collected from households, public-place bins and self-hauled by residents to council facilities.

### **2.7.2 Waste flows – C&I waste generation**

Only 1 council (Yarrabah) reported in 2021 on its commercial and industrial wastes, with a total of 100 tonnes. It is not possible to comment on C&I waste diversion / re-use rates with this data. Given the concurrent collection of household and commercial premises wastes in all 3 councils it is not possible to estimate separate waste volumes by type of premises. All communities have a general store, takeaway food outlet, school, health clinic, art gallery/art centre, post office, mechanical garage and council administration and depots.

### **2.7.3 Waste flows – C&D waste generation**

While the region's 3 councils reported on their construction and demolition wastes volumes for 2021, it is similarly not possible to comment on C&D waste diversion / re-use rates with this data. However, there is no structured recovery activity for this waste stream, which is periodic in nature, so any diversion is ad hoc and driven by residents not the Council.

### **2.7.4 Waste Data Limitations**

Our examination of the data sets provided by all 3 councils to the DES Annual Waste Data returns reveals that the current DES state-wide reporting format is not well suited to the on-ground realities and capacities of the region's councils. (This is also most likely the case for many other First Nations councils.)

There are no weighbridges in any of the councils nor other systematic tools for tracking waste volumes, and councils' information entered in the DES database is at best an estimate. There are also many gaps in the councils' line-by-line entries, compounded by confusing or inappropriate labels in the database that do not reflect the current waste service levels and types in the region.

Improvements to all council's data systems are needed, as well as ongoing training of council staff in data management, so that the benefits of Government investments in waste management and resource recovery improvements can be demonstrated and monitored. However, a revised survey that aligns with the Performance Outcomes table of the *Respecting Country* strategy would be more appropriate for First Nations councils.

## **2.8 Regional Constraints**

Typical constraints in this region are similar to other First Nations councils but in some cases are exacerbated by:

### **Geography**

- small population
- remote isolated locations
- climatic extremes, including the occurrence and impact of natural disasters
- poor access to goods

### Structure

- limited financial resources
- lack of a rate base
- full reliance on external grants
- inappropriate levels of funding
- lack of knowledge-sharing between councils
- transient management and technical staff

### Freight and transport

- high freight costs
- tyranny of distance to markets for recoverable materials
- poorly co-ordinated backloading opportunities.

### Operations

- waste has a low priority even though it is an essential service
- diverse waste streams with poor economies of scale
- disproportionate operational costs due to small population
- ageing plant and equipment often purchased second hand
- lack of available machinery parts and mechanical skills
- limited range of skills in the workforce
- lack of adequate infrastructure and oversight of waste-related activities
- lack of knowledge of the resource-recovery industry
- inequitable access to services, e.g., container refund scheme (CRS)
- lack of reuse or second-hand centres for common household goods

### Community and culture

- strong connection to land and sea
- lower socio-economic indicators for education, income, employment
- poor community understanding of the public health risks of poor waste management
- complex land tenures and Native Title interests.

## 2.9 Waste forecasts

In APC's view, there are several additional socio-and economic drivers influencing waste generation and waste flows in this region including:

- Household income – First Nations community household incomes are typically lower than in non-indigenous households. This sees a higher reliance on certain 'disposable' goods that creates increased consumption / turnover of both consumables (e.g. bottled water instead of tap water) and a higher than average consumption of second-hand white goods (fridges and washing machines) and motor vehicles are common among low-income communities, resulting in shorter life expectancies than new products.
- Infrastructure - Unreliable power supply and power surges can impact the life expectancy of electrical goods.

- Climate - cooling by air conditioners and refrigeration work harder in hot humid climates and due to use have a shorter life span than in other areas.
- Vermin – eating of electrical cables is a common reason for replacement of white goods.
- Population and age distribution – the number of young children typically under three years of age directly impacts waste generation of disposable nappies. It is estimated that each child may use 7,000 disposable nappies from birth to toilet-training. Given the convenience factor of disposable nappies and community issues associated with poor-quality white goods, water and power usage, we do not see any reversal of this trend. We know in this region 6 per cent of the entire population is under 4 years of age.
- Housing Infrastructure – plastic water tanks and solar panels will be waste streams of the future.

**Image 7 Plastic water tank dumped at Hope Vale landfill**



### 3. EXISTING INFRASTRUCTURE AND ASSETS

This section explains the current waste disposal facilities and infrastructure in the region. All three councils in the region have in the past operated their own landfills but operating and maintaining them to regulatory environmental standards is expensive and technically difficult for small councils. Councils have limited or no suitable landfill equipment or trained operators and limited mechanical skills to maintain specialised equipment. Recognising these limitations two of the three councils in the region have closed their landfills and rely on transfer stations and contract transport to third parties to dispose of waste at external regional facilities, namely Springmount.

While this approach comes at a cost, it relieves councils of the day-to-day challenges and responsibility of managing and maintaining their own landfills and the challenges of regulatory compliance and non-conformance with license conditions.

#### 3.1 Hope Vale (HVASC)

Council continues to operate its own landfill located 3 km north-east of the township. It is licensed under ERA60 by Environmental Authority EPR 00186113 issued May 2014. An Indigenous Council Critical Infrastructure Program (ICCIP) grant of approximately one million dollars allowed for much needed capital works including: sealing the access road from the township, establishing stormwater diversion around the active landfill area, consolidating an active tipping face for improved site control, and earthworks which has extended the landfill's life by 7-10 years.

**Image 8 Hope Vale landfill after significant earth works**



Council contracts a third party with earth moving plant and equipment to manage the site. The tip face is regularly covered although may be burnt by residents depositing waste. Some bulky wastes are separated into informal stockpiles including used tyres, disused cars, other bulky metals, and green wastes.

**Image 9 Hope Vale landfill active tip face**



On the approach to the landfill at the site of an old quarry is a lay down area for scrap metal, end of life cars and garden waste. Council is part of the FNQROC annual scrap metal collection that removes the scrap metal and council engages contractors to chip the garden waste periodically. To reduce dumping of household waste at the green waste site Council has installed signage and CCTV to discourage this activity.

**Image 10 Scrap metal stockpile at landfill**



Dumping of wastes, such as construction wastes which are not apparently generated in community have also been identified in the existing lay down areas.

### 3.2 Wujal Wujal (WWASC)

Council's landfill has been closed for over a decade. It has been licensed under then ERA 75 (now ERA 60) Environmental Authority EPR 5010000202 issued November 1998. The landfill has been closed and capped, and the area remediated. Part of the former landfill land has been used over the years since for stockpiling scrap metals, green wastes and Council's gravel reserves.

Current waste infrastructure is located at Council's Works Depot near the town centre.

In 2018 Council had sought expressions of interest for the design, construction and commissioning of a waste transfer station and recycling facility as part of the Works Depot. As only limited funds could be secured for the new waste facility, initial plans to include a full transfer station were downsized. The current facility now includes a new maintenance shed, and within this, a heavy-duty material shredder, conveyor belt and baler/compactor. (Items omitted from the original plans include a tyre de-beader, a glass crusher, and a composting unit.)

**Image 11 WWASC new waste shredding and baling facility + CRP**



### 3.3 Yarrabah (YASC)

The current Council Waste Facility is located approximately 1 km east of town on Workshop Rd. Council's landfill at this location was closed in 2018. It is licensed under then ERA 75 (now ERA 60) by Environmental Authority 501000070 originally issued June 1998.

Two former Council landfill sites have been effectively closed and rehabilitated. A third disused landfill site (on private land 4 km east of town on King Beach Rd) is still being used informally for some C&D wastes, green wastes and disused vehicles, as well as attracting occasional uncontrolled dumping.

The landfill has been closed and a simple transfer station operates within a spacious and fenced secure compound but public access is unsupervised. Recently a new layout has been implemented with the installation of bays or bunkers for source separation of household, whitegoods, green waste, bulky wastes, metals, C&D wastes and vehicles with clear signage. However, except for green waste the bunkers are either not used or poorly separated.

Image 12 Current layout at the existing transfer station site



Image 13 Signage and concrete blocks used to create bunkers



Image 14 Poor separation with metals and household waste mixed



**Image 15 Green waste is well sorted and relatively free of contamination**



To provide 24-hour public access bulk and skip bins are provided at the entrance to the Waste Facility. At the time of our visit bins were overflowing requiring regular clean-up by Council staff. These bulk bins are serviced by Cleanaway with the large hook lift bin transported directly to Springmount and the smaller skip bins serviced by the front load commercial vehicle.

**Image 16 Current waste bins outside the dedicated waste transfer area allowing 24 hr access**



**Image 17 Clinic waste discarded at Yarrabah on the ground**





## 4. FUTURE OPPORTUNITIES AND SOLUTIONS

The waste solutions we are proposing in this section are the most appropriate within the bounds of current and appropriate technology solutions that are fit for purpose for the site conditions, waste volumes to be managed and resources and skills available. The solutions have been well researched and developed in close consultation and collaboration with both councils elected officials and officers as well as other key stakeholders. The solutions seek to support the transition to more contemporary standards and practices and support a more sustainable waste management and circular economy approach across the region while aiming to achieve long-term regulatory compliance. While each council is unique and faces different issues and challenges each requiring a tailored solution, some are common regional issues and solutions whilst other are council specific.

### 4.1 Regional opportunities & solutions

#### 4.1.1 Access to a regional landfill

Small councils face compliance challenges in managing local landfills and given the relative proximity of a major regional landfill at Springmount, Mareeba both Wujal Wujal and Yarrabah have closed their landfills in favour of transfer stations. HVASC are willing to also transition to a transfer station arrangement and keep their landfill for disaster waste only subject to a cost-benefit demonstrating this is more cost effective and ongoing support is provided for the transport of their separated wastes to Springmount for disposal or to regional materials reprocessing facilities for recovery.

Active Environmental Approvals remain in place for both Yarrabah and Hope Vale landfills. These continue to apply during the closure and remediation phases for the landfills and they can also allow for continuation of related waste uses such as stockpile sites for overflow / disaster wastes, and for interment of other organic wastes e.g., animal carcasses.

#### 4.1.2 Waste diversion from landfill through recycling and re-processing

Transfer stations (TSs) and Community Recycling Centres (CRCs) are now common at many municipal waste facilities in Queensland and can maximise the diversion of wastes from landfill disposal and provide a segregation point for household hazardous and problematic waste. They can provide valuable local employment in re-processing and /or preparing materials for transfer.

Across the Eastern Cape region there is a clear need for more appropriate facilities for separation and storage of a range of materials including bulky wastes, tyres, oils, paints, batteries etc. All the councils have established some form of separation and storage capacity, but they do not always meet contemporary standards for weather protection, spillage containment, ease or direction on use.

Image 9 demonstrates a typical example of a waste collection facility as part of a transfer station for household hazardous wastes. This style of facility could well service all councils in the region for separating and storing a range of materials pending their re-processing or further consolidation locally or at nearby regional centres. Materials which should be kept out of landfill and require special handling are, including but not limited to, motor and cooking oils, paints – water and oil, all batteries, e-waste - TV and computers, chemicals, tyres, fluorescent bulbs and tubes, smoke detectors, toner cartridges, gas bottles and fire extinguishers.

Image 18 Community recycling centre



Image 19 Sample CRC – signage with clear explanatory graphics



New transfer stations / CRCs can be designed to local conditions, though typical requirements for them can include:

- Fencing and related public access controls to reduce improper use of facilities
- Appropriate signage to ensure the safety of public users
- Dedicated containers for all waste streams
- Bunding as appropriate to contain spills for oils and paints
- Chemical storage containers
- Skip bins or household and bulky material should also be provided
- Adequate areas for stockpiling of metals, green waste and tyres
- Storage area for mulched green waste
- Cleaning and washing equipment if available for staff

### 4.1.3 Outsourcing kerbside and bulky waste collections

Securing long-term contracts for outsourced MSW kerbside bin collections can ease the burden on Council operational staff and equipment. Wujal Wujal and Yarrabah already outsource their household and bulky waste collections, though their contracts are short-term and as such they are paying a premium.

Given the proximity of Hope Vale to collection contractors in Cooktown and the aging and now inappropriate sized collection vehicle outsourcing this service is now the subject of serious consideration at HVASC. Currently council is using the litter bin collection compactor as the kerbside collection vehicle, which has passed its useful life expectancy. With the smaller vehicle more trips are required taking longer with increased labour and operating costs.

The costs and benefits of outsourcing collections need to be well considered. Outsourcing can displace local employment and it is important that all councils continue to provide local employment, especially where local jobs may be in short supply. Ideally, if services can be provided by other First Nation suppliers this is a compromised outcome.

All councils are adjacent to mainstream councils (Cairns Regional Council for Yarrabah and Cook Shire for both Hopevale and Wujal Wujal). This also provides opportunity and stability as both these councils offer kerbside services to their communities and collection vehicles already come some distance towards each community subject to council boundaries and services to outlying or rural areas.

It is also critical that contracts for outsourced services are secure, long-term with options for renewal and are well funded. Timing these contract to expire with the same end dates of both Cairns and Cook Council contracts provide opportunities for future alignment with the larger councils which would provide significant cost benefits to the smaller first nations councils if regional contracts were to be instigated.

The comparison of the current collection costs for each council is shown in Table 12. While this table shows the relationship between the distance from the council to the Springmount landfill obviously affects collection and disposal costs. Economies of scale via number of services rendered are a key determiner of price. Wujal Wujal with the lowest population has the highest cost per tonne of waste delivered to the landfill, while Yarrabah with the largest population has the lowest cost per tonne of MSW.

**Table 11 Comparison of Outsourced Collections Costs**

Council	Pop'n	# kerbside houses	MSW 2021 t.p.a.	Distance - Mareeba	Collections contract cost p.a.	Cost/head p.a.	Cost/house p.a.	Cost/MSW tonne
Hope Vale	976	293	859	309km	\$276,640	\$283	\$944	\$322
Wujal Wujal	276	134	162.4	283km	\$90,000	\$326	\$671	\$554
Yarrabah	2,505	474	1298	113km	\$361,400	\$144	\$762	\$278

### 4.1.4 Equitable access to Container Refunds

Easy access to local Container Refund Points (CRPs) is an equity issue for all residents in the region. Locally operated permanent CRPs in all councils integrated with / without other waste facilities can provide local

employment and retain both the handling fees and proceeds of container refunds within the local economy. COEX and DES funding is available to assist councils in establishing the preferred facility for their community. CRPs can be established in existing buildings adapted for the purpose, or in relocatable kiosks (ex-shipping containers or similar) built for the purpose. Wujal Wujal is the only community and council with an operating functioning CRP.

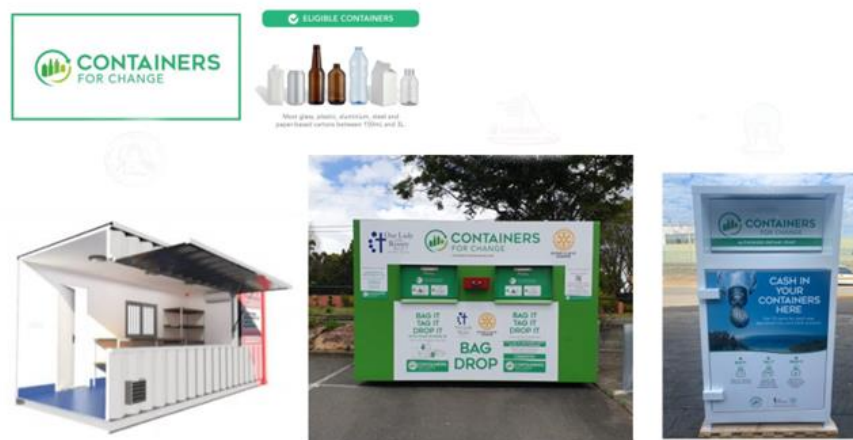
At Yarrabah discussion are well advanced with both COEX and DES in relation to the location, fit out and operation of the CRP. DES and COEX are also encouraging the local community to make bags for the storage and transport of used containers to the CRP in conjunction with Boomerang Bags. Alternatively, other large poly-woven bags could be screen printed with local community artwork. An unused existing shed adjacent the waste transfer facility has been earmarked for the CRP as shown below.

**Image 20 Proposed Yarrabah CRP**



At Hope Vale a new site has been selected within the township and adjacent to sporting facilities, the school and pool. In this case a kiosk option would be used as no existing building or depot is suitable or available. Options are shown below.

**Image 21 COEX CRP and container storage options subject to container volumes**



**4.1.5 Regional contracts and shared services**

FNQROC has a successful program to collect all legacy scrap metal annually, which has markedly reduced the amount of stockpiling and the build-up of legacy issues. This success could be built upon by establishing similar regional contracts for regular collection of other stockpiled wastes, including e-wastes,

tyres, motor and cooking oils, paints, toner cartridges, smoke alarms, gas bottles, fire extinguishers and asbestos. Moving materials frequently with all councils co-ordinated will provide both economies of scale and potentially reduction in cost imposts on each individual council given the isolation and relatively small quantities.

Local re-processing of select waste materials can also be assisted through regionally contracted heavy equipment that is shared amongst councils. None of the councils can justify purchase and operation of such plant. But a mobile crusher / chipper that could regularly visit each council – including those in adjoining regions to process green waste and crush building rubble and concrete – for re-use locally in new projects would be transformative.

#### **4.1.6 Region-wide community education outreach**

In our discussions, all councils are supportive of education programs targeting:

- litter and dumping behaviours
- improved disposal practices at landfills / transfer stations
- encouraging waste avoidance, reduction and reuse practices
- complying with correct kerbside bin use engagement with CRS refund points.

It is important that such programs are co-designed and tailored to each local community. Messaging should be prioritised and linked to the delivery of new or upgraded waste services

While individual councils rarely have the specialist capacities to develop education programs and materials, regionally located resources can work across multiple councils, while still allowing for local delivery by local staff of programs tailored to the individual cultural preferences of each community.

#### **4.1.7 Regional co-ordination and information sharing**

The *Respecting Country* strategy and this RWMP establishes a framework for First Nations councils to guide future investments in both practice and capital improvements of their current waste management functions. There are numerous opportunities for these three councils to work closer together on common issues and challenges.

The formation of a regional waste strategy group (RWSG) could be an asset to the region. Given the commonality of issues and challenges faced by the three councils at both a policy and operational level (including staff turnover), sharing the load may be beneficial for those involved. Such a group, supported by a secretariat, could provide a forum to, and avenue for, communication between both the officers and elected representatives.

Given the inter-related issues, the RWSG could encourage dissemination of information, knowledge, resource and experience sharing, and guide the overall implementation of the RWMP. It could also ascertain end markets for recovered waste materials, develop regional/sub regional contracts, and co-design community/tourist awareness information customised to each council.

Mutually beneficial research guided by the RWMG could include how other councils have approached like issues including:

- reviewing policy and regulatory instruments

- how other councils manage problematic waste streams
- how policies, advance disposal fees, bans and by-laws can be used to modify behaviours
- restrictions on the movement of certain materials/products
- consideration of new approaches – e.g. reusable nappies
- improvements to waste data collection for the whole region, including current generation by standardised waste types, as well as projected waste volumes, allowing for the setting and monitoring of more meaningful waste reduction and resource recovery targets.

As has been recommended for the Straits and Northern Peninsula RWSG, we believe that Torres Cape Indigenous Council Alliance (TCICA) is well placed to provide secretariat support to the group. A dedicated resource could be shared with other First Nations councils' regional waste groups given the commonality of issues between the regions and geography of the regions to maximise impact and with the view of extending regional contracting solutions across the whole Cape not just to this sub-region.

**Image 22 Used chemical drums awaiting backloading**



## 4.2 Council-Specific Issues and Opportunities

### 4.2.1 Hope Vale (HVASC)

The following table reflects our understanding of the current constraints and opportunities at HVASC.

**Table 12 HVASC specific issues and opportunities**

Constraints	Opportunities
Limited financial resources	Secure land available for new and expanded waste transfer facilities
Ageing plant and equipment – unsuitable waste collection truck needs replacing	A well-designed supervised transfer station encourages better waste separation
Poor rubbish bin condition – household bins need replacing	All-weather road access to an external landfill
No permanent CRP site	Good transport and operational links to Cooktown and contract waste services
Illegal dumping issues in and around community	Backloading is available throughout the year
Difficulty meeting compliance conditions for landfill operation	Cultural support for recycling and better waste practices on Country
Ongoing technical staff changes loses corporate knowledge	A site has been identified for a local CRP in community that offers employment and retains handling fee in community
No set destinations for reprocessing waste materials	Co-designed community education campaigns target new waste management practices and anti-dumping programs
Funding agencies do not fund C&D waste disposal	Regional efforts to lobby to overcome bureaucratic impediments regarding C&D waste arising and their management
Elim Beach area is not serviced by Council and informal dump sites over many years continue to operate	Council will establish a mobile trailer service to be serviced based on seasonal use.

**Image 23 Tipping Trailer for Elim Beach area**



#### 4.2.2 Wujal Wujal (WWASC)

The following table reflects our understanding of the current constraints and opportunities at WWASC.

**Table 13 WWASC specific constraints and opportunities**

Constraints	Opportunities
Funding uncertainty limits length of commitment to contract waste services	Good transport and operational links to Cooktown and contract waste services
Sensitive environment receptors require stringent controls on siting and operation of existing and new facilities	All-weather road access to an external transfer station at Cook Shire however high charges impede residents use
Limited land available for new facilities, including storage of waste materials.	Strong council ethic to reduce wastes and re-use materials
Membership of FNQROC is of marginal benefit	Backloading is available throughout the year
Funding agencies do not fund C&D waste disposal	Community education campaigns can target new waste management practices and anti-dumping programs
Expensive haulage costs to Springmount landfill	Nearby villages and settlements offer Council scope to expand its emerging CRP business services
Limited space at Works Depot for separation and storage of high-volume wastes	Ranger programs can support waste clean ups and education on Country
Lack of waste facilities in adjacent national parks and on tourist routes impacts community waste volumes	QBuild using Council to regularly service residents' green wastes justify council-owned shredder
Town is end-of-line for sealed road access with 12-month access	Support for partnering with region's First Nations councils

#### 4.2.3 Yarrabah (YASC)

The following table reflects our understanding of the current constraints and opportunities at YASC

**Table 14 YASC specific constraints and opportunities**

Constraints	Opportunities
Inequity between waste service standards for Cairns Regional Council v YASC residents	Proximity to Cairns and possible opportunity to integrate waste collections service contracts
Monitoring illegal dumping activity challenging due to the settlement layout and secluded recreational areas	Excellent site, size and location of transfer station facility with good fencing.
Funding uncertainty limits length of commitment to current contract waste services	Adjacent shed to Transfer station ideal as the CRP is the start of the journey to other recycling initiatives
Expensive haulage costs to Springmount landfill	Growing awareness of building contractors that they are responsible for the disposal of C&D wastes
Intermittent clearance of public bulk waste bins causes overflow and litter problems	Arts Centre is already interested and engaged in waste related projects
A former landfill on private land not controlled by Council	Regional waste groups can increase voice of First Nations councils
Illegal dumping issues in remote areas – traditional “hot spots”	Supported community education campaigns can target new waste management practices and anti-dumping programs
Regional collection contracts limited to scrap metal, cars and white goods	Support for partnering with region's First Nations councils
Ongoing staff changes loses corporate knowledge	



## 5. RWMP ACTION SUMMARIES AND BUDGETS

The solutions referred to in the previous section will not only reduce waste volumes and meet regulatory compliance but will also seek to improve environmental outcomes and social benefits through new job creation, enhanced training and skills and reduced waste to landfill with lower carbon emissions.

Across the region all household and bulky wastes are still sent to landfills with little waste separation or segregation. The transition to well-designed transfer stations with dedicated recycling centre to enable separation and diversion of wastes from landfills is welcomed by all councils as the logical next step change as councils seek continuous improvement in waste management and resource recovery. This transition needs external funding support and in so doing will assist this region achieve the state's waste diversion goals and that of the First Nations strategy key performance indicators

APC has worked closely with each council by preparing an outline of a council-specific component of the RWMP. The region's needs are not only physical items and infrastructure but also operational and community based. The proposed activities and budget estimates for each council have been prepared after extensive consultation with staff, management and elected officials of each council over the past 12 months. The sections below include a short description of the key actions and activities required to transition to improved and compliant practices linked back to the *Respecting Country* outcomes.

### 5.1 Hope Vale (HVASC)

The following table summarises the issues, solutions and actions identified, required and supported by each Council as they transition to improved practices.

**Table 15 RWMP action and implementation plan for HVASC**

Issues	Solutions	Actions
<b>Household Collections</b>		
<b>Reliability of kerbside collections</b>	Explore costs and benefits of outsourcing kerbside collections and maintain litter bin collections only in house	1. Council prepares CBA + business case for contract outsourcing household and business MSW kerbside collections. Include transport and disposal cost implications assuming landfill closed and all MSW to be transported and disposed to Springmount within the levy area.
<b>Local employment</b>	Subject to outcome call tenders for outsourcing domestic and commercial MSW collections and disposal to Springmount.	2. If CBA endorsed by Council, prepare waste collections tender documentation.
<b>Maintenance of collections equipment</b>	Replace current mini compactor with larger capacity compactor if Council decides not to outsource collections.	3. If Council decides not to outsource, purchase larger capacity compactor.
<b>Rural / remote collections</b>	Replace damaged / broken bins and establish reserves	4. Audit household bins for adequacy and condition, cost out / call tender to replace damaged bins and establish bin reserves.
	Establish a mobile bin trailer service for Elim Beach hut residents MSW and service as needed based on seasonal use.	5. Install house and public bin spring lids to prevent animal disturbance to contents.
		6. Consult Elim Beach hut owners on preferred mode and location for new bin trailer + purchase 4m <sup>3</sup> bin trailer for 4WD towing.

Issues	Solutions	Actions
<b>Landfill</b>		
<b>Compliance with EA</b>	Seek to reduce landfill activity and retain current capacity for dead animal pit and disaster waste management	1. Plan to reduce use of existing landfill once new kerbside collection contract in place, transfer station and community recycling centre operational.
<b>Landfill options</b>	In interim continue to outsource plant operator to maintain site	2. Consult DES on appropriate groundwater quality monitoring in vicinity of closed landfill.
<b>Community Recycling Centre (CRC) / Transfer Station (TS)</b>		
<b>Improve waste separation</b>	Develop a new transfer station termed a "Community Recycling Centre" where wastes are separated and stored in covered bays, bunkers, banded areas with skip bins / containers installed as appropriate for specific waste types.	1. Prepare detailed design and costings for new CRC-TS at site adjacent to STP ponds. Include and cost adequate storage and operating space for recyclable materials, including separated wastes storage / sorting / baling facilities in CRC design.
<b>Safe public access</b>	Control public access to CRC stockpiles / sorting compound design to allow 24hr public access to general waste skip bins.	2. Decide and cost preferred heavy plant for handling and sorting of wastes at CRC (e.g. front-end loader, telehandler).
<b>Transport of separated wastes</b>	Establish a 'Re-use Shed' at the new CRC for public re-use of discarded materials (waste-to-resource / art).	3. Determine preferred haulage mode and receiving / processing destinations for separated wastes.
<b>Local employment</b>	Investigate potential for "Plastics Pirates" trial to reprocess some / all household and commercial non-CRP plastics.	4. Include haulage of separated recyclables to Cooktown / re-processing points in waste collection contracts.
<b>Involve community in re-use of materials</b>	Create new local employment in sorting of separated wastes.	5. Include 'Re-use Shed' in CRC concept design.
		6. Initiate discussions with "Plastic Pirates" trial operator.
<b>Container Refund Scheme (CRS)</b>		
<b>Equitable access to Container Refunds</b>	Establish a permanent, community-operated Container Refund Point (CRP) located within town, accessible to foot traffic as well as cars.	1. Select / design preferred mode for permanent CRP (e.g. container kiosk) with road access / hardstand area – proposed site adjacent to swimming pool / multipurpose centre.
<b>Benefits retained in local community</b>	Provide all households, school, store and clinic with storage baskets/ bags for holding of CRS containers pending return to CRP.	2. Cost out CRP establishment and infrastructure and confirm funding source (COEX or DES).
<b>Local employment</b>	Establish a containers storage / baling facility at Community Recycling Centre.	3. Confirm with COEX and DES allowable baling / compaction of collected containers.
	Consider co-locating at CRP segregated materials bin(s) for household and commercial recyclables (glass and plastics)	4. Sign contract with COEX to establish centre
		5. Canvas options for CRP operator – community or Council.
		6. Determine with DES advice supplier and costs for household storage bags / baskets (e.g. Boomerang Bags with local production at Arts Centre).

Issues	Solutions	Actions
<b>Kerbside recycling</b>		
<b>Transition to household recycling</b>	Consider a longer-term transition to household recycling bins and collections, once CRP and CRC well established (c. 3-5 yrs).	1. In the future consider conducting a pilot kerbside recycling program to ascertain community use, bin yield and contamination and cost as KPIs to assess whether to progress
<b>Organics management</b>		
<b>Garden and storm wastes</b>	Provide open public access for green waste drop-off and mulch pick-up area to encourage use by residents for household and community gardens.	1. Include green waste public drop-off and stockpile area in CRC concept designs
<b>Community re-use of mulch</b>		2. Purchase new shredder for green wastes.
<b>Safe disposal of animal carcasses</b>	Provide a separate, dedicated pit for animal wastes at Council landfill (whether or not landfill closed). Cover wastes regularly with lime and earth.	3. With DES advice, determine suitable area at landfill for a dedicated animal waste pit. (Note: if landfill closes, retain current EA active to allow pit to operate.)
		4. Design site at landfill (whether closed or not) for overflow and disaster waste management.
<b>Legacy wastes</b>		
<b>Scrap metal collections</b>	Continue to use FNQROC scrap metal contract service.	1. Lobby FNQROC to extend the current highly successful scrap metal contract to other problematic materials or work with TCICA and ILF to establish new regional collection contracts based on the FNQROC model to service all First Nations councils on the Cape for an extended range of materials including: E-wastes, tyres, motor and cooking oils, paints, toner cartridges, smoke alarms, gas bottles, fire extinguishers and asbestos
<b>Disused tyres</b>	Pursue regional contracts for removal of other legacy waste materials and/or on-site processing to prevent legacy waste accumulation.	
<b>Regional contracts</b>		
<b>Construction &amp; Demolition</b>		
<b>Re-use of materials</b>	Seek a regional processing solution to crush for re-use the current concrete stockpile.	1. Explore options for regional concrete crushing service to remove legacy stockpile
<b>Paying for disposal of C&amp;D</b>	Seek First Nations regional solution to mitigate future legacy issues by demanding that all standard building contract insert terms require waste disposal fees to be included on construction costs and not borne by Council who will have no landfill capacity or operation to manage.	2. Lobby via TCICA / ILF, and FNQROC RWMP processes to negotiate regional C&D building contract solution with DHPW and other agencies to ensure end of life C&D management costs are built into all contracts as is the precedent in TSIRC by-law.
	If feasible, separate and locally re-use any Council-generated / other C&D wastes.	

Issues	Solutions	Actions
<b>Bulky and problematic wastes</b>		
<b>Bulky waste collections</b>	Continue 2 per year bulky waste collections for all residents.	<ol style="list-style-type: none"> <li>1. Ensure CRC design includes weather protected, bunded and signposted separation and storage facilities for problematic and hazardous wastes (e-waste, tyres, batteries, oils, paints, gas bottles, fire extinguishers and e-wastes).</li> <li>2. Use FNQROC RWMP process and/or TCICA – ILF to establish regional collection contracts for oils, tyres, paints, gas bottles/ fire extinguishers.</li> </ol>
<b>Scrap metals</b>	Continue to participate in FNQROC contract for scrap metal removal	
<b>Hazardous wastes</b>	Community Recycling Centre to provide formal waste separation and storage / stockpile areas for household hazardous and problematic wastes with dedicated bin and bunded areas with good clear graphic signage.	
<b>Regional collections</b>	Pursue regional collection contracts for oils, tyres, paints, gas bottles/ fire extinguishers.	
<b>Litter &amp; Dumping</b>		
<b>Public campaigns</b>	Continue current litter and dumping control practices.	<ol style="list-style-type: none"> <li>1. Seek DES grant funds for co-design anti-litter / dumping campaigns.</li> <li>2. Use FNQROC RWMP process to establish tourist waste facilities within Cook Shire and national parks.</li> </ol>
<b>Animal proof bins</b>	Explore animal-proofing public litter bins (bin lid springs). Provide trailer skip bins at Elim Beach.	
<b>Remote locations</b>	Develop regional solution with Cook Shire and QPWS re tourist waste services.	
<b>Tourist wastes</b>		
<b>Education &amp; Community Engagement</b>		
<b>Regional assistance needed</b>	Develop and deliver community education and awareness programs as new waste services are established (viz CRP, CRC transfer station, household recycling.)	<ol style="list-style-type: none"> <li>1. Include provision of locally themed co-designed community education and awareness programs in design and costings for new CRP and CRC.</li> <li>2. Via Regional Waste Strategy Group (see below) seek assistance from LGAQ /DES (including a possible DES-funded) paid staff position to develop and deliver education and awareness programs.</li> </ol>

The following proposed capital improvements were prepared in consultation with council representatives over the duration of the project. All costs are presented, including 20% contingencies and excluding GST.

### 5.1.1 Waste Collection

Council is considering the outsourcing of waste collections if benefits can be shown to outweigh the costs. While the current Council kerbside collection operation does support local employment, the current operational staff could perhaps be more usefully diverted to other tasks. A Cost Benefit Analysis (CBA) is needed, supported by a Business Plan for outsourcing collections.

While the feasibility of outsourcing is being investigated Council will need to continue to operate the current kerbside collections service with the undersized mini- compactor.

Given the continuing wear-and-tear on Council’s current household bin stock, it is necessary to plan for their cyclical replacement, and to establish an ongoing reserve of spare parts to replace damaged bins. A specific issue of MGBs being tipped over by animals leads us to recommend bin-lid springs for MGBs to prevent bin spillage and littering. BinSprings are an Australian innovation that help keep wheelie bins protected from wind, rain, birds, smells and spills and we recommend they are fitted to all new bins.<sup>2</sup>

Image 24 Bin springs



Table 16 HVAC capital expenditure estimate – waste collection

Item	Description	Cost	Units	Freight	Total ex GST
1	Replacement MGBs	\$40	600	\$10	\$30,000
2	Bin-lid springs supply	\$7	600	\$800	\$5,000
<b>Sub total</b>					<b>\$35,000</b>
<b>Optional</b>					
1	Replacement compactor truck	\$250,000	1	\$9,800	\$259,800
2	Truck body wrap with community education	\$7,000	1		\$7,000
<b>Sub total</b>					<b>\$266,800</b>
<b>Total</b>					<b>\$307,800</b>

### 5.1.2 Community Recycling Centre (CRC) + Transfer Station (TS)

To maximise diversion of household and commercial wastes from landfill disposal, Council supports the establishment of a CRC + TS at the former quarry site opposite the STP ponds, accessed by the road to the existing landfill. A conceptual layout for the proposed improvements to the current waste facilities at the Council Works Depot, and its transformation into a Community Recycling Centre (CRC) is provided at Figure 10 and 11. Estimated capital costs for this facility are shown at Table 19.

This concept will require transformation of the quarry site’s informal waste stockpile area into a modern-design Transfer Station (TS) with weather protection, hard stand areas for storage and stockpiles, banded bays to confine any spillages, and closure to public access. Public disposal of bulky wastes and MSW would be via a raised driveway parallel to the landfill access road where residents would deposit wastes directly into bulk bins at the TS perimeter with 24-hour access. Wastes from these bins would be consolidated and sorted by Council staff within the body of the TS. The land titles for the waste facility and adjacent

<sup>2</sup> <https://www.binspring.com/the-product/>

former quarry site have recently been transferred to Council to allow expansion of the facility and/or related Council uses.

The office and work area for the CRC operated by Council staff – including a Re-use Shop – would be within a new building constructed inside the TS. Public drop off bays / bins for problematic wastes (batteries, e-wastes, oils, paints etc.) would be located adjacent to the building.

**Figure 9 Proposed layout of HVASC CRC and TS**

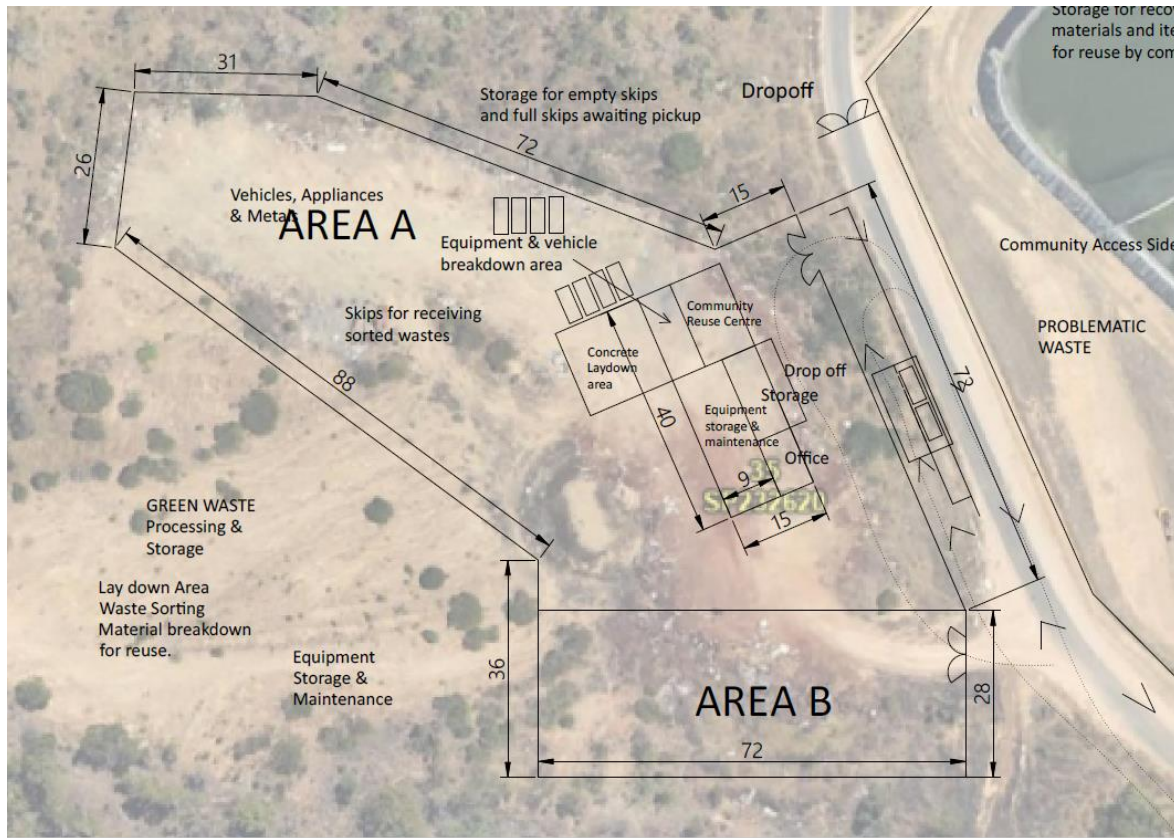


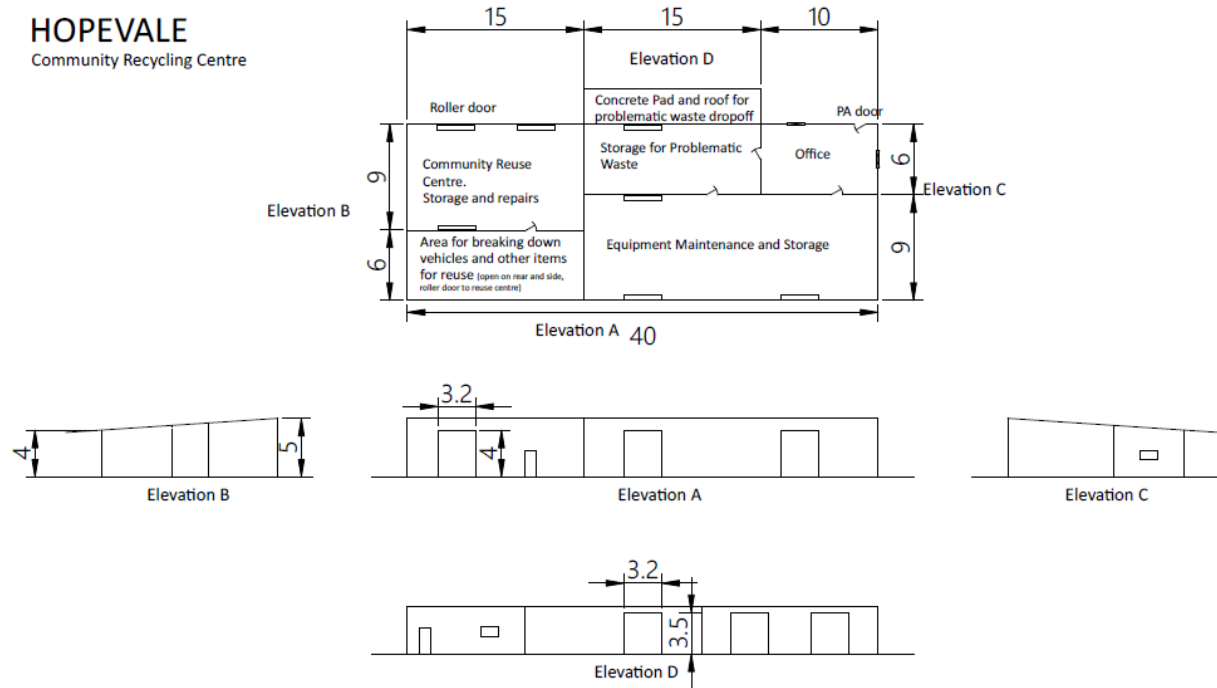
Table 17, describes the standard design and each of the main components of construction of the CRC at the proposed site

**Table 17 Construction Workup Table - HVASC Transfer Station and Community Recycling Centre**

Item	Description	Other Information
Earthworks	All ground works as described below	Day rate allowance of 5 days. See day rate breakdown at bottom of sheet.
Ground structures	Construct retaining wall for interface between 24/7 access ramp and skips to receive bulky waste and household waste. Length of retaining wall to incorporate safe positioning of skip and permit fencing/guardrail along the extent of wall including entrance and exit ramps, say, total of 40m	Skip dimensions: 30m <sup>3</sup> - 6.5L x 2.4W x 2.4H Retaining wall nominal height 1600mm with Guard rail 800mm. Max height 2400 to allow access to skip from side over the guardrail. Check codes for height of guardrail and design to suit as required.
Structures	Construct roof shelter over location of skips to provide rain protection. Shed should cover 24/7 access way as well. Shed dimensions ~ L18m x W7.5m x H4m (on ramp side), can include gates on each end of shed on skip access alignment.	Construction sq/m allowance based on construction costs across the region. As a general for this type of construction \$800 per sq/m will cover materials, supply and construction.
Fencing	Install boundary fence and access gates around perimeter of site. Total length ~370m, includes 3 double gates nominally 6m each (opening dimensions at your discretion)	Fencing supply and install \$180 l/m

	Install fence and gate to secure existing landfill site from unauthorized access ~20m	
Structures	Works shed, nominal dimensions L40m x W15m x H4m. Include internal walls to accommodate Community Reuse centre (15m x 9m), Equipment storage and maintenance (25m x 9m), vehicle and equipment breakdown and recovery area (15m x 6m), problematic waste storage (15m x 6m) office (10m x 6m), internal layout at your discretion. Concrete paved floor under all of shed	Construction sq/m allowance based on construction costs across the region. As a general for this type of construction \$1200 per sq/m will cover materials, supply and construction.
Paving	Concrete paved slab 15m x 15m for waste layout and sorting.	Concrete supply and install rate - \$224 per sq/m
Paving	Concrete paved slab and roof overhang for Problematic waste drop off point (15m x 3m)	Concrete supply and install rate - \$224 per sq/m
Utilities	Install utility services: Electrical:- ~220m from nearest transformer, adjacent to sewage pond controls, could come from sewage control box. Water:- ~160m from water main on road alignment, or from service point in sewage compound. Wastewater:- ~115m along the length of the building from the office and then across to the inlet line to the primary sewage pond	Civil trenching - \$26,400 Day rate allowance for laying - 2100 x 15
Paving	Bitumen Seal treatment of drive through and front of shed area for dust mitigation and weather protection	\$15 per sq/m plus mobilisation costs
Signage	Signage allowance	allowance
Signage	Line Marking allowance	allowance

Figure 10 Proposed layout of HVASC CRC Main Shed



The equipment to establish and support operation of the CRC/ transfer station, particularly for handling problematic wastes, shredding green wastes and support for the CRP, is included in Table 18 overleaf.

**Table 18 Hope Vale capital expenditure estimate – Transfer Station and Community Recycling Centre**

ITEM	Description	Unit Rate (\$/m <sup>2</sup> , \$/m, each)	Unit #	Materials	Construction	Mobilization	Totals	Contingency	Total (Ex GST)
Tenure Compliance, Engineering	Resolve Land Tenure and Land Use, compliance issues & design engineering	\$20,000	1		\$20,000		\$20,000	\$4,000	\$24,000
Earth Works	All preparatory earth works leveling, grading - stormwater drainage sump				\$70,400		\$70,400	\$14,080	\$84,480
Ground structures	Prep of ramp for 24/7 drop-off site			\$20,804	\$11,290		\$32,094	\$6,419	\$38,513
Structures	Structure over 24/7 Drop off site	\$108,000	1		\$108,000		\$108,000	\$21,600	\$129,600
Structures	Works Shed	\$600,000	1		\$600,000		\$600,000	\$120,000	\$720,000
Paving	Concrete paving and bitumen				\$72,480	\$30,000	\$102,480	\$20,496	\$122,976
Line Marking		\$8,500	1	\$8,500			\$8,500	\$1,700	\$10,200
Utilities	Electrical, water and wastewater			\$24,200	\$57,900		\$82,100	\$16,420	\$98,520
Fencing	0	\$180	370		\$66,600		\$66,600	\$13,320	\$79,920
Security	CCTV system to cover 24/7 access area	\$20,000	1		\$20,000		\$20,000	\$4,000	\$24,000
Fleet Vehicle	Twin Cab 4WD	\$65,000	1	\$65,000			\$65,000	\$13,000	\$78,000
Front end loader	UHI MACHINERY LG940	\$80,000	1	\$80,000			\$80,000	\$16,000	\$96,000
Pallet Scales	TF1212-1500Kg	\$2,300	1	\$2,300			\$2,300	\$460	\$2,760
Green Waste Shredder	Vermeer BC1000XL	\$100,000	1	\$100,000			\$100,000	\$20,000	\$120,000
Stillages	Sheeted Collapsible Pallet Stillage for Problematic Waste	\$3,250	10	\$32,500			\$32,500	\$6,500	\$39,000
IBC's	Second hand for use holding sorted recyclable products	\$100	10	\$1,000			\$1,000	\$200	\$1,200
Signage		\$8,500	1	\$8,500			\$8,500	\$1,700	\$10,200
<b>Total</b>				<b>\$342,804</b>	<b>\$1,026,670</b>	<b>\$30,000</b>	<b>\$1,399,474</b>	<b>\$279,895</b>	<b>\$1,679,369</b>

### 5.1.3 Container Refund Point

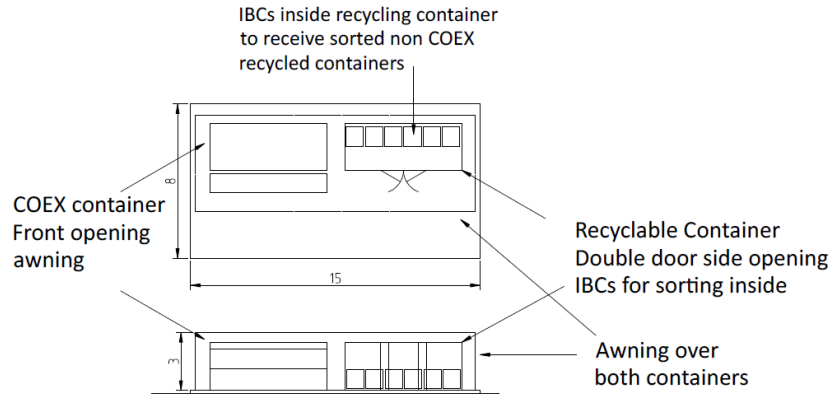
The mobile, trailer-based CRP (operated by Auswaste from Cooktown) is to be replaced by a permanent town-based, locally operated CRP. Council has chosen a site for the new CRP adjacent to the town swimming pool and Multi-purpose Community Centre. This is an ideal location within the town centre, easily accessible by foot and vehicle traffic, and near facilities that are regularly used by the community. The CRP will be a kiosk-style facility, with Council preferring it to be operated by a local community organisation. Its construction will require a concrete slab base and connection to utilities. We are assuming all capital costs associated with the site establishment will be met by COEX or a combination with some DES support.

**Table 17 Hope Vale– CRP capital expenditure estimate**

ITEM	Description	Unit Rate (\$/m <sup>2</sup> , \$/m, each)	Unit #	Construction	Totals	Contingency	Total (Ex GST)
CRP Paving	Concrete paving for site	\$25,000	1	\$25,000	\$25,000	\$5,000	\$30,000
CRP Structures	Containers for CRP and recyclables	\$15,000	2	\$30,000	\$30,000	\$6,000	\$36,000
CRP Utilities	Electrical, water and wastewater	\$20,000	1	\$20,000	\$20,000	\$4,000	\$24,000
<b>Total</b>				<b>\$75,000</b>	<b>\$75,000</b>	<b>\$15,000</b>	<b>\$90,000</b>



**Figure 11 Proposed layout of HVASC CRP**



**5.1.4 Landfill management**

Continued use of the existing Council landfill will in part depend on whether Council outsources its kerbside collection service. All collected MSW would then be either transported directly to Springmount landfill, or via an intermediate transfer station for bulking up with other waste to gain improved economies of scale to Springmount landfill. It may take some years for both the transfer station construction and the outsourcing of the domestic waste collection model to be fully implemented. The equipment to support interim operation of the existing landfill currently involves a local contractor covering deposited wastes with their own equipment. Council currently bears the cost of this.

**5.1.5 Litter & dumping**

The purchase of a mobile bulky waste, trailer-mounted bin will also be required to regularize collections for the Elim Beach hut owners and reduce the likelihood of illegal dumping at this beach location.

**Table 18 Hope Vale capital expenditure estimate – illegal dumping management**

Item	Description	Cost/unit	Units	Freight/ unit	Total
1	Elim Beach trailer bin	\$ 9,500	3		\$28,500
2	Education				\$1,500
<b>Total</b>					<b>\$30,000</b>

**Image 25 Trailer-mounted skip bin**



### 5.1.6 Budget summary – CapEx

The total estimated cost for all capital items, including contingency is \$1,834,369 (or if the new waste collection compactor is required \$2,101,169) as shown below excluding GST.

**Table 19 Hope Vale capital expenditure estimate summary**

Description	Total (ex. GST)
Waste collection	\$35,000
Transfer station / Community Recycling Centre	\$1,679,369
CRP	\$90,000
Litter & dumping	\$30,000
<b>Total</b>	<b>\$1,834,369</b>
<b>Optional</b>	
New collection vehicle	\$266,800
<b>Total</b>	<b>\$2,101,169</b>

### 5.1.7 Budget summary – OpEx

The total estimated cost for all annual operating costs, including contingency but excluding GST is \$537,168 assuming a contractor will deliver a kerbside service and all waste will be delivered to Springmount from the transfer station.

**Table 20 Hope Vale annual operating expenditure estimate**

Item	Details	Unit Cost	Number	Annual Cost	Contingency	Total (Ex GST)
Contractor, MSW collections	Annual fee for contract collection of MSW from each house and delivery to Springmount	\$5,320	52	\$276,640	\$55,328	\$331,968
Contractor, Bulky waste collections	Bulky Waste Skip Bin Collections by contractor fortnight collection for 6 skip bins, fortnightly.	\$6,400	6	\$38,400	\$7,680	\$46,080
Equipment Fuel (\$/L)	Fuel for Diesel powered equipment. (Loader, Compactor Truck) for use while working on waste management	\$3	4500	\$13,500	\$2,700	\$16,200
Equipment Maintenance	Annual Maintenance for Diesel powered equipment. (Loader, Compactor Truck) for use while working on waste management	\$8,000	2	\$16,000	\$3,200	\$19,200
Operators (\$)	Salary, superannuation and leave entitlements	\$85,000	1	\$85,000	\$17,000	\$102,000
Hand Equipment (\$)	Hi pressure sprayer, shovels, rakes, forks, brooms	\$1,500	1	\$1,500	\$300	\$1,800
Consumables (\$)	Detergents, bin bags	\$2,500	1	\$2,500	\$500	\$3,000
PPE (\$)	Includes new gloves, replacement of first aid kit materials	\$600	1	\$600	\$120	\$720
Education Materials (\$)	New posters, magnets etc. to continue to reinforce the message	\$1,000	1	\$1,000	\$200	\$1,200
Registration Fees (\$)	Yearly registration of vehicles	\$2,500	1	\$2,500	\$500	\$3,000
Program Administration	Waste Management share of Council manager and assistant	\$100,000		\$10,000	\$2,000	\$12,000
<b>Sub Total</b>						<b>\$537,168</b>
<b>GST</b>						<b>\$53,717</b>
<b>Total</b>						<b>\$590,885</b>

The combined operational and capital budget for Year 1 is provided below.

**Table 21 CapEx and OpEx budget year 1**

Description	Total (ex. GST)
Year 1 capital	\$1,834,369
Year 1 operational	\$537,168
<b>Total</b>	<b>\$2,371,537</b>

## 5.2 Wujal Wujal (WWASC)

The following table summarises the issues, solutions and actions identified, required and supported by each Council as they transition to improved practices.

**Table 22 RWMP action and implementation plan for WWASC**

Issues	Solutions	Actions
<b>Household Collections</b>		
<b>Secure services via long-term contract</b>	<p>Continue to outsource waste collections via a long-term contract that transfer all collected waste to Springmount LF.</p> <p>Resolve payments / boundaries for Wujal Wujal residents in Douglas Shire to receive WWASC MSW and bulky waste collections given their proximity to WWASC services.</p>	<ol style="list-style-type: none"> <li>1. Audit household bins for adequacy and condition.</li> <li>2. Cost out bin replacements</li> <li>3. Call tenders for long-term outsourced waste collection contract of say 5 years + 2 x 1-year extensions).</li> <li>4. Initiate discussions with Douglas Shire for MoU for extending WWASC waste services to Wujal Wujal residents living at Banabilla in Douglas Shire given proximity. .</li> </ol>
<b>Community Recycling Centre (CRC)</b>		
<p><b>Feasibility of operations</b></p> <p><b>Improve waste separation</b></p> <p><b>More local employment</b></p> <p><b>New business opportunities</b></p> <p><b>New technologies</b></p> <p><b>Involve community in re-use of materials</b></p>	<p>Determine via a Business Case if the establishment of a Community Recycling Centre (CRC) for tyres, cardboard / paper and wood wastes is viable, identifying all costs and revenues.</p> <p>Outreach to “Plastics Pirates” to participate in trial to reprocess plastics.</p> <p>Establish a ‘reuse shop’ if space is available at depot.</p> <p>Encourage waste to art for sale at the community art centre.</p>	<ol style="list-style-type: none"> <li>1. Prepare CRC Business Plan specifications for local or sub-regional processing hub to investigate: regional supply sources for CRC feedstock <ul style="list-style-type: none"> <li>- markets for re-processed materials</li> <li>- backloading / reverse logistics to reduce transport costs to and from the CRC</li> <li>- end market product specifications</li> <li>- feasibility of using shredded and de-beaded tyres and pulverized glass as road-base materials (equipment, volumes, markets etc).</li> <li>- layout and cost-estimates for onsite processing equipment, buildings, sorting, storage areas / bins.</li> <li>- potential revenues for various grade outputs</li> <li>- Consider if including Cook Shire and Cape Tribulation will enhance viability as a regional processing hub.</li> </ul> </li> <li>2. Consult DES re EA and planning approval requirements for new CRC.</li> <li>3. Initiate discussions with “Plastic Pirates” trial operator.</li> <li>4. Encourage waste to art community competition</li> </ol>
<b>Container Refund Scheme (CRS)</b>		
<p><b>Local employment</b></p> <p><b>Safer public access</b></p> <p><b>New business opportunities</b></p>	<p>Continue to operate the CRP from Council’s Works Depot, balancing income from handling fees with operating costs</p> <p>Integrated with CRC planning, ensure safe public access for both cars and foot traffic to CRP which is integrated with other Council workshop operations.</p> <p>Expand current Council CRS operations within the region with support from DES and COEX.</p>	<ol style="list-style-type: none"> <li>1. Prepare cost estimates for supplying all houses with heavy duty wire storage baskets / bags for containers. (DES/COEX \$\$ to assist purchases)</li> <li>2. Prepare plans and cost estimates for safe public access to CRP (current / new location?)</li> <li>3. Negotiate MOUs with adjacent communities, Cook Shire, Douglas Shire and AusWaste for expanded Council-operated mobile CRS within the region.</li> <li>4. If there is sufficient level of interest progress discussions with COEX / DES for purchase of a dual-axle trailer to commence mobile CRP operations.</li> </ol>

Issues	Solutions	Actions
<b>Organics</b>		
<b>Community re-use of mulch</b>	Relocate green wastes stockpile.	1. Fence new stockpile location.
	Continue making mulch available for residents and Council re-use.	2. Purchase shredder for green wastes.
<b>New business opportunities</b>	Consider refining wooden pallet shredding operations with the view of adding to the green waste mulch	
<b>Legacy wastes</b>		
<b>Scrap metal collections</b>	Continue to use FNQROC scrap metal contract service.	1. Lobby FNQROC to extend the current highly successful scrap metal contract to other problematic materials or work with TCICA and ILF to establish new regional collection contracts based on the FNQROC model to service all First Nations councils on the Cape for an extended range of materials including: E-wastes, tyres, motor and cooking oils, paints, toner cartridges, smoke alarms, gas bottles, fire extinguishers and asbestos
<b>Broader benefits of FNQROC membership</b>	Pursue regional contracts for removal of other legacy waste materials and/ or on-site processing to prevent legacy waste accumulation.	
<b>Construction &amp; demolition</b>		
<b>Payment for disposal</b>	Seek First Nations regional solution to mitigate future legacy issues by demanding that all standard building contracts insert terms requiring waste disposal fees to be included on construction costs and not borne by Council who will have no method to manage.	1. Explore options for regional concrete crushing service to remove legacy stockpile
	If feasible, separate and locally re-use any Council-generated / other C&D wastes.	2. Lobby via TCICA / ILF, and FNQROC RWMP processes to negotiate regional C&D building contract solution with -QBuild and other agencies to ensure end of life C&D management costs are built into all contracts as is the precedent in TSIRC by-law.
<b>Bulky and problematic wastes</b>		
<b>Regional collections</b>	Continue 2 per year bulky waste collections for all residents.	1. Ensure CRC design includes weather protected, bunded and signposted separation and storage facilities for problematic and hazardous wastes (e-waste, tyres, batteries, oils, paints, gas bottles, fire extinguishers and e-wastes).
	Continue to participate in FNQROC contract for scrap metal removal	
<b>Bulk bins and better storage areas</b>	Community Recycling Centre to provide formal waste separation and storage / stockpile areas for household hazardous and problematic wastes with dedicated bin and bunded areas with good clear graphic signage.	2. Use FNQROC RWMP process and/or TCICA – ILF to establish regional collection contracts for oils, tyres, paints, gas bottles/ fire extinguishers.
	Pursue regional collection contracts for oils, tyres, paints, gas bottles/ fire extinguishers.	3. Formalise new location for overflow bulky wastes co-located with green wastes.
	Co-locate overflow bulky wastes (metals / cars) at new green waste stockpile location	

Issues	Solutions	Actions
<b>Litter &amp; dumping</b>		
<b>Anti-dumping measures</b>	Continue current litter, dumping and bulky waste collection programs.	1. Use FNQROC RWMP process to establish tourist waste facilities within Cook Shire, Douglas Shire and national parks to reduce the waste disposal burden on Council and the limited community resources available.
<b>Tourist wastes</b>	Continue River Guardian and Jabalbina Ranger programs.  Install anti-dumping signage at known dumping 'hot spots'.  Develop regional solution with Cook Shire Council, Douglas Shire Council and QPWS re tourist waste services.	
<b>Education &amp; Community Engagement</b>		
<b>Regional assistance needed</b>	Develop and deliver community education and awareness programs as new waste services are established (viz CRP and CRC transfer station),	1. Include provision of locally themed co-designed community education and awareness programs in design and costings for new CRP and CRC.

The following proposed capital improvements were prepared in consultation with council representatives over the duration of the project.

### 5.2.1 Community Recycling Centre

Council's Works Depot has already commenced the re-processing of some waste materials (tyres and wooden pallets) via the recent purchase and operation of a heavy-duty shredder and conveyor line.

This is co-located with a small CRP where residents drive in to deposit their used beverage containers and obtain refunds with a sorting table and vertical baler.

The large open plan shed houses these facilities with space available for Council's plans to expand re-processing capacity for glass crushing, tyre de-beading, cardboard / paper, and wood wastes. Council has agreed that any expansion of current reprocessing facilities, including the prospects of including other regional wastes from Cook Shire and Cape Tribulation as feedstock should be preceded by a Business Case at an estimated preparation cost of \$30,000.

Irrespective of any growth in materials re-processing, the current Works Depot needs to formalise and expand its undercover storage areas for problematic and some bulky wastes, and for any re-processed materials. A new public drop-off facility is also needed on the south-western boundary of the depot.

A conceptual layout for the proposed improvements to the current waste facilities at the Council Works Depot, and its transformation into a Community Recycling Centre (CRC) is provided at Figure 14.

Final concepts, designs and EA / planning approvals will depend on the findings of the Business Case, including the nature, types, volumes, sources and destinations for materials to be processed at the CRC.

Figure 12 Proposed layout of WWASC CRC

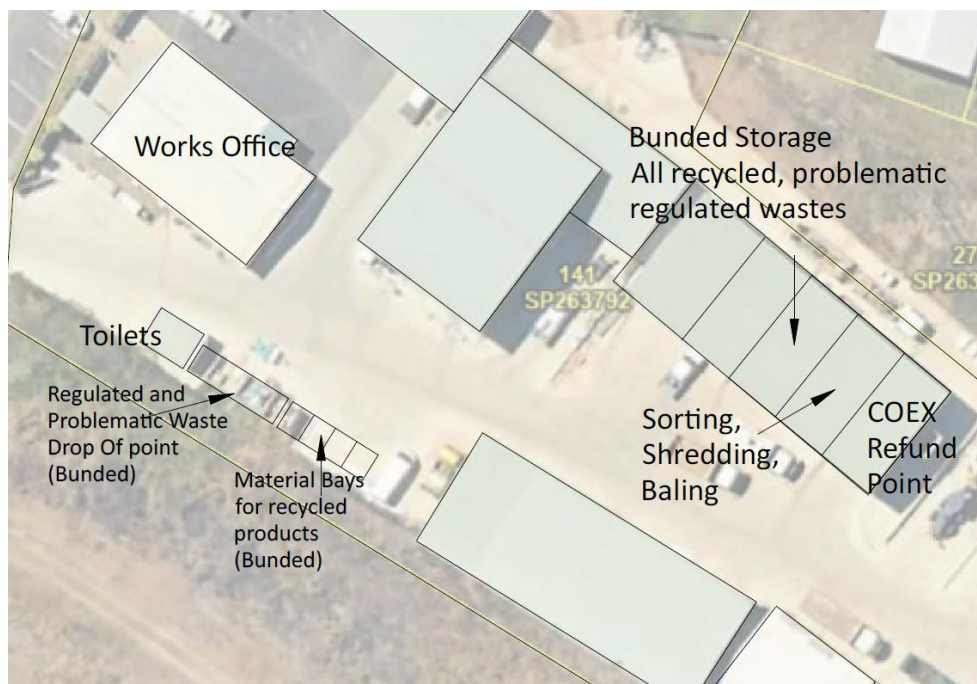


Table 23 Wujal Wujal capital expenditure estimate – CRC

ITEM	Description	Unit Rate (\$/m <sup>2</sup> , \$/m, each)	Unit #	Materials	Construction	Totals	Contingency	Total (Ex GST)
Land Tenure, Compliance, Engineering	Review/Resolve site for Land Tenure and Land Use Issue, compliance issues and design engineering	\$20,000	1		\$20,000	\$20,000	\$4,000	\$24,000
Structures	Problematic/Regulated/Material Bays	\$60	800		\$48,000	\$48,000	\$9,600	\$57,600
skip trailers	RentMe 4m3 Skip Bin Trailer	\$9,500	3	\$28,500		\$28,500	\$5,700	\$34,200
CRP trailer	Collection of COEX containers from outlying areas	\$5,000	1	\$5,000		\$5,000	\$1,000	\$6,000
Stillages	Sheeted Collapsible Pallet Stillage for Problematic Waste	\$3,250	10	\$32,500		\$32,500	\$6,500	\$39,000
IBC's	Second hand for use holding sorted recyclable products prior to packaging and shipping	\$100	10	\$1,000		\$1,000	\$0	\$1,000
Signage		\$5,000	1	\$5,000		\$5,000	\$0	\$5,000
Sub Total				\$72,000	\$68,000	\$140,000	\$26,800	\$166,800
GST								\$16,680
Total								\$183,480

### 5.2.2 Stockpile for Green Wastes and Overflow Bulky Wastes

The former landfill site – known by Council as the Top tip or Top Depot location – is the current stockpile site for green wastes, disused cars and used for other council purposes. This land is to be redeveloped as a residential subdivision, so a new stockpile site is needed. Council has identified a new site to the north-east of town with good road access and away from residential areas. This new site will require fencing and some supervised access for residents to ensure correct use.

QBuild is now contracting Council to manage residents' ongoing green (garden) wastes and so increasing demand on green waste storage and processing. Council will be able to shred green wastes at the new site but need to purchase a shredder for their own operation rather than rely on a contractor arborist who operates a mobile shredder.

**Table 24 Wujal Wujal capital expenditure estimate – Green waste processing**

ITEM	Description	Unit Rate (\$/m \$/m, each)	Unit #	Materials	Construction	Totals	Contingency	Total (Ex GST)
Fencing	Fencing greenwaste storage area	\$180	320		\$57,600	\$57,600	\$11,520	\$69,120
Green Waste Shredder	Vermeer BC1000XL	\$100,000	1	\$100,000		\$100,000	\$20,000	\$120,000
<b>Sub Total</b>				<b>\$100,000</b>	<b>\$57,600</b>	<b>\$157,600</b>	<b>\$31,520</b>	<b>\$189,120</b>
<b>GST</b>								<b>\$18,912</b>
<b>Total</b>								<b>\$208,032</b>

### 5.2.3 Budget summary - CapEx

The total estimated cost for all capital items, is \$385,920 as shown below.

**Table 25 Wujal Wujal capital expenditure estimate summary**

Description	Total (ex. GST)
Community Recycling Centre	\$166,800
Green waste processing area	\$189,120
CRC Business Case	\$30,000
<b>Total</b>	<b>\$385,920</b>

### 5.2.4 Budget summary – OpEx

The total estimated cost for all annual operating costs, is \$279,360 based on the current waste contractor undertaking collections and delivery to Springmount.

**Table 26 Wujal Wujal annual operating expenditure estimate**

Item	Details	Unit Cost	Number	Annual Cost	Contingency	Total (Ex GST)
Contractor MSW collections	Annual fee for contract collection of MSW from each house and delivery to Springmount	\$9,000	12	\$108,000	\$21,600	\$129,600
Equipment Fuel (\$/L)	Fuel for Diesel powered equipment. (Loader, Compactor Truck) for use while working on waste management	\$3	4680	\$11,700	\$2,340	\$14,040
Equipment Maintenance	Annual Maintenance for Diesel powered equipment. (Loader, Compactor Truck) for use while working on waste management	\$5,000	2	\$10,000	\$2,000	\$12,000
Operators (\$)	Salary, superannuation and leave entitlements	\$85,000	1	\$85,000	\$17,000	\$102,000
Hand Equipment (\$)	Hi pressure sprayer, shovels, rakes, forks, brooms	\$1,500	1	\$1,500	\$300	\$1,800
Consumables (\$)	Detergents, bin bags	\$2,500	1	\$2,500	\$500	\$3,000
PPE (\$)	Includes new gloves, replacement of first aid kit materials	\$600	1	\$600	\$120	\$720
Education Materials (\$)	New posters, magnets etc to continue to reinforce the message	\$1,000	1	\$1,000	\$200	\$1,200
Registration Fees (\$)	Yearly registration of vehicles	\$2,500	1	\$2,500	\$500	\$3,000
Program Administration	Waste management share of Council manager and assistant \$/FTE	\$100,000	0	\$10,000	\$2,000	\$12,000
<b>Sub Total</b>				<b>\$232,800</b>	<b>\$46,560</b>	<b>\$279,360</b>
<b>GST</b>						<b>\$27,936</b>
<b>Total</b>						<b>\$307,296</b>

The combined operational and capital budget for year 1 is provided below.

**Table 27 Wujal Wujal capital and operating budget year 1 summary**

Description	Total (ex. GST)
Year 1 Capex	\$385,920
Year 1 Opex	\$279,360
<b>Total</b>	<b>\$665,280</b>

### 5.3 Yarrabah (YASC)

The following table summarises the issues, solutions and actions identified, required and supported by each Council as they transition to improved practices.

**Table 28 RWMP action and implementation plan for YASC**

Issue	Solution	Action and critical path
<b>Household Collections</b>		
<b>Secure reliable collection services via long-term contract</b>	<p>Continue to outsource waste collections via a short-term contract that transfers all non-diverted MSW wastes to Springmount LF.</p> <p>Include household and public bin maintenance, repair and replacement as part of contract.</p> <p>Explore integrating MSW kerbside and bulky waste collections with Cairns Regional Council contractors.</p>	<ol style="list-style-type: none"> <li>1. Prepare tender documents for 4 years to coincide with the expiration of the Cairns Regional Council collection contract.</li> <li>2. Initiate discussions with Cairns Regional Council re integrating collections with their regional contract at renewal as a separate priced option so any economies of scale can be assessed.</li> <li>3. If integrated collections contract proceeds, YASC to establish dedicated operations contact point ("hotline") between contractor and YASC.</li> <li>4. If integrated collections do not proceed, call open tender for a new long-term contract again to mirror the duration of Cairns Regional Council so that future opportunities can be assessed</li> <li>5. Install house bin spring lids to prevent animal disturbance to contents.</li> </ol>
<b>Landfill</b>		
<b>Compliant and secure closure of former landfills</b>	<p>Permanently close and rehabilitate former landfills.</p> <p>Control public access to all former landfills to prevent misuse and illegal dumping.</p> <p>Subject to TO's PBC landowner agreement, retain King Beach Rd site as overflow green waste (post-disaster/ storm events) and / or scrap metal waste storage.</p>	<ol style="list-style-type: none"> <li>1. Confirm details / adequacy of rehabilitation of now closed #1 and #2 landfills.</li> <li>2. Plan for closure, fencing, capping and rehabilitation of Kings Beach Rd #3 landfill, in consultation with Traditional Owners.</li> <li>3. Include Waste Community Recycling Centre and landfill #4 capping costs as part of Council's upgrade plans for existing Waste Facility.</li> </ol>
<b>Overflow waste storage</b>		
<b>Community Recycling Centre + Transfer Station</b>		
<p><b>Improve waste separation</b></p> <p><b>Safe public access</b></p> <p><b>Local employment</b></p>	<p>Upgrade Council's existing Waste Facility as a new Community Recycling Centre (CRC) and transfer station (TS) - that integrates &amp; co-locates all waste activities.</p> <p>CRC and TS are to be supervised, fenced and public access controlled.</p>	<ol style="list-style-type: none"> <li>1. Work with current consultants to prepare final layout and design details for CRC and TS to allow scope of works to be developed for public tender including preferred adaptation of adjacent carpenters shed and modifications to existing waste separation areas. Confirm lot boundaries and new fencing location, and plan rehabilitation of excluded lands.</li> </ol>



<b>Transition to community recycling</b>		<ol style="list-style-type: none"> <li>2. Provide 24-hour public access to bulky waste 'drop off' skip bins at TS.</li> <li>3. TS wastes are to be separated and stored in covered bays, banded and skip bins / containers installed as appropriate for specific waste types.</li> <li>4. Plan locally appropriate public awareness / education campaign for correct public use of CRC and TS, including in-school programs.</li> </ol>
<b>Issue</b>	<b>Solution</b>	<b>Action and critical path</b>
<b>Container Refund Scheme (CRS)</b>		
<p><b>Equitable access to Container Refunds</b></p> <p><b>Benefits retained in local community</b></p> <p><b>Local employment</b></p>	<p>Establish Council-operated CRP in vacant shed adjacent to Council's Waste Facility.</p> <p>Plan for CRP operation at a minimum of 2 days/week, and plan to extend operating hours as/if demand and funding exist.</p> <p>Integrate CRP operations and access with other services at CRC.</p> <p>COEX to arrange and pay for transport of collected containers from CRP to Cairns / other.</p> <p>Provide all households, school, store and clinic with storage bags for holding of CRS containers pending return to CRP.</p>	<ol style="list-style-type: none"> <li>1. Finalise CRP design with DES and COEX.</li> <li>2. Plan container counting, refund handling, and revenue reporting systems.</li> <li>3. With COEX, organize training of Council staff as CRP operators.</li> <li>4. Continue development of household container storage bags – Council, DES, Boomerang Bags.</li> <li>5. Plan locally appropriate public awareness / education campaign with COEX \$s and assistance.</li> <li>6. Check if EA amendment and/or new planning approvals required for re-use of sheds for CRP and waste purposes.</li> </ol>
<b>Organics</b>		
<p><b>Community re-use of mulch</b></p> <p><b>Overflow waste storage</b></p>	<p>Consolidate green waste composting in single area at Waste transfer site</p> <p>Continue to make mulch available for residents, Council and future community market garden re-use.</p>	<ol style="list-style-type: none"> <li>1. Include green waste composting area in re-design of Waste Facility and Recycling Centre.</li> <li>2. Purchase shredder for green wastes and stockpile mulch for re-use.</li> <li>3. Continue plans for community-operated market gardens as a destination for mulch.</li> <li>4. With DES, determine appropriate site for a dedicated pit for animal carcasses, including if EA required.</li> </ol>
<b>Legacy Wastes</b>		
<p><b>Scrap metals</b></p> <p><b>Regional contracts</b></p>	<p>Continue to participate in the FNQROC scrap metal collection contract.</p> <p>Provide adequate stockpile space and/or skip bins at TS for storage of disused cars and other metals pending contract collection.</p> <p>Stockpiled dis-used cars to be stacked, if possible, to reduce space requirements.</p> <p>Remove legacy metals and other wastes from former landfill sites.</p> <p>Pursue regional contracts for removal of other legacy waste materials and/ or on-site processing to prevent legacy waste accumulation.</p>	<ol style="list-style-type: none"> <li>1. Ensure TS planning includes adequate space provision for waste metals stockpiling.</li> <li>2. Carry out regular removal of dumped cars in township to Recycling Centre stockpile.</li> <li>3. Investigate multi-purpose plant (e.g., telehandler or front-end loader) with capacity to stack car bodies.</li> <li>4. Lobby FNQROC to extend the current highly successful scrap metal contract to other problematic materials or work with TCICA and ILF to establish new regional collection contracts based on the FNQROC model to service all First Nations councils on the Cape for an extended range of materials including: E-wastes, tyres, motor and cooking oils, paints, toner cartridges, smoke alarms, gas bottles, fire extinguishers and asbestos</li> <li>5. Scope volumes of legacy wastes at former landfills and plan for removal and rehabilitation as resources permit.</li> <li>6.</li> </ol>

Issue	Solution	Action and critical path
<b>Construction &amp; Demolition</b>		
<p><b>Payment for disposal</b></p> <p><b>Council policies</b></p> <p><b>Re-use of materials</b></p>	<p>Seek First Nations regional solution to mitigate future legacy issues by demanding that all standard building contracts insert terms that require waste disposal fees to be included on construction costs and not borne by Council who have no landfill or operational equipment to manage.</p> <p>Develop new Council by – law to support contract clauses where building contractors must remove their C&amp;D wastes for out-of-area disposal (e.g., TSIRC, TSC).</p> <p>Continue / increase policing of builders' C&amp;D waste bins.</p> <p>If feasible, separate, and locally re-use any Council-generated C&amp;D wastes.</p> <p>Clean-up any current stockpiles of legacy C&amp;D wastes.</p>	<ol style="list-style-type: none"> <li>1. Scope volumes of legacy C&amp;D wastes at former landfills and plan for removal and rehabilitation as resources permit.</li> <li>2. Explore options for regional concrete crushing service to remove legacy stockpile</li> <li>3. Lobby via TCICA / ILF, and FNQROC RWMP processes to negotiate regional C&amp;D building contract solution with DHPW and other agencies to ensure end of life C&amp;D management costs are built into all contracts as is the precedent in TSIRC by-law.</li> </ol>
<b>Bulky and problematic wastes</b>		
<p><b>Separation and storage</b></p> <p><b>Regional collections</b></p>	<p>Continue 2 per year bulky waste collections for all residents.</p> <p>Continue to participate in FNQROC contract for scrap metal removal</p> <p>Community Recycling Centre to provide formal waste separation and storage / stockpile areas for household hazardous and problematic wastes with dedicated bin and bunded areas with good clear graphic signage.</p> <p>Pursue regional collection contracts for e waste, oils, tyres, paints, gas bottles/ fire extinguishers.</p>	<ol style="list-style-type: none"> <li>1. Ensure CRC design includes weather protected, bunded and signposted separation and storage facilities for problematic and hazardous wastes (e-waste, tyres, batteries, oils, paints, gas bottles, fire extinguishers).</li> <li>2. Use FNQROC RWMP process and/or TCICA – ILF to establish regional collection contracts for e-waste, oils, tyres, paints, gas bottles/ fire extinguishers.</li> </ol>
<b>Litter &amp; Dumping</b>		
<p><b>Regular bulky waste collections</b></p> <p><b>Ranger programs</b></p> <p><b>Anti-dumping measures</b></p>	<p>Continue current litter, dumping and bulky waste collection programs.</p> <p>Continue Indigenous Ranger programs.</p> <p>Install mobile trailer skip bins, anti-dumping signage and/or remote surveillance cameras at dumping 'hot spots'.</p>	<ol style="list-style-type: none"> <li>1. Ensure bulky wastes collections are included in CRC contract discussions.</li> <li>2. Purchase mobile trailer skip bins for use at dumping hot spots.</li> <li>3. Select locations for installation of anti-dumping signage and surveillance cameras.</li> </ol>
<b>Education &amp; Community Engagement</b>		
<p><b>Regional assistance needed</b></p> <p><b>Involve community in re-use of materials</b></p>	<p>Develop and deliver community education and awareness programs as new CRP, CRC + TS waste services are established</p> <p>Establish a 'reuse shop' at the Waste Facility / co-locate with CRP and Men's Shed.</p> <p>Promote to residents.</p> <p>Encourage waste to art for sale at the Yarrabah Arts and Cultural Precinct.</p>	<ol style="list-style-type: none"> <li>1. Include provision of locally themed community education and awareness programs in negotiations with Cairns Regional Council if kerbside contract services are to be shared.</li> <li>2. Via Regional Waste Strategy Group (see below) seek assistance from LGAQ and DES (including a possible DES-funded) paid staff position to develop and deliver education and awareness programs.</li> </ol>

The following proposed capital improvements were prepared in consultation with council representatives over the duration of the project. All costs are presented, excluding contingencies and GST.

### 5.3.1 Community Recycling Centre and Transfer Station

A conceptual layout for the proposed improvements to the current waste facilities at the Council Works Depot, and its transformation into a Community Recycling Centre (CRC) is provided at Figure 15. This concept will require a reconfiguration of the existing waste separation bays at the Waste Facility into a modern-design Transfer Station (TS) with weather protection, hard stand areas for storage and stockpiles, banded bays to confine any spillages, and closure to public access.

Public disposal of bulky wastes and MSW would be via a raised driveway parallel to the existing King Beach Rd where residents would deposit wastes directly into bulk bins just inside the TS perimeter allowing 24-hour drop off. Wastes from these bins would be consolidated and sorted by Council staff within the body of the TS. The office and work area for the CRC operated by Council staff – including a Re-use Shop – would be adjacent to the proposed CRP in the “Carpentry Shop”. Public drop off bays / bins for problematic wastes (batteries, e-wastes, oils, paints etc.) would be located adjacent to the building. Capital estimates are provided to adapt these buildings and areas for these purposes.

Figure 13 Proposed layout of YASC CRC

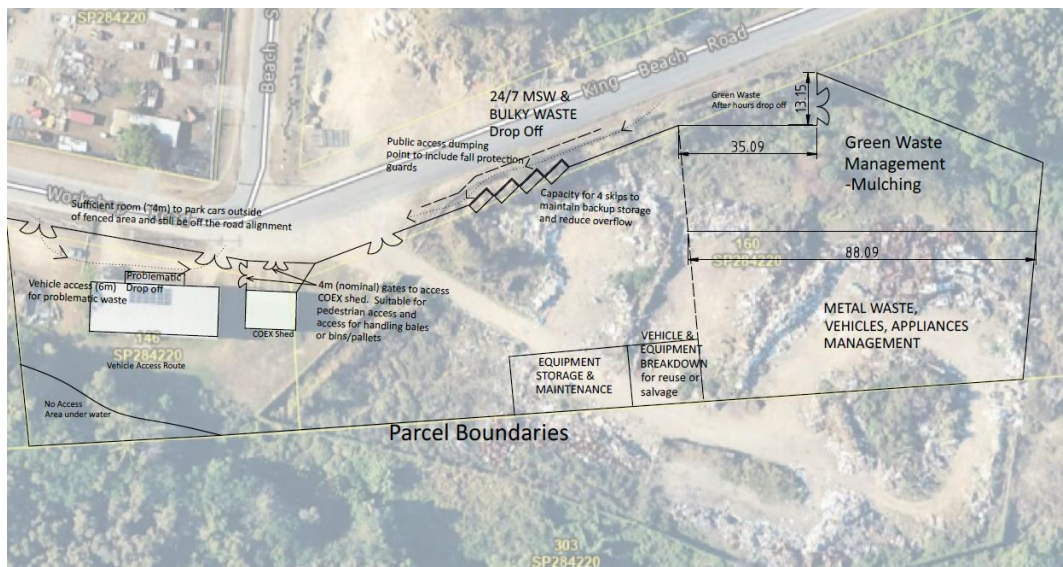


Image 26 Former carpenters shed is now part of the new waste facility infrastructure



The equipment to support operation of the CRC/ transfer station, particularly for handling problematic wastes is outlined in Table 30.

**Table 29 Yarrabah capital expenditure estimate – CRC / transfer station**

ITEM	Description	Unit Rate (\$/m <sup>2</sup> , \$/m, each)	Unit #	Materials	Construction	Totals	Contingency	Total (Ex GST)
Land Tenure, Compliance, Engineering	Review/Resolve site for Land Tenure and Land Use Issue, compliance issues and design engineering	\$20,000	1		\$20,000	\$20,000	\$4,000	\$24,000
Earth Works	Grade site for stormwater collection and capture drains and sumps				\$38,000	\$38,000	\$7,600	\$45,600
Ground structures	Preparation of ramp for 24/7 drop off site			\$20,500	\$14,800	\$35,300	\$7,060	\$42,360
Structures	Structure over 24/7 Drop off site	\$180,000	1		\$180,000	\$180,000	\$36,000	\$216,000
Structures	Maintenance Shed	\$800	450	\$0	\$360,000	\$360,000	\$72,000	\$432,000
Paving	Laydown area and salvage	\$224	270		\$60,480	\$60,480	\$12,096	\$72,576
Utilities	Total Underground 365m			\$18,600	\$44,500	\$63,100	\$12,620	\$75,720
Fencing	New boundary fence and gates	\$180	640			\$0	\$0	\$0
Security	CCTV system to cover 24/7 access area	\$20,000	1		\$20,000	\$20,000	\$4,000	\$24,000
Front end loader	UHI MACHINERY LG940	\$80,000	1	\$80,000		\$80,000	\$16,000	\$96,000
Pallet Scales	TF1212-1500Kg	\$2,300	1	\$2,300		\$2,300	\$460	\$2,760
Green Waste Shredder	Vermeer BC1000XL	\$100,000	1	\$100,000		\$100,000	\$20,000	\$120,000
Stillages	Sheeted Collapsible Pallet Stillage for Problematic Waste	\$3,250	10	\$32,500		\$32,500	\$6,500	\$39,000
IBC's	Second hand for use holding sorted recyclable products prior to packaging and shipping	\$100	10	\$1,000		\$1,000	\$200	\$1,200
Signage		\$8,500	1	\$8,500		\$8,500	\$1,700	\$10,200
Sub Total				\$263,400	\$737,780	\$1,001,180	\$200,236	\$1,201,416
GST								\$120,142
Total								\$1,321,558

### 5.3.2 Landfill management

The closure of Council's landfill in 2018 has allowed re-use of the site for waste related storage and stockpiles. Per DES requirements under ERA 60, further planning and remediation steps are needed to finalise the closure, while still allow for continuing waste-related activities, including an animal carcass disposal pit. Former landfill locations need to be checked and confirmed as appropriately closed. The continued use of the former King Beach Rd landfill (located on private land) for overflow green-waste stockpiles will need to be agreed with its Traditional Owners PBC.

**Table 30 Yarrabah capital expenditure estimate – landfill activities**

Item	Description	Cost
1	Closure and remediation plan	\$70,000
2	Remediation works	\$380,000
3	Animal carcass pit	\$15,000
<b>Total</b>		<b>\$465,000</b>

### 5.3.4 Illegal dumping

Trailer bins (refer below) will be placed strategically around the sites where dumping activities are observed. Trailers will include signage to promote positive behaviour. This will address support for managing illegal dumping, including management of turtle shells and dugong carcasses. Refer Image 26.

**Table 31 Yarrabah capital expenditure estimate – illegal dumping management**

Item	Description	Cost/unit	Units	Total
1	Tipping trailer bins	\$9,500	4	\$38,000
2	Signage			\$6,000
<b>Total</b>				<b>\$44,000</b>

### 5.3.5 Budget summary – CapEx

The total estimated cost for all capital items, is \$1,710,416, as shown below.

**Table 32 Yarrabah capital expenditure estimate**

Description	Total (ex. GST)
Community Recycling Centre /Transfer station	\$1,201,416
Landfill remediation	\$465,000
Illegal dumping	\$44,000
<b>Total</b>	<b>\$1,710,416</b>

### 5.3.6 Budget summary – OpEx

The total estimated cost for all annual operating costs, is \$642,720 assuming a contractor will deliver the kerbside service.

**Table 33 Yarrabah annual operating expenditure estimate**

Item	Details	Unit Cost	Number	Annual Cost	Contingency	Total (Ex GST)
MSW collection	Twice weekly MSW kerbside collections + c. 30 commercials + 50 public litter bins. MSW	\$4,550	52	\$236,600	\$47,320	\$283,920
Bulky waste	6 bulky waste skip bins collected fortnightly by Cleanaway.	\$950	26	\$24,700	\$4,940	\$29,640
MSW disposal	MSW collection c.12t/wk x \$200 / tonne disposal	\$2,400	52	\$124,800	\$24,960	\$149,760
24/7 skip bin transport and disposal	1 x 12m <sup>3</sup> Hook bin collected fortnightly by Cleanaway,	\$950	26	\$24,700	\$4,940	\$29,640
Equipment Fuel (\$/L)	Fuel for Diesel powered equipment for use while working on waste management	\$3	4680	\$11,700	\$2,340	\$14,040
Equipment Maintenance	Annual Maintenance for Diesel powered equipment for waste management	\$5,000	2	\$10,000	\$2,000	\$12,000
Operators (\$)	Salary, superannuation and leave entitlements	\$85,000	1	\$85,000	\$17,000	\$102,000
Hand Equipment (\$)	Hi pressure sprayer, shovels, rakes, forks, brooms	\$1,500	1	\$1,500	\$300	\$1,800
Consumables (\$)	Detergents, bin bags	\$2,500	1	\$2,500	\$500	\$3,000
PPE (\$)	Includes new gloves, replacement of first aid kit materials	\$600	1	\$600	\$120	\$720
Education Materials (\$)	New posters, magnets etc. to continue to reinforce the message	\$1,000	1	\$1,000	\$200	\$1,200
Registration Fees (\$)	Yearly registration of vehicles	\$2,500	1	\$2,500	\$500	\$3,000
Program Administration	Waste management share of Council manager and assistant \$/FTE	\$100,000	0.1	\$10,000	\$2,000	\$12,000
<b>Sub Total</b>				<b>\$535,600</b>	<b>\$107,120</b>	<b>\$642,720</b>
<b>GST</b>						<b>\$64,272</b>
<b>Total</b>						<b>\$706,992</b>

The combined OpEx and CapEx budget for year 1 is provided below.

**Table 34 Yarrabah capital and operational budget year 1**

Description	Total (ex. GST)
Year 1 Capex	\$1,710,416
Year 1 Opex	\$642,720
<b>Total</b>	<b>\$2,353,136</b>

### 5.4 Regional Waste Strategy Group

A Regional Waste Strategy Group (RWSG) could project-manage the implementation of the Eastern Cape Regional Waste Management Plan (RWMP). The RWSG would be a partnership between Hope Vale Aboriginal Shire Council (HVASC), Wujal Wujal Aboriginal Shire Council (WWASC), Yarrabah Aboriginal Shire Council (YASC), Torres Cape Indigenous Council Alliance (TCICA), the Department of Environment and Science (DES) and the Local Government Association of Queensland (LGAQ).

A key function of the RWSG would be to assist all councils to establish improved and common waste data systems, and to collate and report consistently on regional waste data. This is especially important for demonstrating how ongoing investments in waste management and resource recovery improvements within the region are supporting the Queensland Government’s corresponding state-wide targets.

We have prepared draft Terms of Reference for the RWSG - see **Appendix A**.

**Budget Summary** – TCICA have provided a quotation to provide secretariat services to the RWSG. A dedicated project officer can be shared between multiple regions. It is assumed this region will contribute one quarter to the position with three other regions contributing the same amount. An activity budget to cover travel and meeting costs plus an operational budget for education resource development, oversight and delivery and for training and development of appropriate waste data systems.

**Table 35 Estimate of funds to support RWSG by TCICA**

Activity	Total Cost, first year
TCICA project manager	\$50,000
Activity budget	\$30,000
Waste data systems upgrades & training	\$25,000
Education budget	\$25,000
<b>Total</b>	<b>\$130,000</b>

**Image 27 TCICA can play a vital role in developing regional contracts for other problem waste streams**



## 6.5 RWMP Regional Budget

None of these plans can come to fruition without adequate and ongoing funding. The necessary capital and operating budgets to transition each council to improved practices in line with all other councils is provided in this section. These budgets were estimated by APC at the time of writing. Given current national and international economic conditions, there is likely to be considerable escalation in costs dependent on how soon funding decisions can be made and funds allocated. This will especially affect final prices for construction materials, specialist / trade labour, fuel and transport costs.

To implement the full recommendations of this report to transition to improved and compliant practices, the following capital and annual operating costs are predicted based on current-year estimates.

**Table 36 RWMP funds required ex. GST**

Capital required once only	Total	Source Table
Hope Vale ASC	\$1,834,369	Table 20
Wujal Wujal ASC	\$385,920	Table 26
Yarrabah ASC	\$1,710,416	Table 35
<b>Sub total</b>	<b>\$3,930,705</b>	
Operational budget – annual		
Hope Vale ASC	\$537,168	Table 21
Wujal Wujal ASC	\$279,360	Table 26
Yarrabah ASC	\$642,720	Table 35
Regional Waste Strategy Group	\$130,000	Table 36
<b>Sub total</b>	<b>\$1,589,248</b>	
<b>Total</b>	<b>\$5,519,953</b>	

**Image 28 E waste is a current challenge for all councils with no services or systems for recovery**



The budget has been divided by year to show the amount of CapEx and OpEx required from year one to six and then the ongoing OpEx budget from year six for perpetuity.

**Table 37 Cumulative Year RWMP funds required ex. GST**

Year of Expenditure	Council	CapEx	OpEx	Cumulative OpEx	Total
Year 1	Hope Vale ASC	\$1,834,369	\$537,168		\$5,519,953
	Wujal Wujal ASC	\$385,920	\$279,360		
	Yarrabah ASC	\$1,710,416	\$642,720		
	Regional Waste Strategy Group		\$130,000		
Year 2	Hope Vale ASC		\$537,168	\$1,074,336	\$1,589,248
	Wujal Wujal ASC		\$279,360	\$558,720	
	Yarrabah ASC		\$642,720	\$1,285,440	
	Regional Waste Strategy Group		\$130,000	\$260,000	
Year 3	Hope Vale ASC		\$537,168	\$1,611,504	\$1,589,248
	Wujal Wujal ASC		\$279,360	\$838,080	
	Yarrabah ASC		\$642,720	\$1,928,160	
	Regional Waste Strategy Group		\$130,000	\$390,000	
Year 4	Hope Vale ASC		\$537,168	\$2,148,672	\$1,589,248
	Wujal Wujal ASC		\$279,360	\$1,117,440	
	Yarrabah ASC		\$642,720	\$2,570,880	
	Regional Waste Strategy Group		\$130,000	\$520,000	
Year 5	Hope Vale ASC		\$537,168	\$2,685,840	\$1,589,248
	Wujal Wujal ASC		\$279,360	\$1,396,800	
	Yarrabah ASC		\$642,720	\$3,213,600	
	Regional Waste Strategy Group		\$130,000	\$650,000	
<b>Year1 -Year 5 total</b>					<b>\$11,876,945</b>
<b>Year 6 onwards</b>					<b>\$1,589,248</b>

**Image 29 Existing recycling efforts across the region are *ad hoc***





## 6. MONITORING AND REVIEW

The *Respecting Country* strategy aims to transition First Nations councils to improved waste management and resource-recovery outcomes, and to provide a set of principles, targets, and an actions timeline. All activities will be subject to government support and funding given the financial and corporate constraints under which these councils operate. A key function for the proposed RWSG would be to prepare an annual regional report for its respective councils and DES on progress against the performance measures below.

**Table 38 East Cape RWMP and Respecting Country Performance Measures**

Performance outcomes and RWMP response	Number of councils/timeframes		
	Short-term (1–2 years)	Medium-term (3–4 years)	Long-term (5+ years)
1. Active participation in the Regional Waste Strategy Group	All		
<b>Response: Group to be formed and supported by each council subject to funding of RWMP</b>			
2. Establishment of new or expanded business and employment opportunities delivering new waste management and resource-recovery solutions	All		
<b>Response: New waste separation and Recycling Centres.</b>			
3. Councils implementing regional waste management plans	All		
<b>Response: Subject to government funding RWMP capex and OpEx</b>			
4. Councils have a container refund point	All		
<b>Response: Subject to negotiations with COEX</b>			
5. Councils offering regular bulky waste solutions	All		
<b>Response: All councils do, so already do pre- and post-cyclone season.</b>			
6. Councils able to report accurately on waste data and budgets (operating and capital)		All	
<b>Response: Subject to funding RWMP with each council supported in capacity building and systems</b>			
7. Councils implementing waste education program(s)		All	
<b>Response: Subject to funding of the RWSG</b>			
8. Councils operate landfills, transfer stations and other operations compliant with their environmental authorities (EAs)	2 councils	All	
<b>Response: Subject to funding RWMP</b>			
9. Councils implementing litter and dumping avoidance and management strategies	2 Council	1 council	
<b>Response: Subject to RWMP funding</b>			

## **APPENDIX A TERMS OF REFERENCE FOR REGIONAL WASTE STRATEGY GROUP**

The Regional Waste Strategy Group (RWSG) is established to project-manage the implementation of the Eastern Cape Regional Waste Management Plan (RWMP). The RWSG is a partnership between Hope Vale Aboriginal Shire Council (HVASC), Wujal Wujal Aboriginal Shire Council (WWASC), Yarrabah Aboriginal Shire Council (YASC), Torres Cape Indigenous Council Alliance (TCICA), the Department of Environment and Science (DES) and the Local Government Association of Queensland (LGAQ).

### **Functions and Responsibilities**

The RWSG's functions are to:

- Investigate opportunities for waste avoidance, reduction, reuse, repair, recycle to minimise landfill and waste disposal across the region
- Lobby for the establishment of used beverage redemption points
- Develop, design and deliver culturally appropriate and fit-for-purpose messages using a combination of methods, education and communication resources regarding correct use of waste services, facilities aiming to reduce litter and dumping issues in and around communities
- Investigate opportunities to consolidate hazardous and problematic waste at a centralised regional or sub-regional facility to improve economies of scale to access markets more frequently
- Explore the option of introducing new recycling systems based on quantities and type
- Explore options for organic waste processing
- Jointly develop budget templates for tracking of all waste management costs to assist in both reporting and grant submissions
- Coordinate waste data tracking, data systems improvements and staff training.

**Referral of Matters** – In exercising its responsibilities, this RWSG may refer appropriate items to relevant Queensland Government Departments for input and advice.

**Membership** – The membership of this RWSG is nominated by the mayors and comprises senior officers experienced in waste management from the following organisations:

- HVASC
- WWASC
- YASC
- Department of Environment and Science (DES)
- Local Government Association of Queensland (LGAQ).

**Guest/Stakeholders** – The guest/stakeholders of the RWSG are those nominated below and shall be invited to the RWSG as required:

- COEX, DATSIP, Auswaste, Cook Shire Council, Douglas Shire Council, Cairns Regional Council
- Other waste industry and associated organisations may also be invited to assist as required.

**Chair** – The Chair responsibilities will be rotated between RWSG members.

The Chair will be expected to:

- guide and provide leadership to the RWSG
- facilitate formal discussions with a focus on the overall objectives of the RWSG.

**Secretary** – The Secretariat function will be performed by TCICA.

**Quorum** – At least one member from each member council should attend each RWSG meeting. Where there is no quorum at the meeting, any key decisions are held over for consideration at the next meeting.

**Meetings** – RWSG meetings may be held face-to face, by telephone, videoconference, or other electronic means. RWSG meetings shall be held monthly and preferably on a set meeting cycle. Meeting times will be advised by the secretary in collaboration with the RWSG members. The Chair holds the executive rights to reschedule and/or cancel proposed meetings. Members are required to be fully prepared for each meeting, having read the documentation in advance, and to make every reasonable effort to attend each meeting.

**Agendas and Minutes** – Agendas will be developed by the Secretary in conjunction with the Chair and members, in line with the call for agenda items.

Agendas and associated documentation will be distributed three working days prior to the meeting, via electronic means. Members will be notified by email of the location and availability of material.

Meeting records are subject to various legislation pertaining to public records and therefore must be retained in accordance with Queensland and Commonwealth Government records management policies. Responsibility for ensuring appropriate records management rests with the Secretary under the direction of the Chair of the RWSG.

Minutes are to be prepared for each RWSG meeting. The draft minutes and action sheet of each meeting are to be reviewed by the Chair and circulated to all members by the Secretary as soon as practicable. A copy of the minutes, once they have been reviewed by the Chair, will be included in the agenda papers for the next RWSG meeting.

**Reporting** – Copies of meetings will be forwarded to DES and LGAQ should they be absent from any meeting.

# Appendix C - Waste Model Assumptions and Outputs

# Waste Flow Model Outputs

## Overview

The basis for the waste flow model was created from a number of key sources.

Through the initial Request for Information (RFI) process, and the collation of data from other sources such as the DES Local council survey data, an understanding of the state of waste generation and management within each council, and the FNQROC region more holistically has been developed.

This data – representative of the current state of play – has been used to build up the picture of possible future waste generation for MSW, utilising ABS data with current and projected low-, medium-, and high-scenario population counts. Taking 2021 as a baseline, the waste generation rate per capita for 2021 (calculated by dividing the total MSW generated that year, by the respective population total) is used in combination with projected population counts to estimate the tonnes of MSW to be generated out to 2050. A core assumption required to use this approach is that waste generation per capita does not change over time, however, this is only to establish a baseline, or ‘business as usual’ scenario.

In a similar manner, C&I and C&D waste totals have been forecast using 2021 totals as a baseline, but it is recognised that commercial waste is not solely dependent upon population alone. By assuming that commercial waste generation is tied to broader economic activity, forecast C&I and C&D waste totals take into account both population and estimates of future Gross Regional Product (GRP). Future GRP has been estimated based upon historic real GRP for the FNQROC region, whilst nominal GRP was estimated through utilising historic Consumer Purchase Index (CPI) data for Brisbane, in the absence of such a data set for Cairns. This approach has allowed Arup to establish baseline (or business as usual) overall waste generation totals for MSW, C&I and C&D from 2021 to 2050.

To make use of the business-as-usual waste generation across the MSW, C&I and C&D streams, and to provide the level of detail conducive to assessing how and where waste materials may flow, a final step in constructing the picture involves the use of waste audit data. Whilst acknowledging the limitations of waste audits in that they are representative of only a single point in time, and generally a select category of materials, they do offer a method of estimating what scope of materials may be present within future waste streams. Coupled to the assumption that waste generation rates do not change over time (under business as usual) and are proportional to population change, Arup has also assumed that the composition of waste streams does not change over time. These core modelling assumptions are also followed by other overarching assumptions, including:

- Waste generated by tourists is captured within overall C&I waste tonnages, and the tonnes generated within each local government area can be estimated using historical peaks and troughs in visitor numbers (pre-2020) where the proportion of visitors to each local government area remains fixed
- The composition of kerbside general waste, kerbside commingled recyclables, and MSW self-haul residual waste as reported by Cairns Regional Council and Mareeba Shire Council, are acceptable to use as proxy values for other councils where such data is unavailable
- Estimating the composition of C&I and C&D self-haul residual waste across each council can be achieved by using indicative audit data compiled by Arcadis in their *Queensland Waste & Resource Recovery Infrastructure Report (2019)*
- Cairns ARRF Facility (‘Bedminster’) closes in 2026, and under business as usual, no replacement recovery mechanism is introduced to handle kerbside general waste generated by CRC, DSC and MSC, meaning all kerbside general waste is instead sent to landfill

- The forecasted waste totals do not take into account future waste materials or objects that are not already in circulation, and have not been acknowledged by historic waste audits
- Recovery rates shown for FNQ are based on information provided from issued council RFIs and DES local council survey data 2013-2021. Baseline data provided is from 2020/21, or where data was unavailable for 2020/21, the most recent information was used. It is important to note that the current recovery rates do not distinguish between waste diverted from landfill (i.e., total resource recovery) and recycling rates which are a subset component of total resource recovery..

The data provided from 2020/21 acts as the baseline year for future projected waste modelling. Where data from 2020/21 was unavailable the most recent data for each council has been used, this data typically being from 2018 or 2019 local council survey data. From the data provided, 79% of the average annual waste generation is attributed to MSW, with only 12% and 9% of the total C&I and C&D respectively.

### Action 1 Model results

Action 1 is conceived as being a region-wide initiative that aims to reduce waste generation at a household level. The waste reduction per capita targets set by the *Queensland Waste Management and Resource Recovery Strategy* serve as the guide to the pace and intensity of decreasing MSW waste generation over time as modelled in this action.

Councils included in Action	Action commencement
Cairns Regional Council	2024-25
Cassowary Coast Regional Council	
Cook Shire Council	
Croydon Shire Council	
Douglas Shire Council	
Etheridge Shire Council	
Hope Vale Aboriginal Shire Council	
Mareeba Shire Council	
Tablelands Regional Council	
Wujal Wujal Aboriginal Shire Council	
Yarrabah Aboriginal Shire Council	

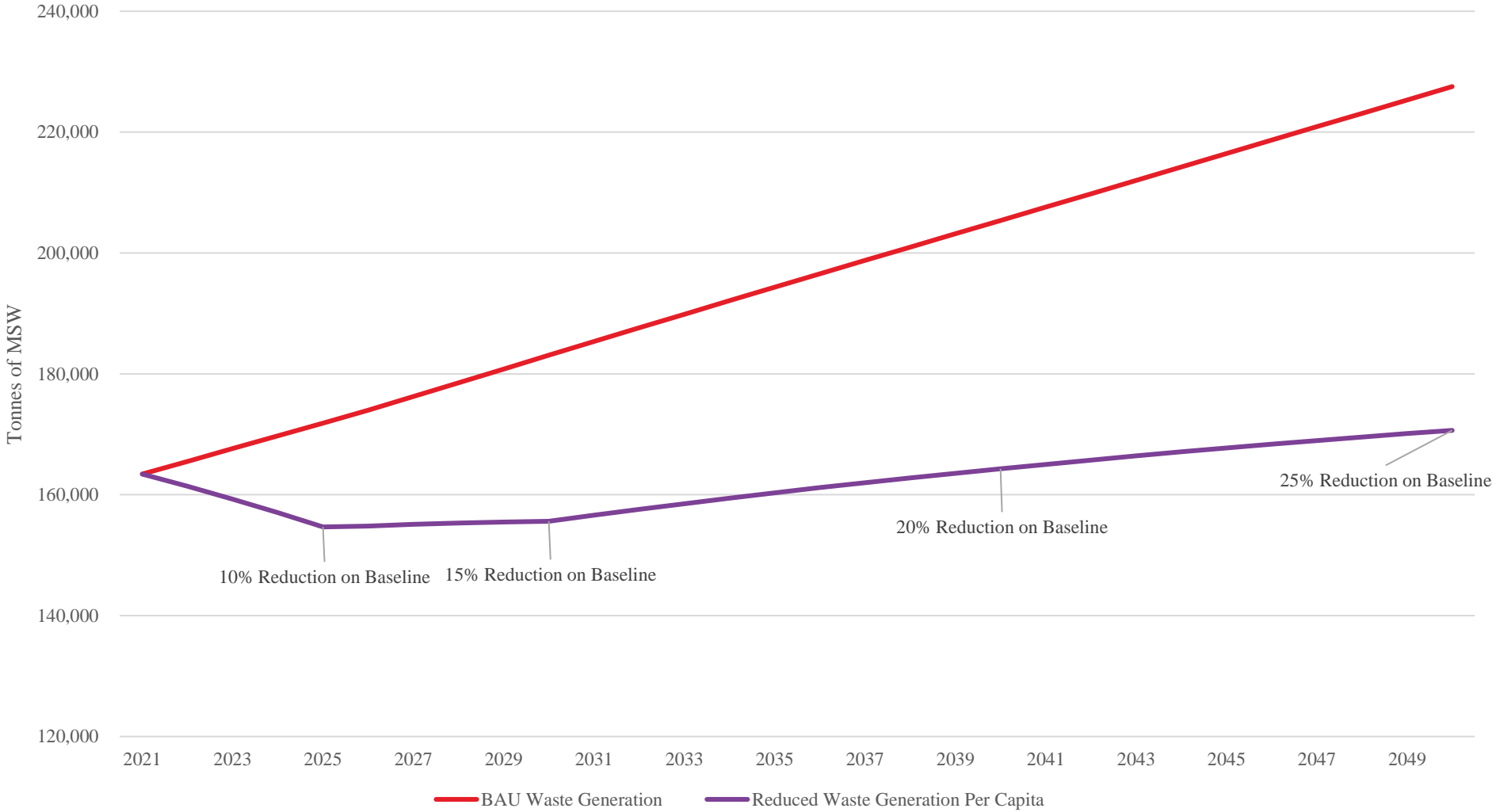
The key assumptions which inform the modelling of Action 1 are as follows:

- All councils implement Action 1 as undertaken as a regional approach
- The core focus of Action 1 in the Cost Benefit Analysis (CBA) is on soft infrastructure, particularly in the form of employing Waste Education Officers across each council and regional to support the delivery of ongoing education and marketing campaigns
- Education programs and marketing campaigns are successful in driving behavioural change, resulting in per capita waste generation to decrease over time
- Education programs and marketing campaigns will only enable a council to achieve 50% of the State Government MSW waste reduction targets for households; to achieve waste reduction in line with State targets additional action above education alone will be required, including initiatives such as: enforcing compliance, increase in data capture, monitoring behavioural change, supporting community initiatives (product stewardship schemes, tool libraries, repair cafes, Buy Back shops), as well as policy changes and technological advances outside of council's control such as changes in product design that enable the reuse, repair and recycling of a greater proportion of materials

Noting the assumptions above, a comparison between Business as Usual (BAU) waste generation, and waste generation across all councils in line with State targets has been made. This is highlighted in the graph below, which is based upon the medium-series population projection from 2021 to 2050.

The results portrayed below are independent of initiatives included in Actions 2 to 5.

Forecast regional MSW generation - BAU vs Reduced waste generation per capita





## Action 2 Model results

Action 2 comprises regional servicing contracts, to provide a consistent process for the shredding of green waste, shredding and transport of tyres, and crushing of concrete. It is anticipated that a regional contract would enable cost savings to all councils involved, and provide smaller regional councils with a more frequent servicing schedule. Whilst only a minor portion of all green waste, tyres, or concrete is currently sent to landfill, this action expects these resources to instead be fully recovered and support current recovery activities.

Councils included in Action	Action commencement
All	2024-25

The key assumptions which inform the modelling of Action 2 are as follows:

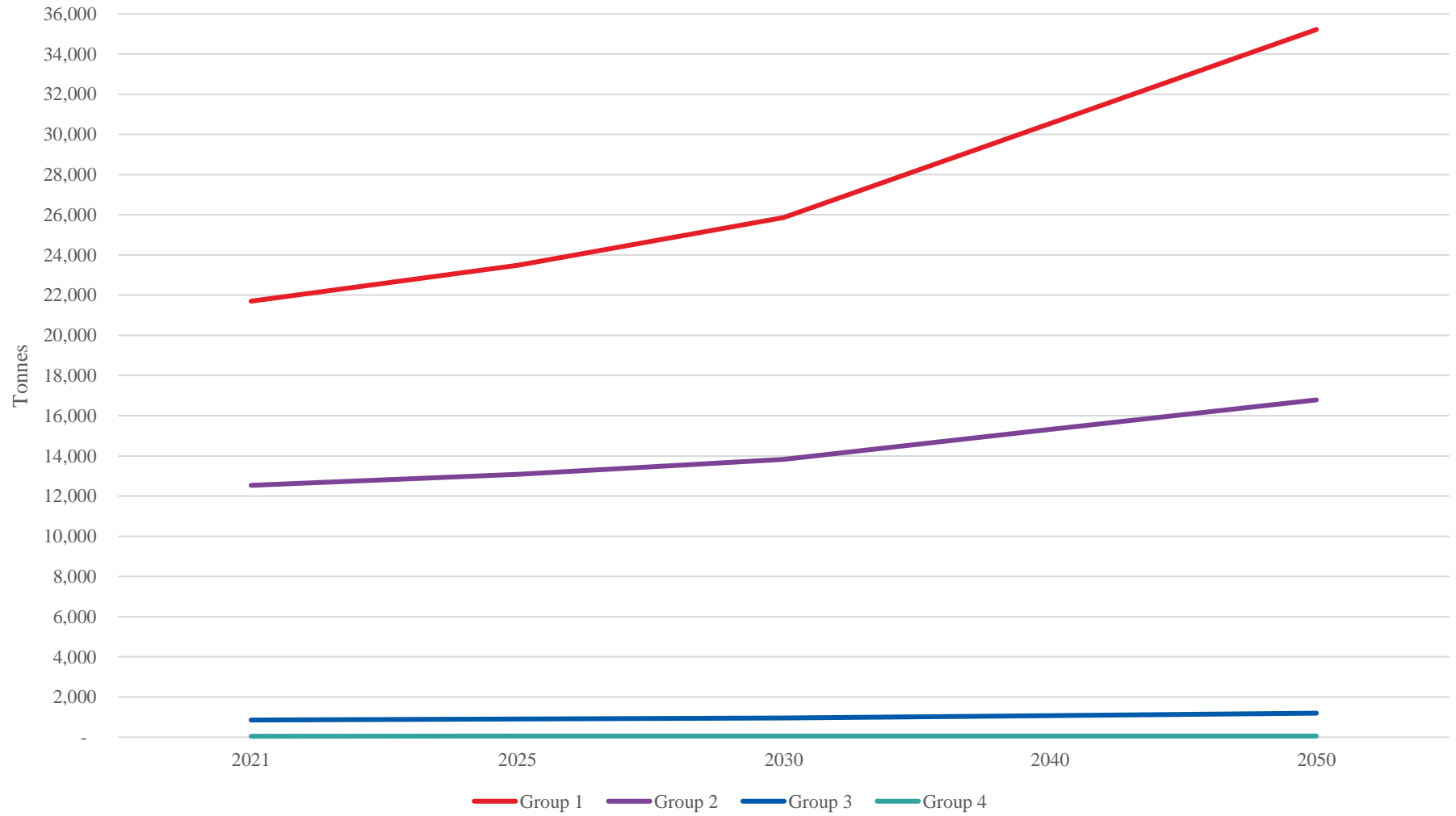
- All eleven councils subscribe to a regional servicing contract, that encompasses the mobile processing of green waste, tyres, and concrete via a contractor(s).
- Green waste is shredded and left at a council facility for use as mulch (either by the council or community)
- Tyres are shredded and then consolidated for more efficient transported to Brisbane for further processing and recycling
- Concrete is crushed and left at a council facility for reuse locally (maintaining site roads, forming gravel hardstands, or as part of council civil infrastructure works programs)
- Under BAU, it has been estimated that councils incur the following costs to manage these three materials:
  - Average green waste shredding rate of \$20/m<sup>3</sup>
  - Average tyre shredding rate of \$120/tonne
  - Average concrete crushing rate of \$30/tonne
- To account for the transport of shredded tyres, a transport allowance has been factored into the CBA costs. This is calculated by using the average distance between each Group and Brisbane (kilometres), multiplied by a transport rate of \$12/km.
  - Group 1 is anticipated as undertaking 4 tyre shred campaigns each year, so would incur transport costs four times per annum
  - Group 2 is anticipated as undertaking 3 tyre shred campaigns each year, so would incur transport costs three times per annum
  - Groups 3 and 4 are anticipated as undertaking a single tyre shredding campaign each year, so would incur transport costs once per annum
- Tonnes of green waste, tyres and concrete increase at BAU waste generation rates over time
- The cost of the servicing contract borne by each council is proportional to the tonnes of green waste, tyres or concrete they receive and have available for processing. Hence, in the CBA much of the servicing contract cost is borne by Cairns, given its relatively high totals of green waste and concrete, relative to other councils. It is acknowledged that this may not be reflective of how contracts are

normally administered through FNQROC or how this contract would be administered should this initiative be implemented.

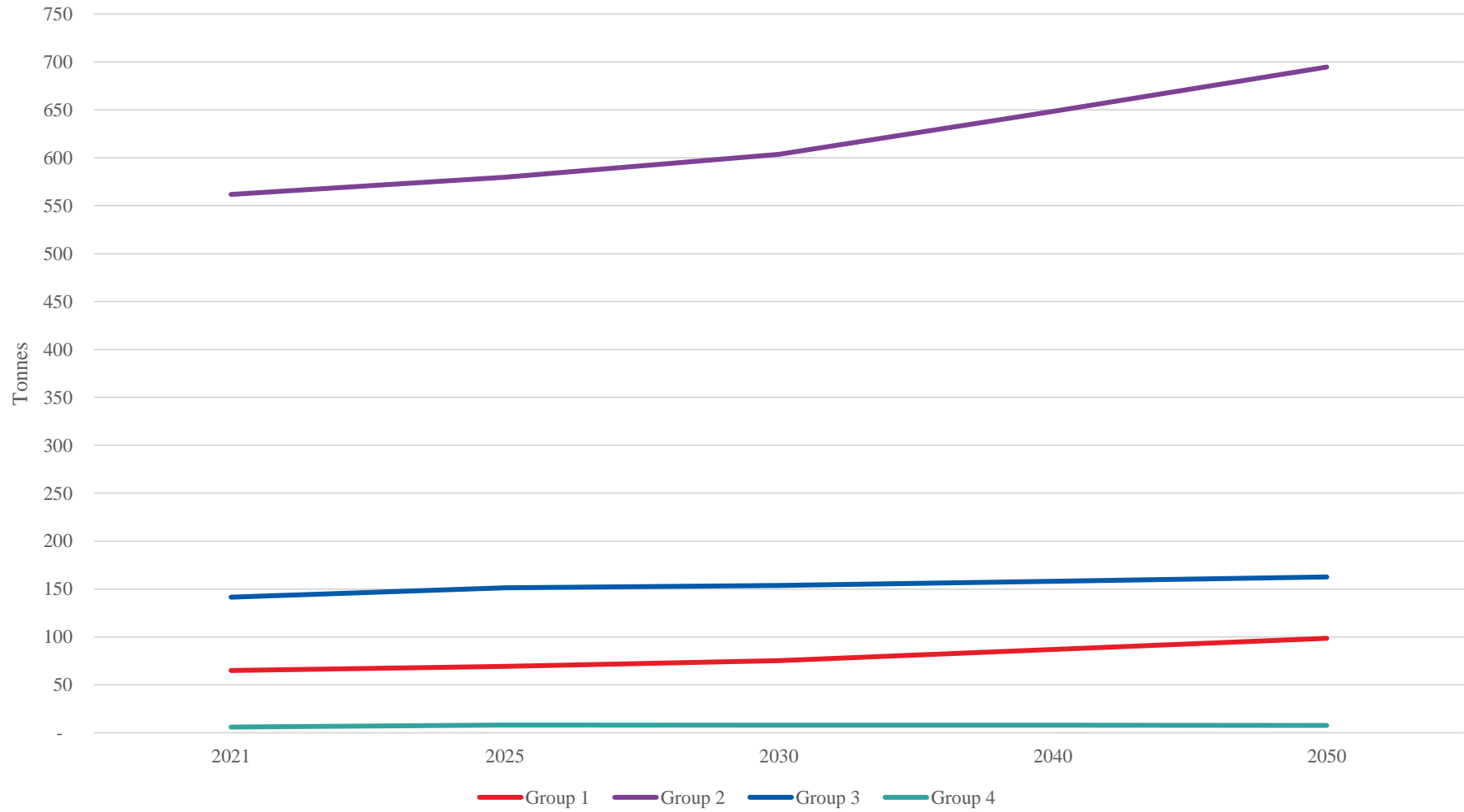
The tonnes of recovered green waste, tyres, and concrete are shown in the below graphs for each Group, these values include tonnes already recovered and additional tonnages as a result of the action.

The results portrayed in the below graphs are independent of implementation of Actions 1, and 3 to 5.

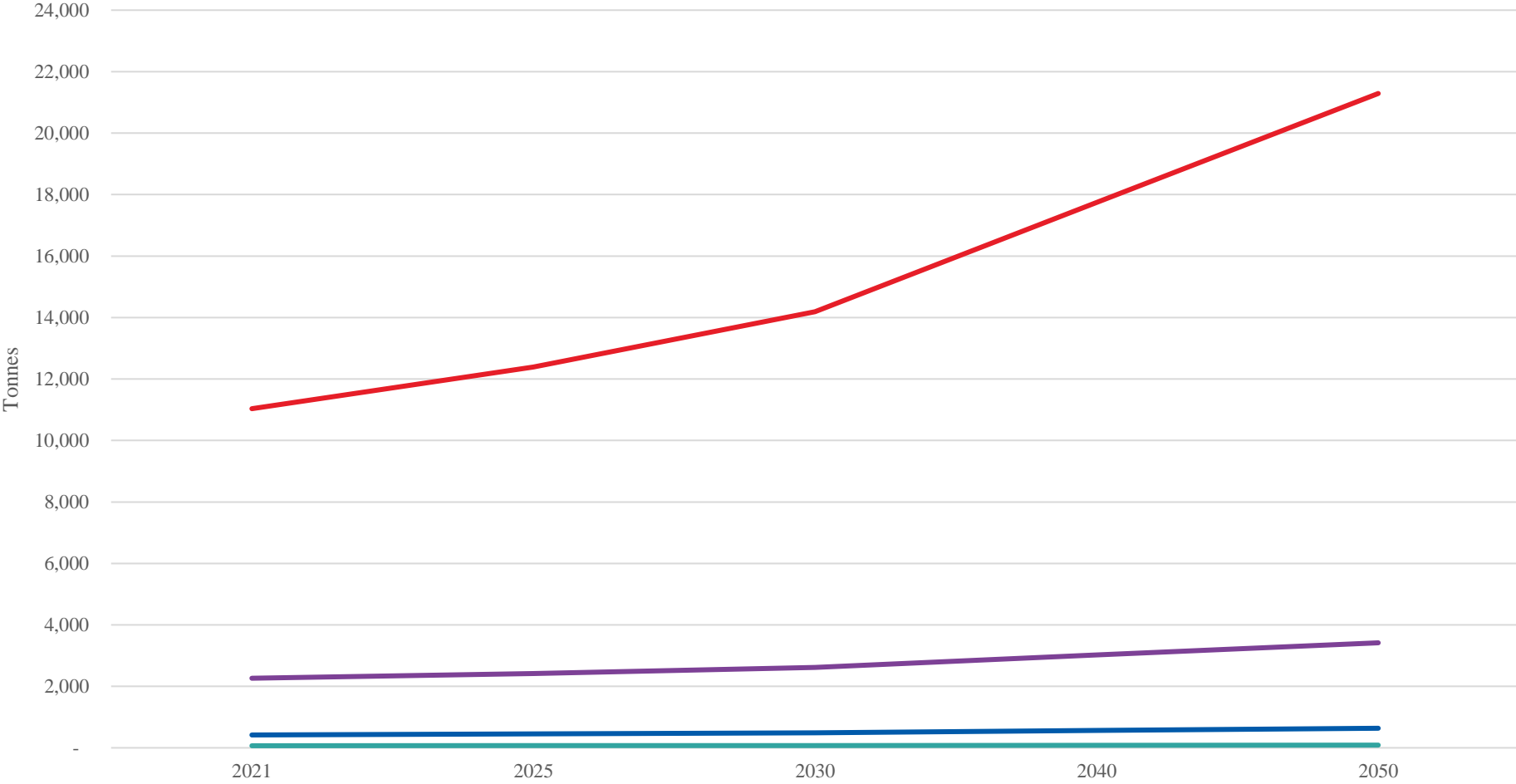
Tonnes of Green Waste recovered as part of Action 2



Tonnes of Tyres recovered as part of Action 2



Tonnes of Concrete recovered as part of Action 2



Group 1 Group 2 Group 3 Group 4

### Action 3 Model results

Action 3 considers the development and implementation of new transfer stations and resource recovery infrastructure that addresses the immediate concerns of a select number of councils. The construction of new facilities, or the upgrade of existing facilities, offers an opportunity to implement site layouts, configuration and resources that aid increased resource recovery. In particular, it is expected that new facilities would not only expand on types of materials recovered but enable the improved recovery from self haul residual streams (of either MSW, C&I or C&D origin).

Councils included in Action	Action commencement
Cairns Regional Council	2025
Cook Shire Council	2025
Croydon Shire Council	2026
Etheridge Shire Council	2024, 2026, 2027 x 2
Hope Vale Aboriginal Shire Council	2024
Wujal Wujal Aboriginal Shire Council	2024
Yarrabah Aboriginal Shire Council	2024

The key assumptions which inform the modelling of Action 3 are as follows:

- A council can achieve a blanket 25% recovery of targeted materials from self haul residual streams by modifying the layout of their transfer station, supplying extra bins or stockpile areas for additional materials, but whose site is not permanently staffed
- A council can achieve a blanket 50% recovery of targeted materials from self haul residual streams by completing the above, but also by introducing a dedicated resource recovery wall/shed followed by a residual waste drop off area, and providing a permanent gatehouse operator/staff member to manage sorting of waste
- A council can achieve a blanket 75% recovery of targeted materials from self haul residual streams by completing the above, but also by providing an operator who can use an excavator to remove any other recoverable materials from residual waste that has been dropped off, permanent gatehouse operators, and staff situated at drop off areas to provide guidance and enforce compliance
- Sites are sized so as to be able to accommodate future growth and changes to resource recovery needs
- Staffing requirements will remain constant
- New mobile processing equipment is purchased alongside new facilities as required
- Tonnes of self haul residual waste streams increase at BAU waste generation rates over time
- On the basis of audit data provided by Cairns Regional Council, the following table outlines materials present within MSW, C&I and C&D self haul residual streams that are deemed recoverable

How the blanket self haul residual waste recovery rates mentioned above have been applied to each council is shown in the below table. It has been assumed that Cairns Regional Council would at the same time as introducing a new transfer station to their network of facilities, optimise all existing facilities so they are also configured in a way that allows improved recovery from self haul residual streams.

Council	Transfer Station	Self Haul Recovery Rate Applied
Cairns Regional Council	All transfer stations	75%
Cook Shire Council	Cooktown Transfer Station	50%
Croydon Shire Council	Croydon Landfill	25%
Etheridge Shire Council	Mt Sullivan Landfill Mt Surprise Landfill Forsayth Landfill Einasleyh Landfill	25%
Hope Vale Aboriginal Shire Council	Hope Vale Landfill	25%
Wujal Wujal Aboriginal Shire Council	Wujal Wujal Landfill / Resource Recovery Area	25%
Yarrabah Aboriginal Shire Council	Yarrabah Transfer Station	25%

The materials to which this recovery has been applied are outlined below:

Waste stream	Residual materials targeted for improved recovery	Future materials predicted to be recovered through Product Stewardship Schemes
<b>MSW</b>	Concrete Glass Green waste Paper and cardboard Plastics (recyclable) Scrap metal Timber (not treated or furniture)	E-waste Hazardous materials Household batteries
<b>C&amp;I</b>	Ferrous metals Food organics Green waste Glass Non-ferrous metals Paper and cardboard Plastics (rigid recyclable) Timber (not treated)	Textiles Plastics (soft and other)
<b>C&amp;D</b>	Ferrous metals Glass Green waste Masonry Non-ferrous metals Paper and cardboard	Textiles Plastics (soft and other)

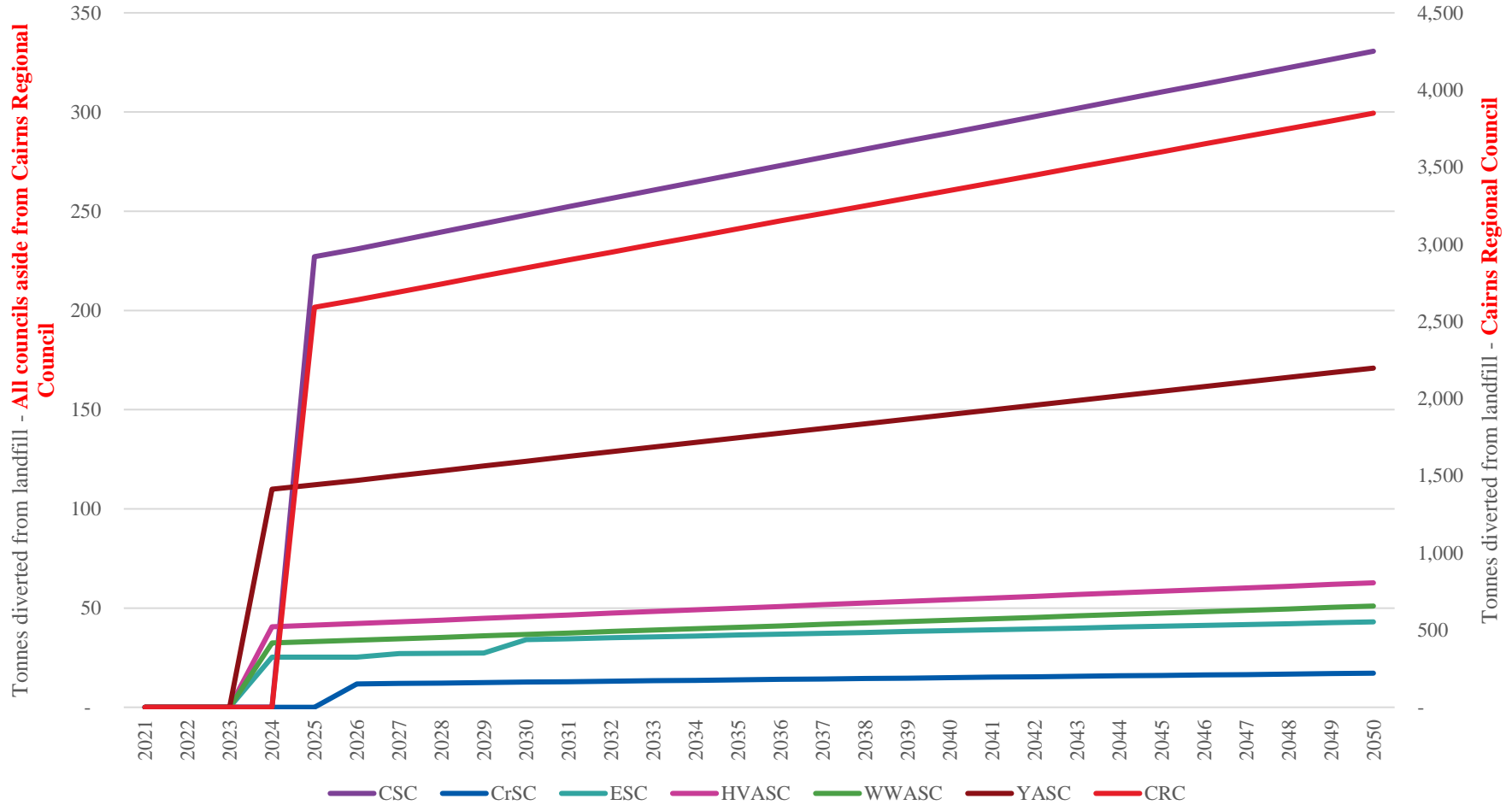
	Plastics (rigid recyclable)	
	Soils	
	Timber (not treated)	

The figure below demonstrates the tonnes of resources diverted from landfill due to the implementation of Action 3. Please note that for visual clarity, the tonnes recovered by Cairns Regional Council have been plotted on a second y-axis.

The results portrayed below are independent of Actions 1 to 2, and 4 to 5.



### Tonnes diverted from landfill due to recovery from MSW, C&I and C&D self haul residual streams as part of Action 3



## Action 4 Model results

Action 4 involves the rollout of kerbside commingled recycling services to households within a select number of councils in the region. This action represents a preliminary step towards diverting tonnes of recyclable materials from landfill, and making use of existing capacity within regional waste infrastructure (specifically, the Cairns MRF).

Councils included in Action	Action commencement
Cassowary Coast Regional Council	2024
Cook Shire Council	2030
Mareeba Shire Council	2027

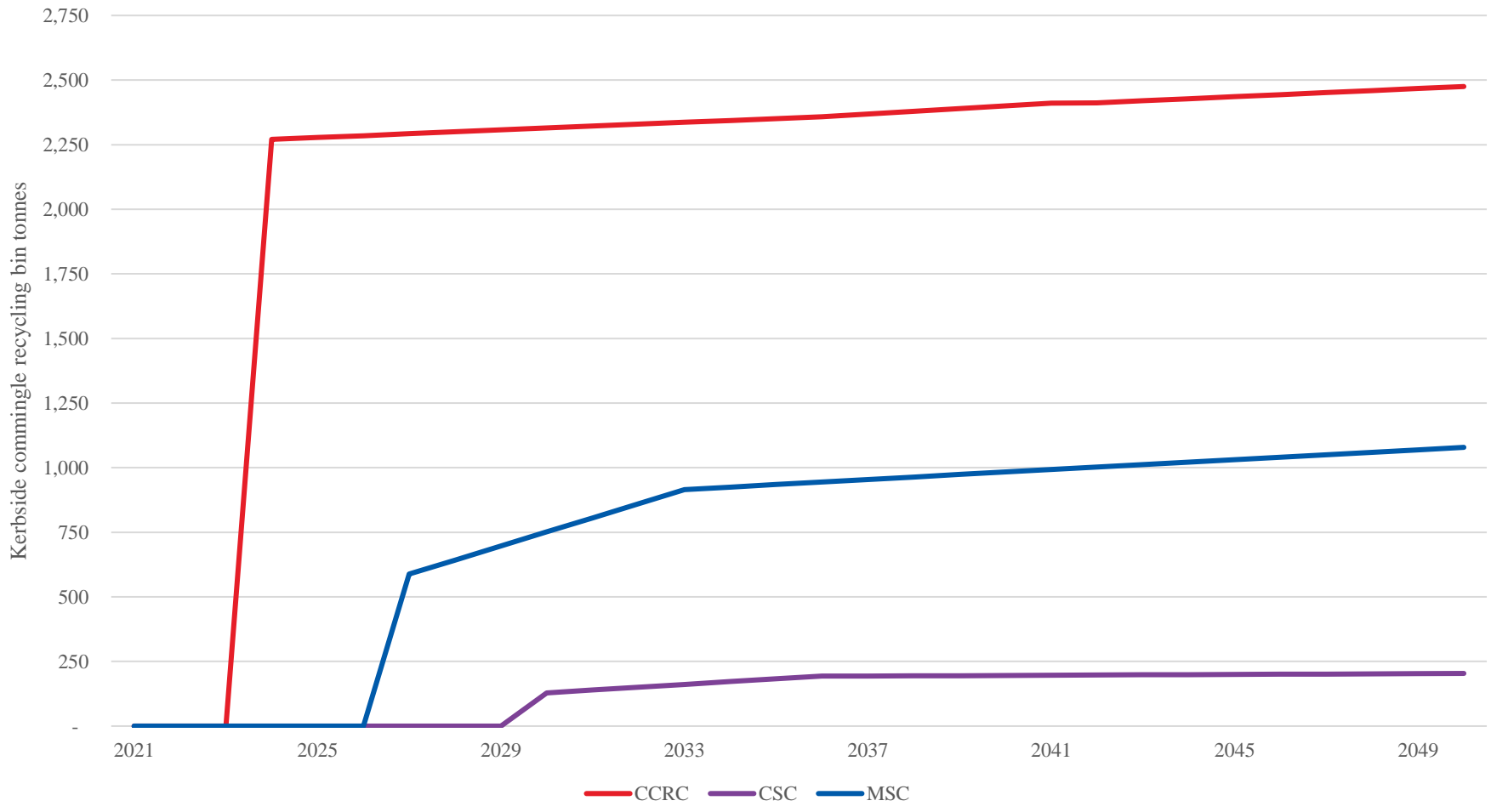
The key assumptions which inform the modelling of Action 4 are as follows:

- No additional waste is generated as a result of introducing a new kerbside commingled recycling service
- No councils undertake their own kerbside collections and instead engage a waste contractor; this means that no council is directly responsible for the procurement of new side lift collection vehicles, or the employment of drivers
- For those councils which introduce a kerbside commingled recycling bin, it is assumed that servicing of said bin will occur every week of the year – as in, a collection schedule would be developed which splits council areas into two and performs kerbside services on alternating weeks (Week A, Week B)
- The dry waste bin employed by Cassowary Coast Regional Council is assumed to be replaced by a commingled recycling bin in future, and all tonnes of material directed to this waste stream currently will continue to be directed to a commingled recycling service
- A post-2026 scenario is applied for Mareeba Shire Council, so as to assume that no commingled recyclables are recovered from kerbside general waste presented to the Cairns ARRF (‘Bedminster’) for processing. This implies that prior to a new kerbside commingled recycling service, all commingled recyclables generated within Mareeba Shire Council are sent to landfill
- All households which currently have a kerbside general waste bin are to receive a kerbside commingled recycling bin, and the growth in the number of new dwellings which receive a kerbside commingled recycling bin following the initial service rollout can be estimated by applying the trend in the construction of separate houses recorded for each council between 2016 and 2021 to future years
- All loads of commingled recyclables are sent to the Cairns MRF for processing, which achieves an 85% recovery rate, and the composition of the commingled recycling bin (informed by audit data from Cairns Regional Council and Douglas Shire Council) do not change over time
- The bulk transport of commingled recyclables to the Cairns MRF is excluded from the assessment of the OPEX costs considered in the CBA
- The capture rate for commingled recyclables present in the kerbside general waste stream starts at 30% in Year 1, and gradually improves up to 48% by Year 7 of the program
- The contamination rate of the commingled recycling bin starts at 20% from Year 1, and gradually reduces to 14% by Year 7 of the program
- A consistent 2% of the commingled recycling comprises organics
- Tonnes of kerbside waste general waste increase under BAU waste generation rates over time

The tonnes of commingled recyclables captured from the kerbside general waste stream for each council is shown in the figure below. As noted above, as Cassowary Coast Regional Council's dry waste is assumed to be fully replaced by a kerbside commingled recycling bin in future, the aforementioned capture rates are not applicable.

The results portrayed below are independent of Actions 1 to 3, and 5.

Capture of commingled recyclables from kerbside general waste following implementation of Action 4



## Action 5 Model results

Action 5 involves the roll out of kerbside Food Organics, Garden Organics (FOGO) services to Group 1 and 2, in order to maximise the diversion of organic waste from landfill. Also built into this Action is the development of a new organics processing facility (assumed to be within the Cairns LGA), which is capable of processing all kerbside FOGO waste.

Councils included in Action	Action commencement
Cairns Regional Council	2026
Cassowary Coast Regional Council	2028
Douglas Shire Council	2028
Mareeba Shire Council	2028
Tablelands Regional Council	2028

The key assumptions which inform the modelling of Action 5 are as follows:

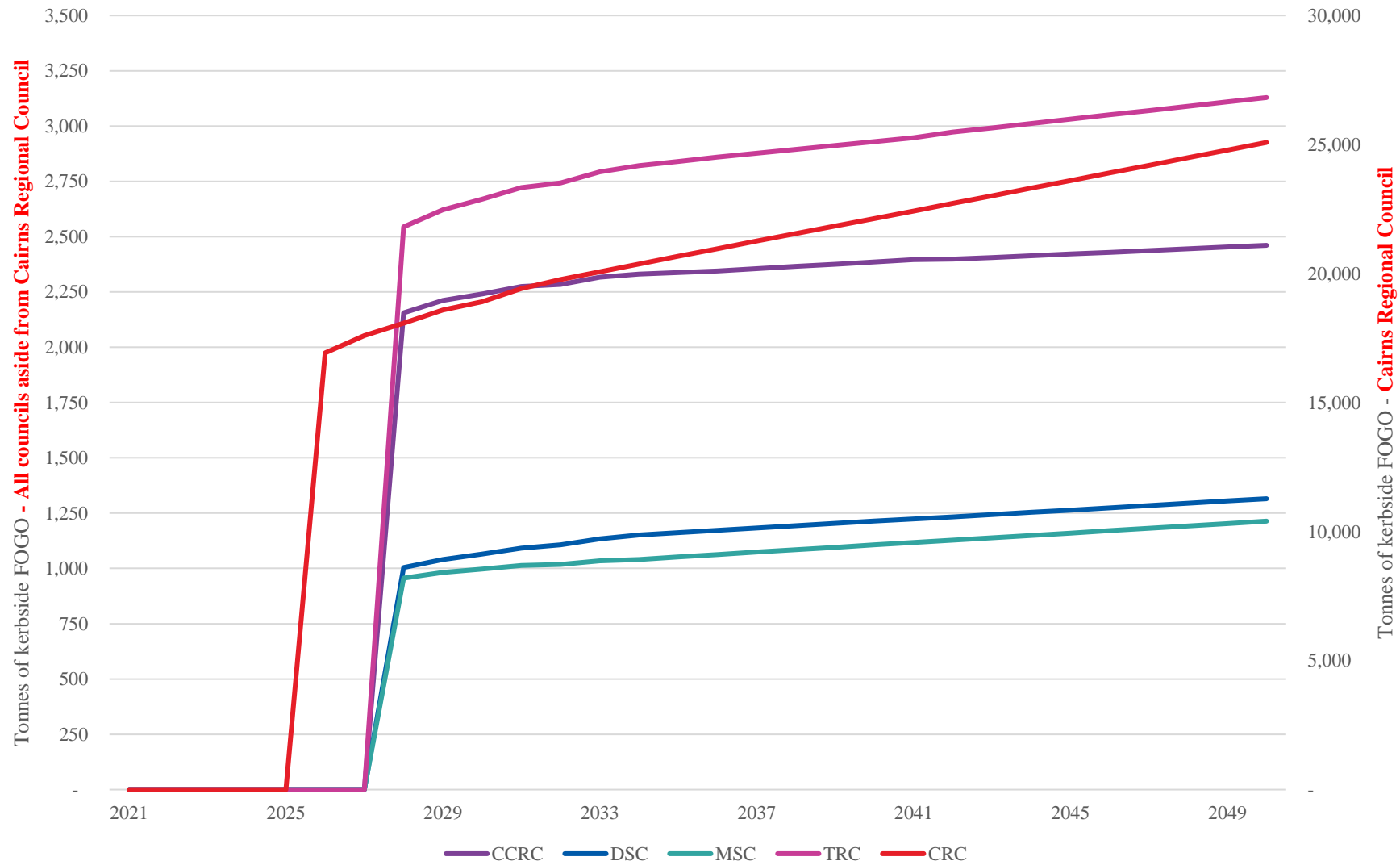
- No additional waste is generated as a result of introducing a new kerbside FOGO service
- No councils undertake their own kerbside collections and instead engage a waste contractor; this means that no council is directly responsible for the procurement of new side lift collection vehicles, or the employment of drivers
- For those councils which introduce a kerbside FOGO bin, it is assumed that servicing of the FOGO bin will occur every week of the year. This means that kerbside general waste and commingled recycling bins will only be serviced every (alternating) fortnight. This service frequency is reflective of best practice in terms of achieving the diversion of organic waste from kerbside general waste streams and minimising FOGO contamination but recognises that this may need to be weighed against local requirements
- All households which currently have a kerbside general waste and co-mingled recycling bin are to receive a kerbside FOGO bin, and the growth in the number of new dwellings which receive a kerbside FOGO bin following the initial service rollout can be estimated by applying the trend in the construction of separate houses recorded for each council between 2016 and 2021 to future years
- The bulk transport of FOGO to the proposed organics processing facility is excluded from the assessment of the OPEX costs considered in the CBA
- Self haul green waste received at council's transfer stations continues to be shredded and provided to the community as mulch. No portion of the self haul green waste volumes has been included in estimations of the organics processing facility capacity
- No consideration of C&I feedstock sources
- Cassowary Coast Regional Council's wet waste stream is assumed to be in future be replaced by a kerbside general waste service, and it is from this waste stream that organic captures rates have been applied
- The proposed organics processing facility is a fully enclosed, best practice in-vessel tunnel composting facility, that uses a 62 day residence time (14 days of pasteurisation, 28 days of active maturation, and 20 days of static stabilisation and storage) which results in a fully stabilised, mature compost product as per AS 4454-2012
- The proposed organics facility is financed, owned and operated by Cairns Regional Council

- Based upon a single set of audit data from Cairns Regional Council, a high-level estimation of the tonnes of organics that could be available in future for processing by the proposed facility has been made, to which an estimated 60/40 split has been applied to account for seasonal variation in green waste generation throughout the year (reflecting wet and dry seasons, respectively). The volumes are therefore approximate only based on limited data
- 40% of the feedstock presented to the organics processing facility is converted into a compost product following water and mass losses during the composting process
- A capture rate for FO of 27% is achieved in Year 1 of the rollout, and this gradually improves to a rate of 39% by Year 7 of the program
- A capture rate for GO of 85% is achieved in Year 1 of the rollout, and this gradually improves to a rate of 92% by Year 7 of the program
- Contamination rates of the FOGO bin start at 10% in Year 1, and gradually improve to 2% by Year 7 of the program
- The proportion of FO and GO present in existing kerbside general waste bins has been informed by audit data provided by Cairns Regional Council, Douglas Shire Council, and Mareeba Shire Council. Where a council had no audit data, bin compositions have been assumed to be equivalent to one of the provided audit data sets (depending upon both location and whether a council employs a one- or two-bin system currently)
- Tonnes of kerbside general waste increase under BAU waste generation rates over time

The capture of FOGO from kerbside general waste, and therefore the diversion of this organic waste from landfill (particularly post-2026, by which it is assumed the Bedminster facility will have closed and all kerbside general waste would otherwise be sent to landfill), is shown in the figure below. Please note that for visual clarity, the tonnes recovered by Cairns Regional Council have been plotted on a second y-axis.

The results portrayed below are independent of Actions 1 to 4.

Capture of organics from kerbside general waste following implementation of Action 5



## Actions 6 and 7

Actions 6 and 7 are not included within the waste flow model.

## Action 8 Model results

Action 8 evaluates the potential feedstock that would be available from the region for treatment at a future Energy from Waste (EfW) facility, accessible by the FNQROC region. The anticipated tonnes of residual waste potentially available for processing by an EfW facility noted below are independent of the above actions, in that the waste streams described below have not been subject to any prior recovery mechanisms. In support of the waste hierarchy, and as a requirement of having the social licence to operate, or send waste to an EfW facility, it is highlighted here that all practicable efforts should be first made to recover reusable, repairable, and recyclable materials from residual waste streams.

Councils included in Action	Action commencement
Cairns Regional Council	2035
Cassowary Coast Regional Council	2035
Douglas Shire Council	2035
Mareeba Shire Council	2035
Tablelands Regional Council	2035

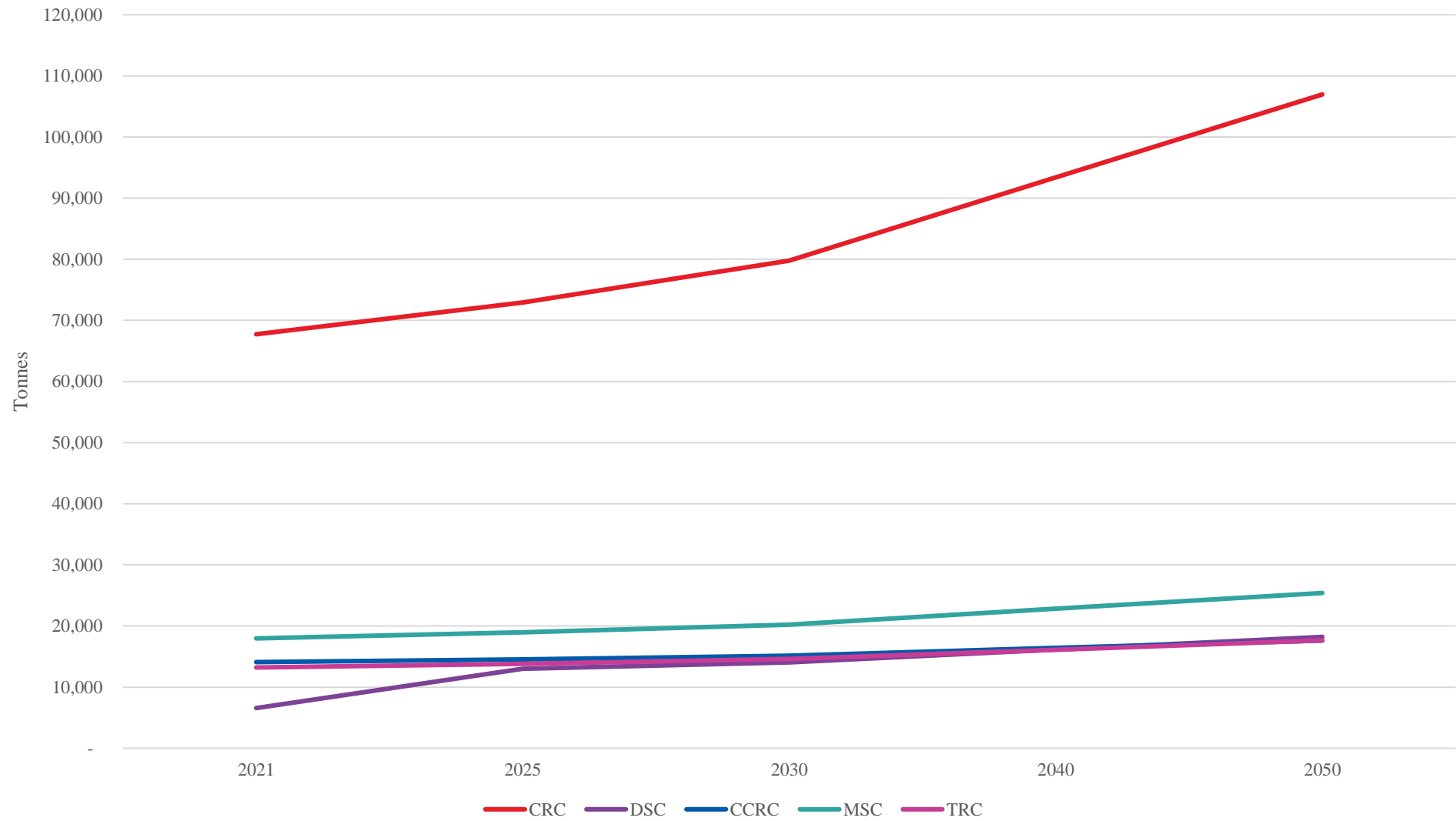
The key assumptions which inform the modelling of Action 8 are as follows:

- In the context of the waste flow model, four waste residual waste streams would be available for processing at an EfW facility, are:
  - MSW kerbside general waste
  - MSW self haul residual waste
  - C&I self haul residual waste
  - C&D self haul residual waste
- A theoretical EfW facility would convert 80% of all feedstock it receives into energy, and the remaining 20% of the feedstock would be converted into ash (e.g., incinerator bottom ash and flue gas treatment residuals)
- No recovery of the incinerator bottom ash is undertaken
- Tonnes of kerbside and self haul residual waste increase at BAU waste generation rates

The results portrayed below are independent of Actions 1 to 7.



Potential tonnes of feedstock available for Energy from Waste



## Cumulative effect of all Actions considered by the CBA

When taking into account all Actions considered under the CBA it is possible to estimate what cumulative effect upon a council's MSW recovery rate may be. The summed effect of Actions 2 to 5 has been considered for the MSW waste stream below.

### Municipal Solid Waste

The individual effect the CBA elements of Actions 2 to 5 are predicted to have upon MSW recovery rates for each council is shown in the below table. The recovery rates associated with each Action are the final MSW recovery rate achieved by 2050.

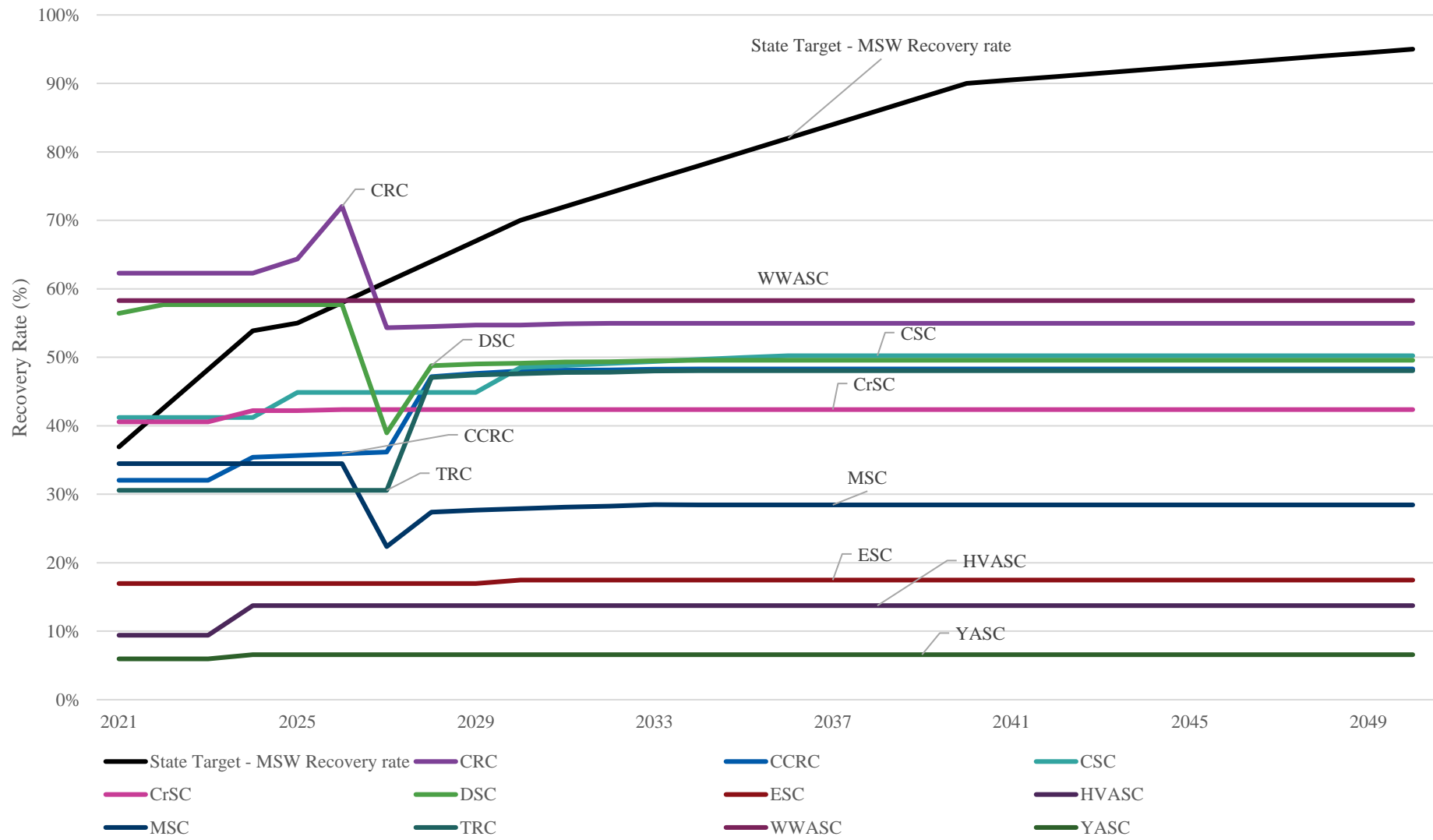
Council	BAU Recovery Rates		Recovery achieved through Actions				
	2021	2050	Action 2	Action 3	Action 4	Action 5	Total
<b>CRC</b>	62%	36%	0%	2%	0%	17%	<b>55%</b>
<b>CCRC</b>	32%	32%	0%	0%	4.8%	11.4%	<b>48%</b>
<b>CSC</b>	41%	41%	0%	3.6%	5.4%	0%	<b>50%</b>
<b>CrSC</b>	41%	41%	1.6%	0.2%	0%	0%	<b>42%</b>
<b>DSC</b>	56%	38%	0%	0%	0%	10.6%	<b>48%</b>
<b>ESC</b>	17%	17%	0%	0.5%	0%	0%	<b>17.5%</b>
<b>HVASC</b>	9%	9%	1.4%	2.9%	0%	0%	<b>14%</b>
<b>MSC</b>	34%	20%	0%	0%	3.7%	4.9%	<b>28%</b>
<b>TRC</b>	31%	31%	0%	0%	0%	17.5%	<b>48%</b>
<b>WWASC</b>	58%	58%	0%	0%	0%	0%	<b>58%</b>
<b>YASC</b>	6%	6%	0%	1%	0%	0%	<b>10%</b>

As a key indicator of performance, it is evident that for most councils through implementation of CBA elements within Actions 2 to 5, the MSW recovery rate achieved by each council by 2050 is as good, if not better, than what is predicted to occur by 2050 under the BAU scenario (i.e., no additional recovery mechanisms are introduced).

The change in MSW recovery rates over time is plotted in the below chart. The steep drop in MSW recovery rate observed for Cairns Regional Council, Douglas Shire Council, and Mareeba Shire Council is attributable to the closure of the Bedminster in 2026.

*Note recovery rates have been determined based on input data provided by councils. Changes to individual council waste tonnages and recovery rates would impact on these results.*

Predicted MSW resource recovery rate with implementation of Actions 2 - 5



### Regional waste recovery performance

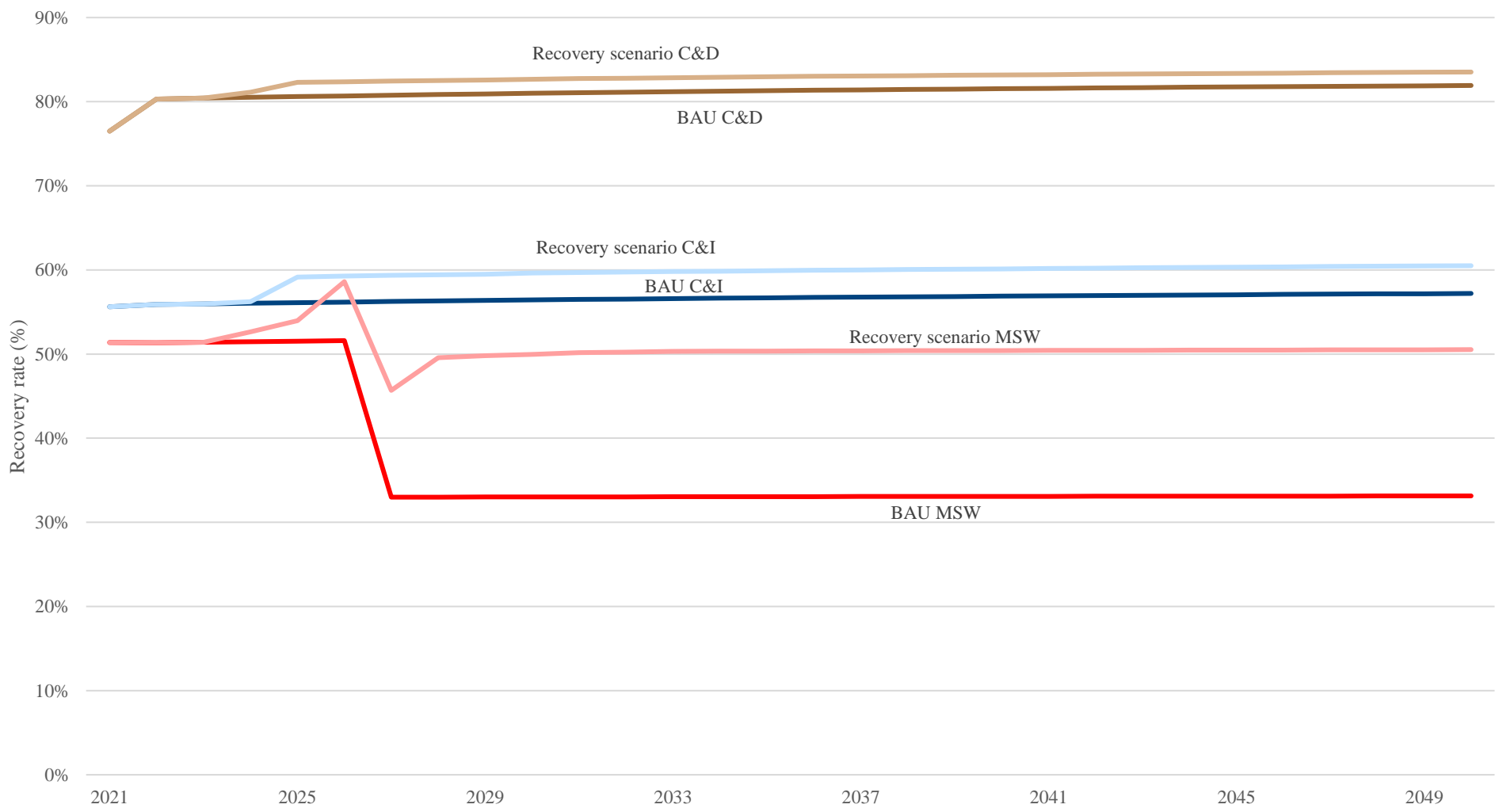
Total recovery rates for Actions 2-5 considered under the CBA have been calculated for the broader FNQROC region. The below table highlights the possible recovery rate achievable for each overall waste stream by 2050.

	MSW	C&I	C&D
<b>BAU Recovery Rate at 2050</b>	33%	57%	82%
<b>Recovery Rate at 2050 following implementation of Actions</b>	51%	61%	84%

The effect of Actions 2 – 5 upon the overall recovery rate of MSW, C&I and C&D generated within the FNQROC region over time is presented in the figure below.

As identified above, as some councils (notably Cairns Regional Council) only manage a relatively small portion of C&I or C&D waste, overall recovery rates for the region for these two streams are not necessarily representative of actual C&I and C&D waste recovery performance.

MSW, C&I and C&D Overall recovery rates for FNQROC region - BAU vs. Actions 2-5

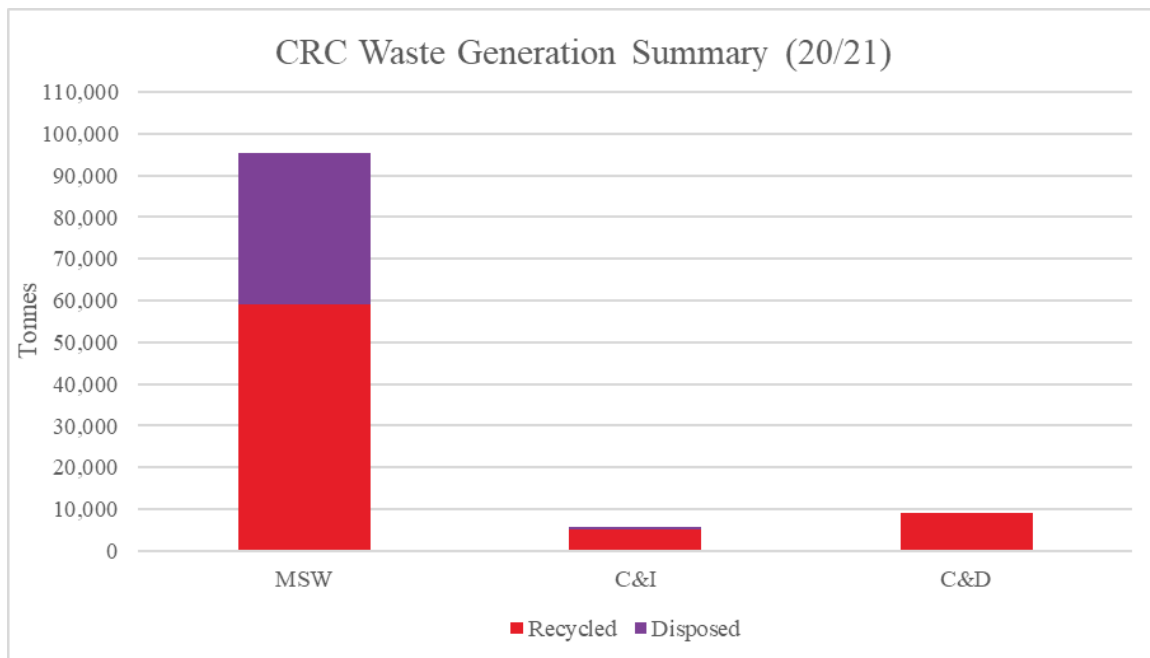


— BAU MSW   
 — BAU C&I   
 — BAU C&D   
 — Recovery scenario MSW   
 — Recovery scenario C&I   
 — Recovery scenario C&D

# Appendix D - Council Waste and Recycling Material Flows

# Cairns Regional Council

# CRC current infrastructure and waste generation summary



Site Name	Type	Licenced capacity (Tonnes per Annum)	Maximum Capacity/Constraints
<b>Advanced Resource Recovery Facility (ARRF)</b>	Processing facility	Not provided	100,000 tpa
<b>Portsmouth Transfer Station</b>	Transfer Station	5000	30,000 tpa
<b>Materials Recovery Facility (including glass recovery facility)</b>	MRF	Not provided	30,000 tpa
<b>Smithfield Transfer Station</b>	Transfer Station	5000	25,000 tpa
<b>Gordonvale Transfer Station</b>	Transfer Station	Not provided	10,000 tpa
<b>Babinda Transfer Station</b>	Transfer Station	Not provided	2,000 tpa
<b>Bramston Beach Waste Disposal Facility</b>	Rural Bin Site	Not provided	300 tpa



# Current

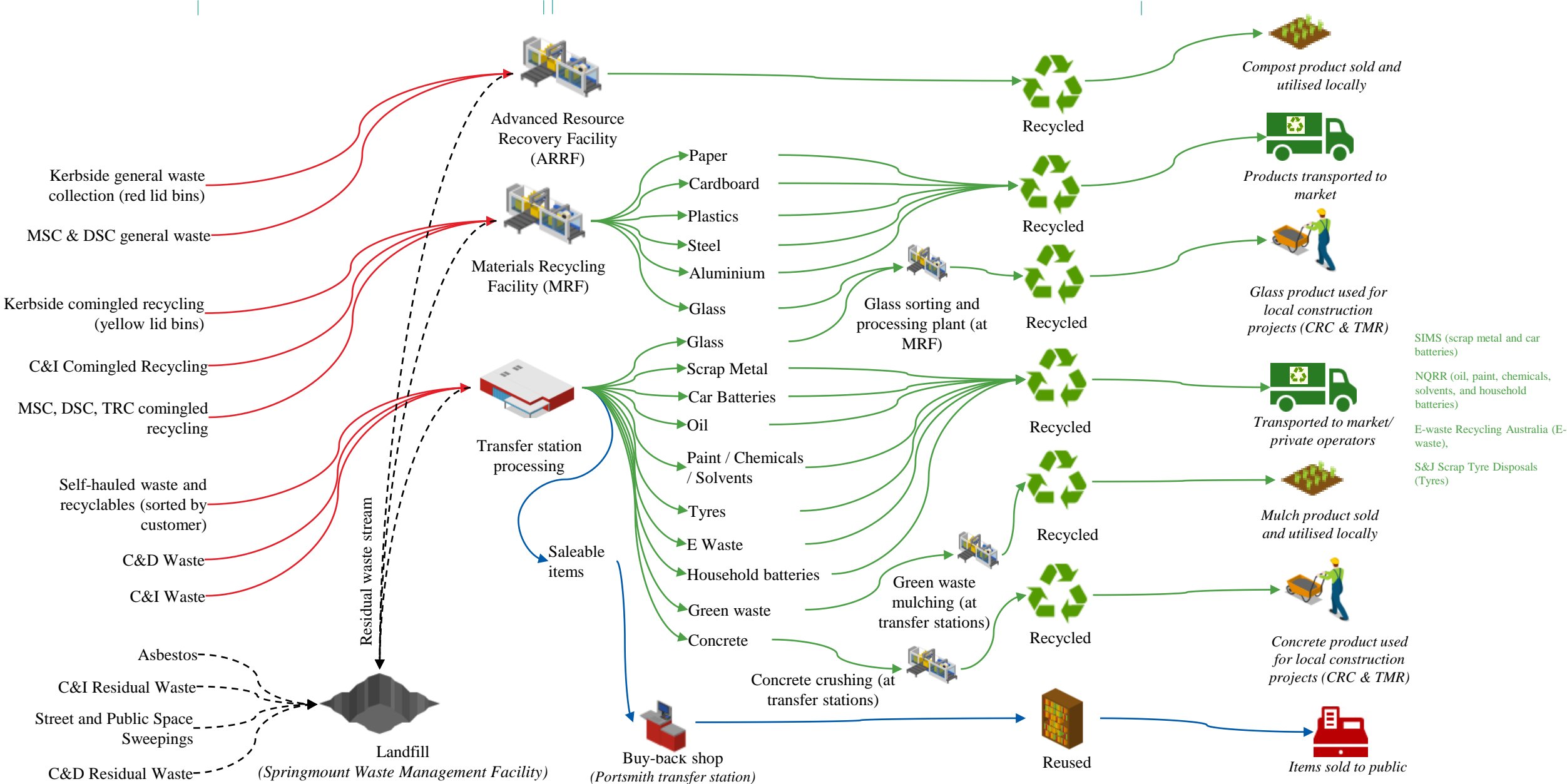


Collected via kerbside pickup (red and yellow bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, CRC works, businesses and public

# ARUP



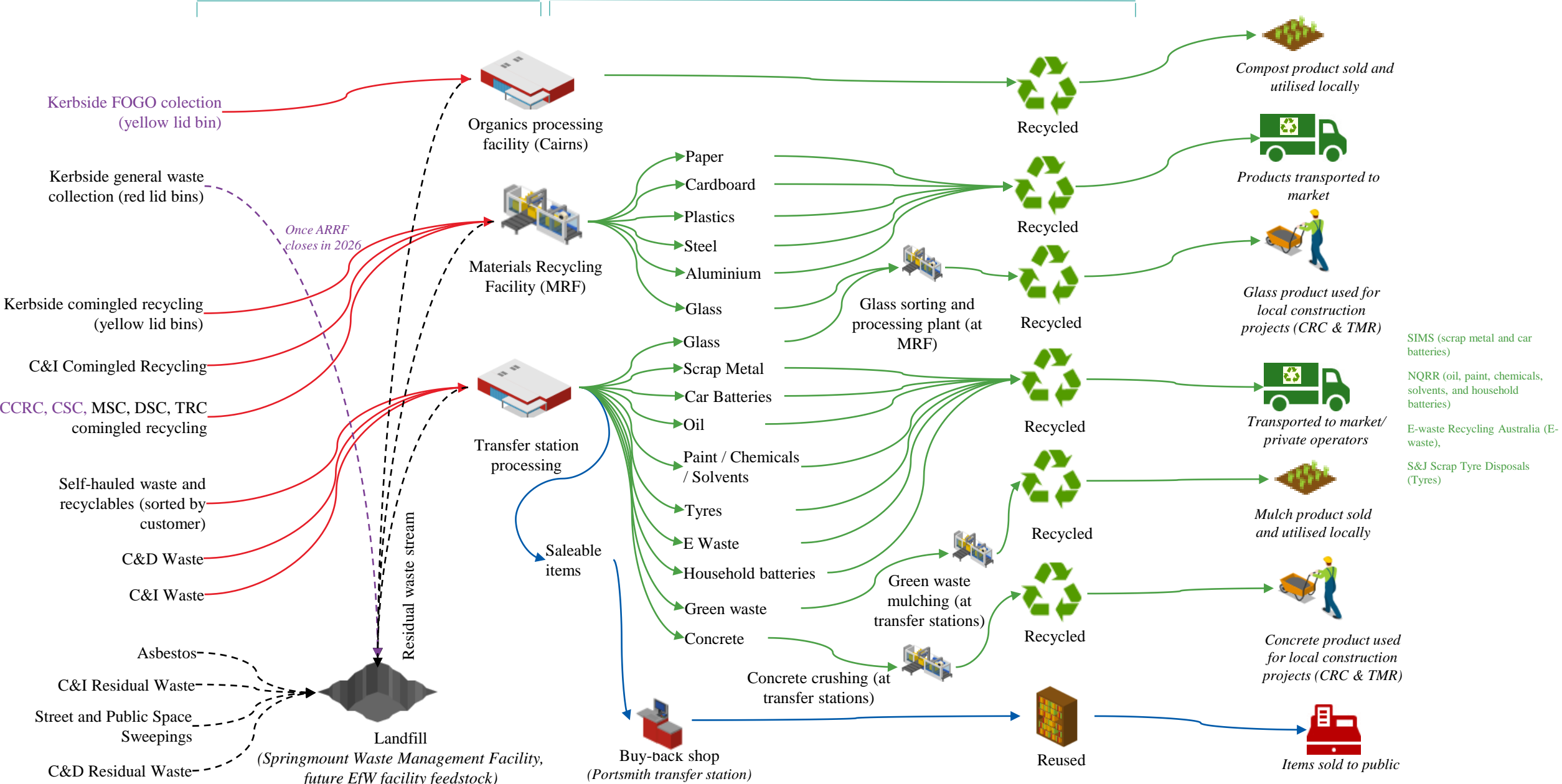
# Proposed



Collected via kerbside pickup (red and yellow bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

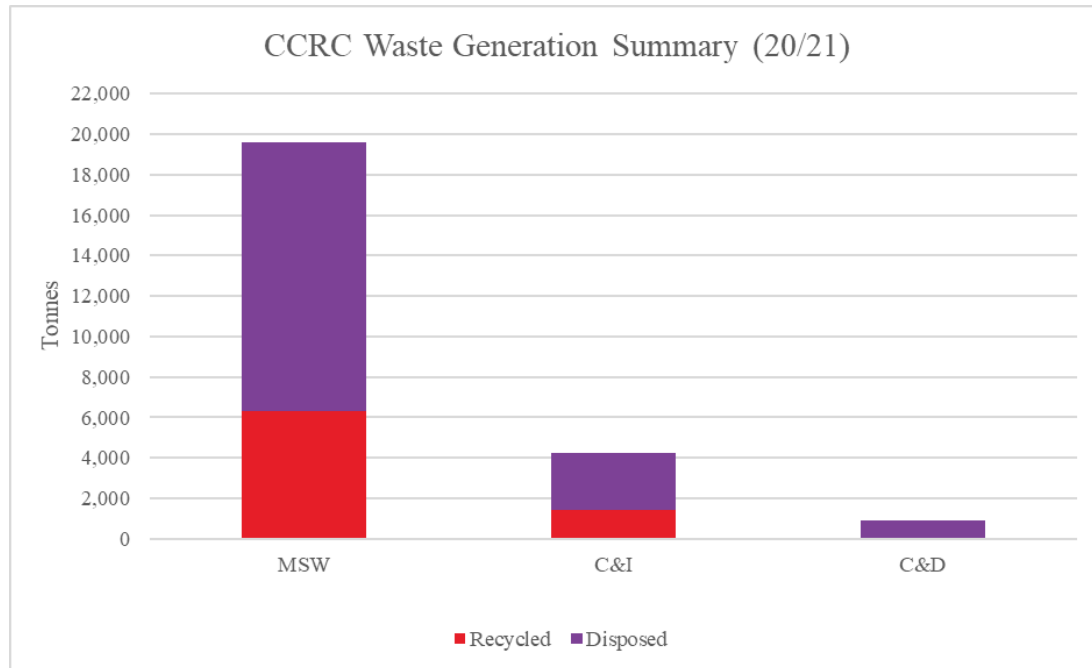


Collection contractors, CRC works, businesses and public



# Cassowary Coast Regional Council

# CCRC current infrastructure and waste generation summary



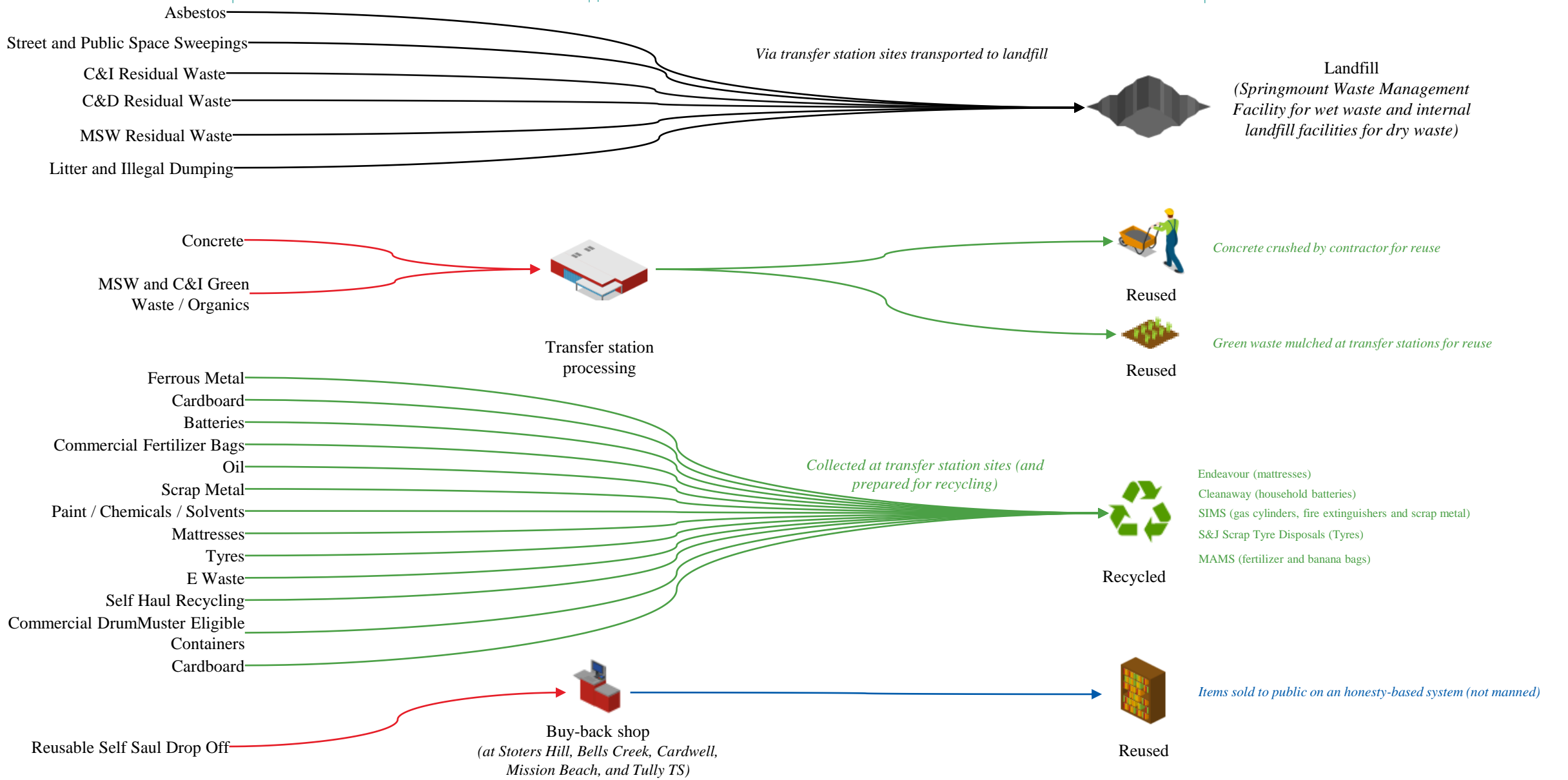
Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum capacity/constraints
<b>Stoters Hill Landfill</b>	Landfill	50,000	50 Years
<b>Stoters Hill Transfer Station</b>	Transfer Station	11,000	Not provided
<b>Tully Landfill</b>	Landfill	20,000	3 Years
<b>Tully Transfer Station</b>	Transfer Station	10,000	Not provided
<b>Mission Beach Transfer Station</b>	Transfer Station	5,000	Not provided (site reaching licenced capacity)
<b>Cardwell Transfer Station</b>	Transfer Station	3,000	Not provided
<b>Murray Upper Transfer Station</b>	Transfer Station	1,000	Not provided
<b>Hull Heads Transfer Station</b>	Transfer Station	1,000	Not provided
<b>Bells Creek Transfer Station</b>	Transfer Station	5,000	Not provided



Collected via Kerbside Pickup (wet and dry bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, CCRC works, businesses and public

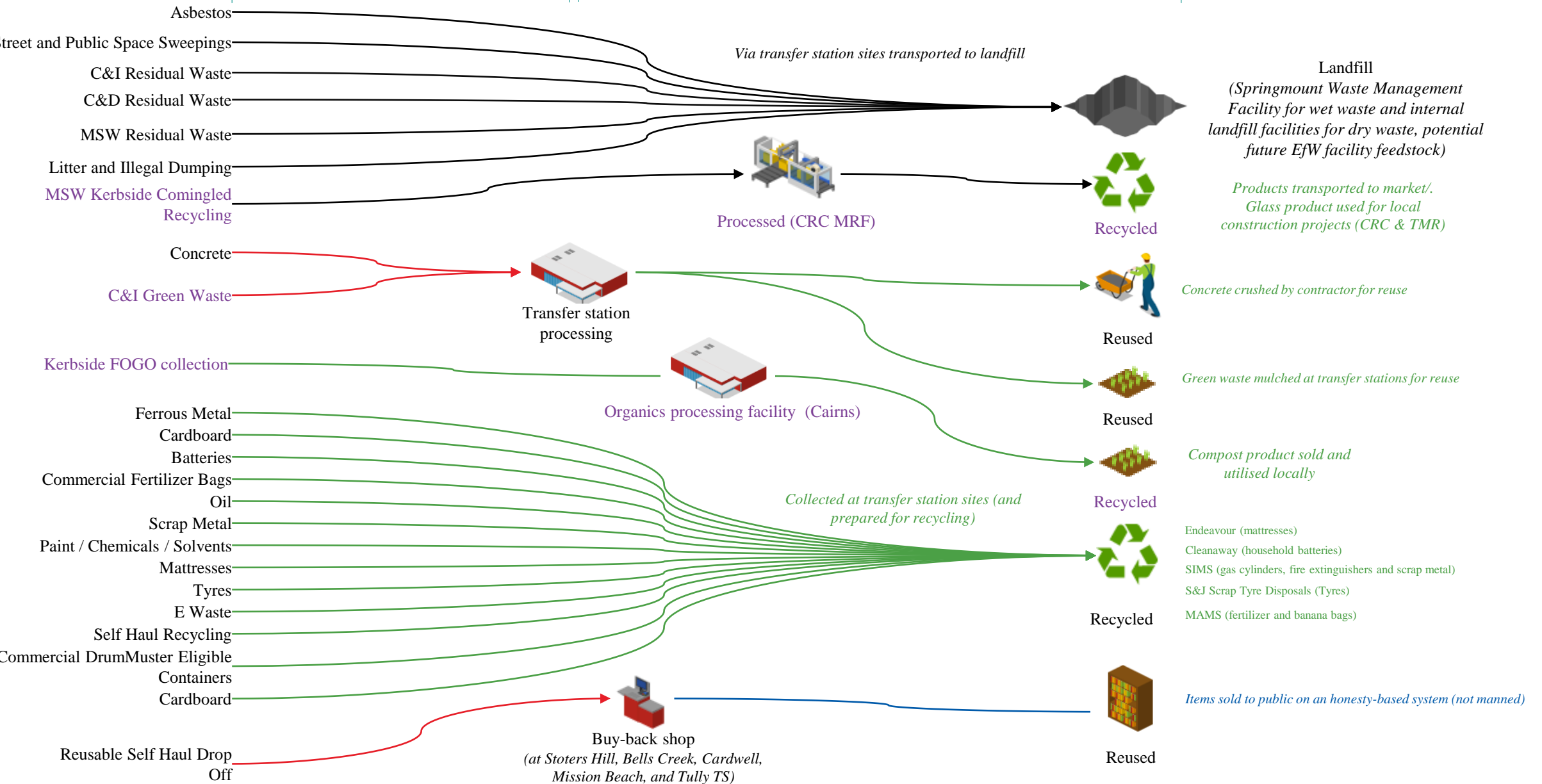


# Proposed



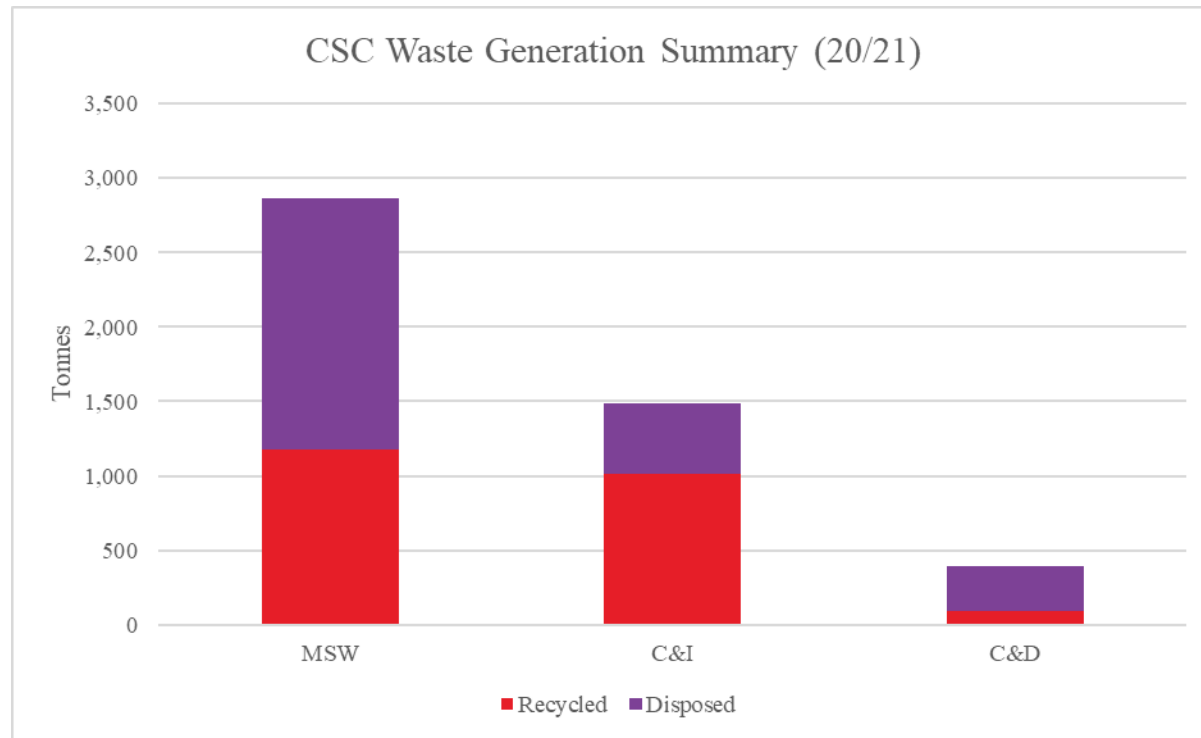
Collected via Kerbside Pickup (wet and dry bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

Collection contractors, CCRC works, businesses and public



# Cook Shire Council

# CSC current infrastructure and waste generation summary



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity/ Constraints
<b>Cooktown Waste Transfer Station</b>	Transfer Station	50,000	3,120 tpa (new site identified for this facility)
<b>Ayton Waste Transfer Station</b>	Transfer Station	50,000	Not provided (spatially constrained)
<b>Lakeland Waste Transfer Station</b>	Transfer Station	2,000	Not provided (no space constraints)
<b>Laura Waste Transfer Station</b>	Transfer Station	2,000	Not provided (no space constraints)
<b>Coen landfill</b>	Landfill	50,000	10-30* Years
<b>Portland Roads Waste Transfer Station</b>	Transfer Station	NA (under licencing threshold)	Not provided
<b>Port Stewart Waste Transfer Facility</b>	Transfer Station	NA (under licencing threshold)	Not provided
<b>Archer River Waste Facility</b>	Transfer Station	NA (under licencing threshold)	Not provided
<b>Marina Plains Waste Facility</b>	Bin Station	NA (under licencing threshold)	Not provided
<b>Moreton Telegraph Waste Facility</b>	Transfer Station	NA (under licencing threshold)	Not provided
<b>Rossville Recyclables Drop Off Point</b>	Bin Station	NA (under licencing threshold)	Not provided
<b>Starcke Boat Ramp Waste Facility</b>	Bin Station	NA (under licencing threshold)	Not provided



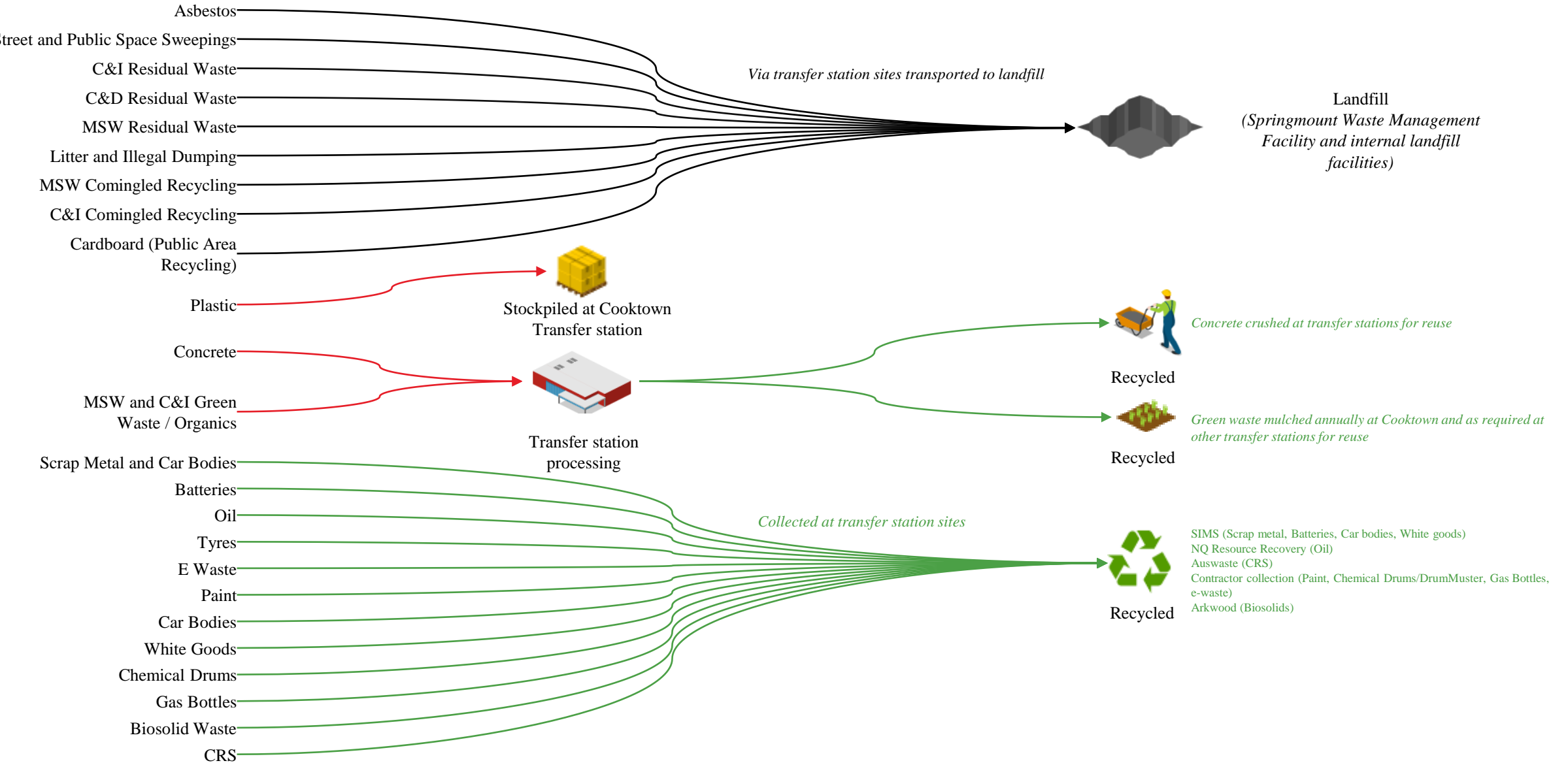
# Current



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, CSC works, businesses and public

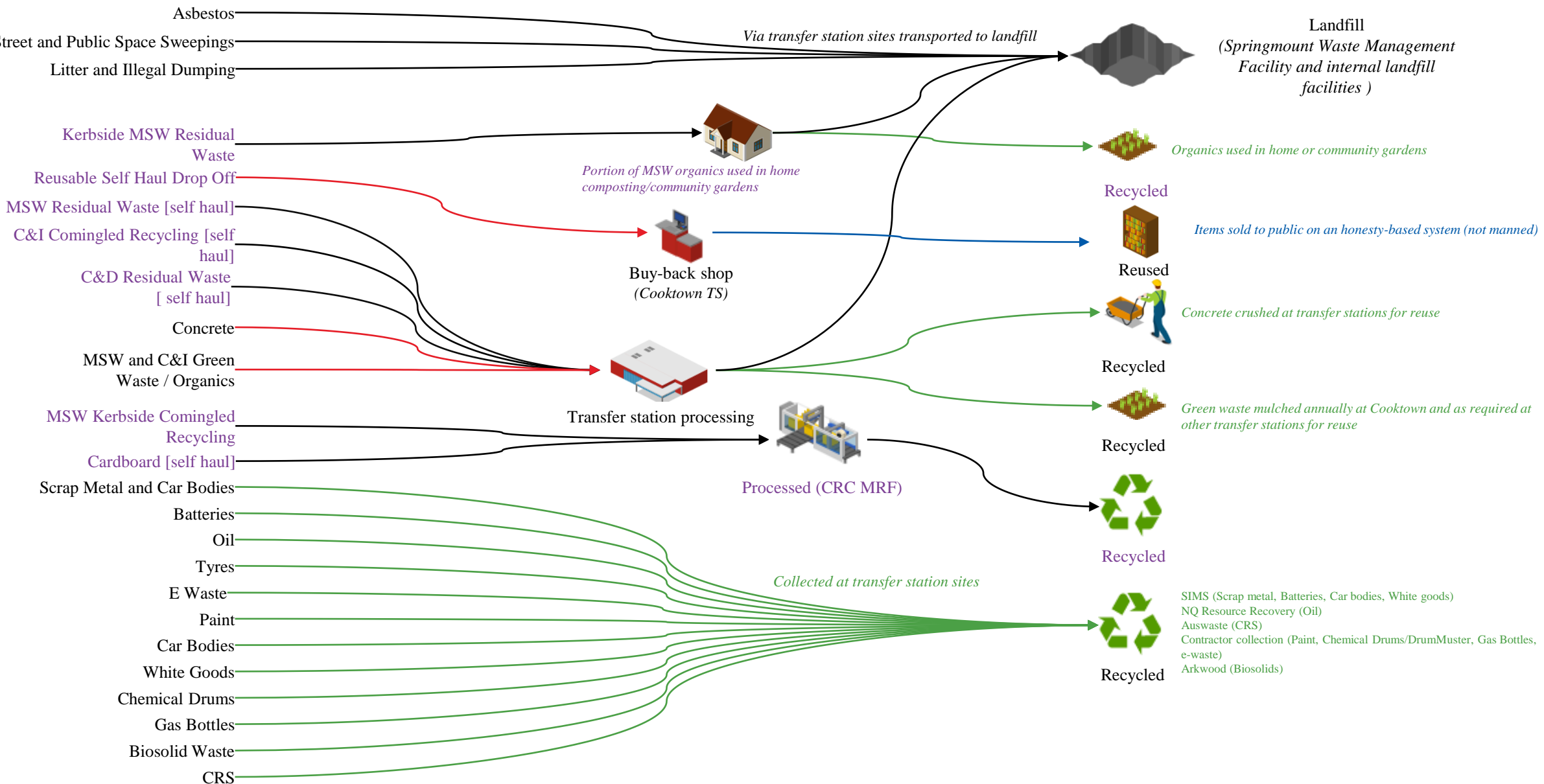


# Proposed



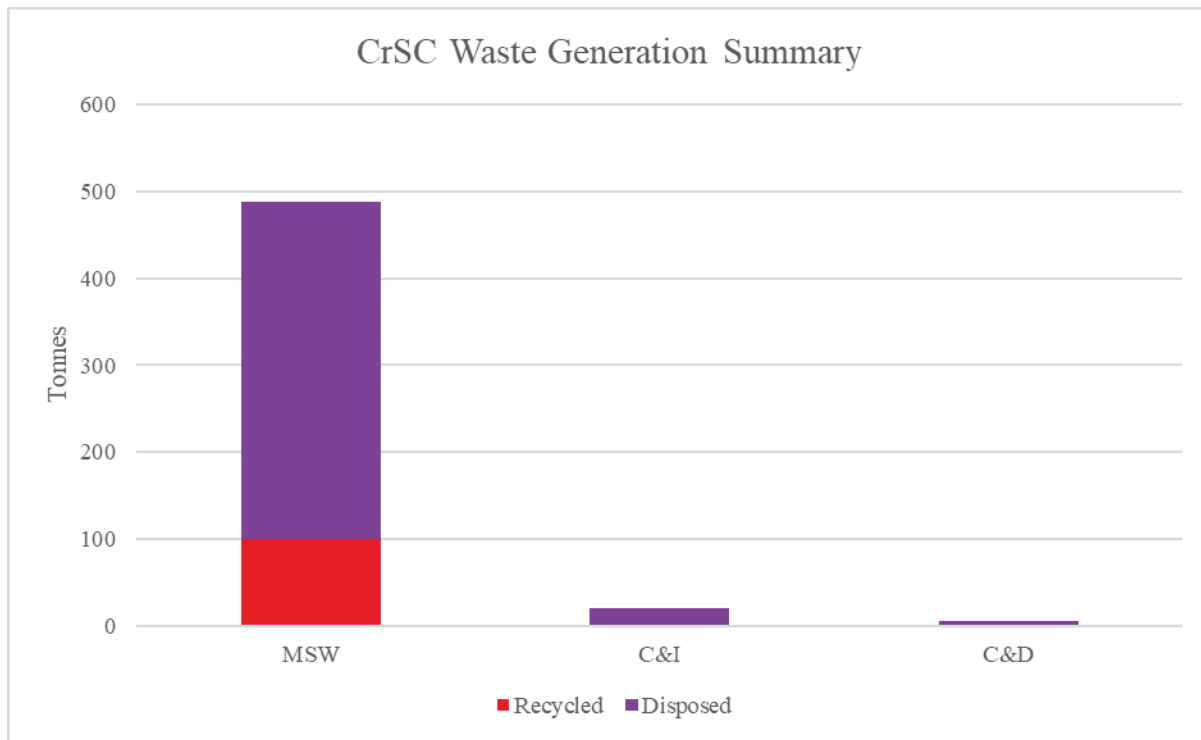
Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

Collection contractors, CSC works, businesses and public



# Croydon Shire Council

# CrSC current infrastructure and waste generation summary



Site Name	Type	Licenced Capacity (Tonnes per Annum)	Maximum Capacity
<b>Croydon Landfill</b>	Landfill	Not provided	40 Years

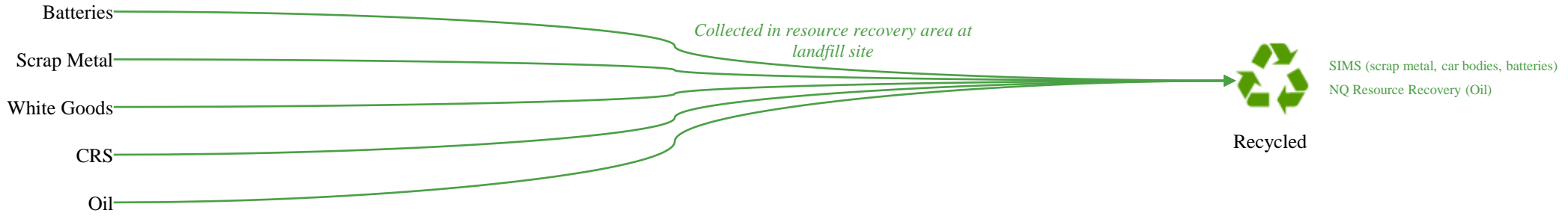
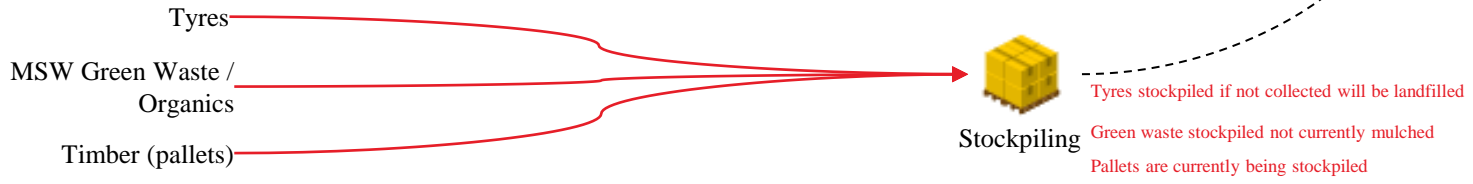
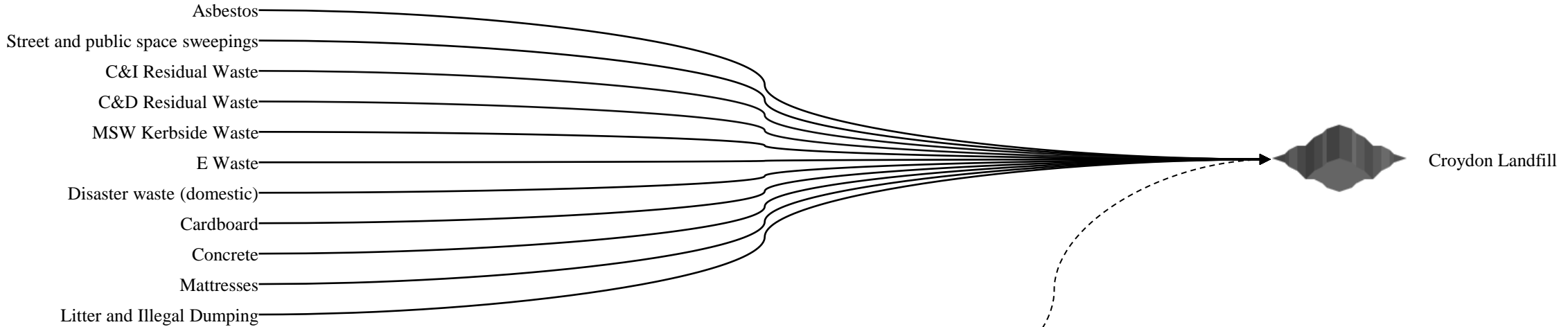
# Current



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Collection contractors

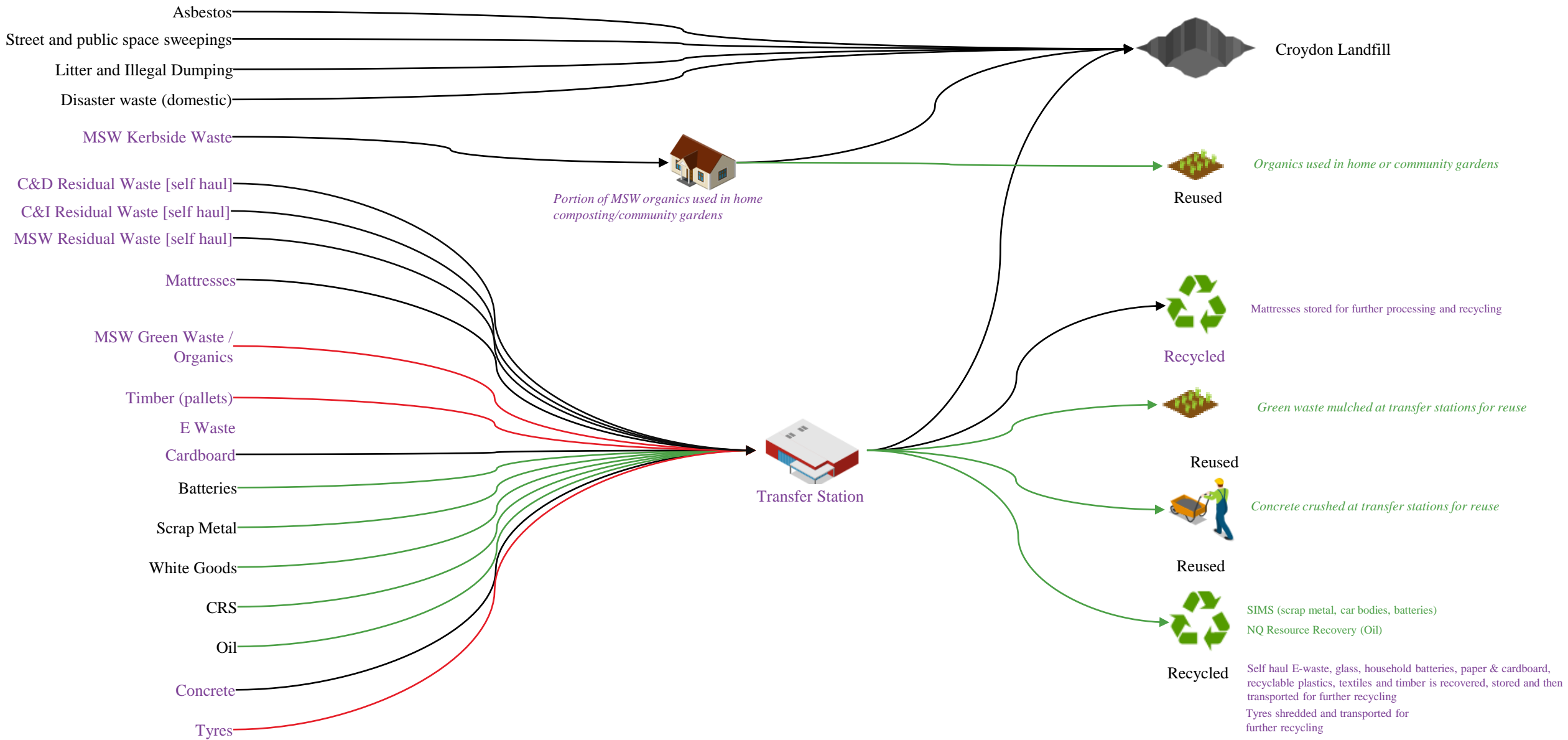


# Proposed



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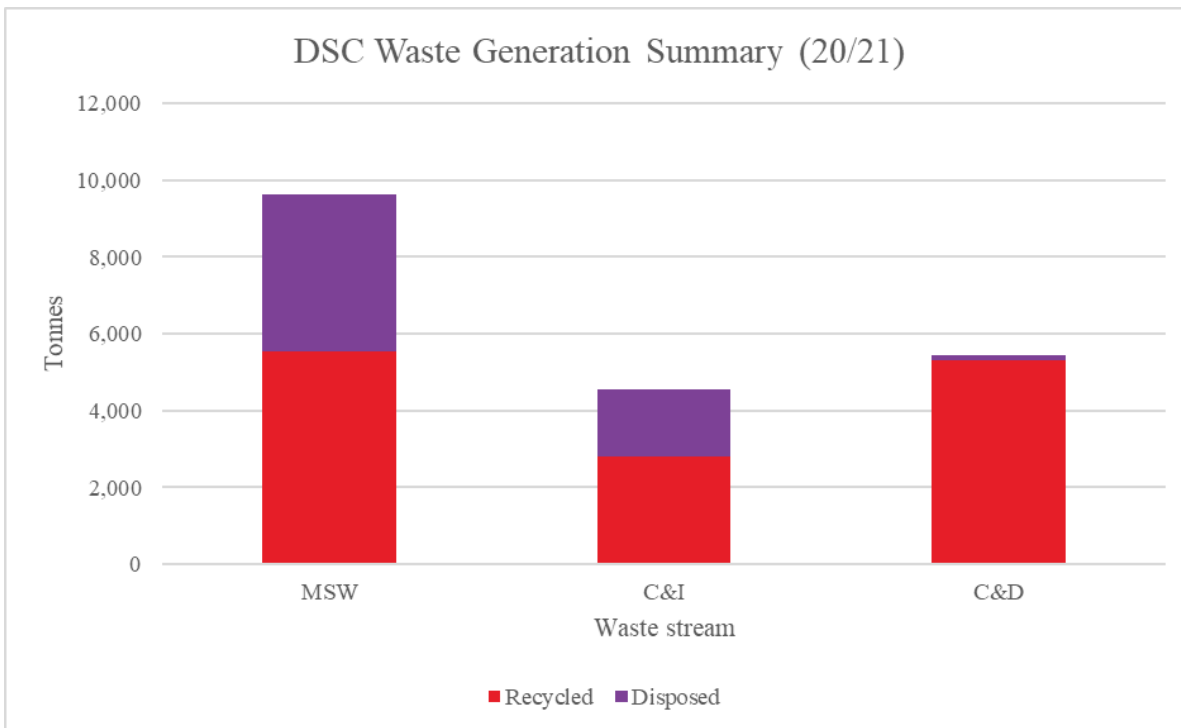
Collection contractors



Douglas Shire Council

ARUP

# DSC current infrastructure and waste generation summary



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity
<b>Killaloe Landfill</b>	Landfill	< 20,000	0.5 years (closed, accepting discrete waste streams)
<b>Killaloe Transfer Station</b>	Transfer Station	NA (under licencing threshold)	Not provided (site spatially comfortable)
<b>Newell Transfer Station</b>	Transfer Station	NA (under licencing threshold)	Not provided (site only open 8hrs a week, slowly closing)
<b>Cow Bay Transfer Station</b>	Transfer Station	NA (under licencing threshold)	Not provided (site spatially constrained and reaching licence threshold)
<b>Daintree Transfer Station</b>	Transfer Station	NA (under licencing threshold)	Not provided (no capacity issues)

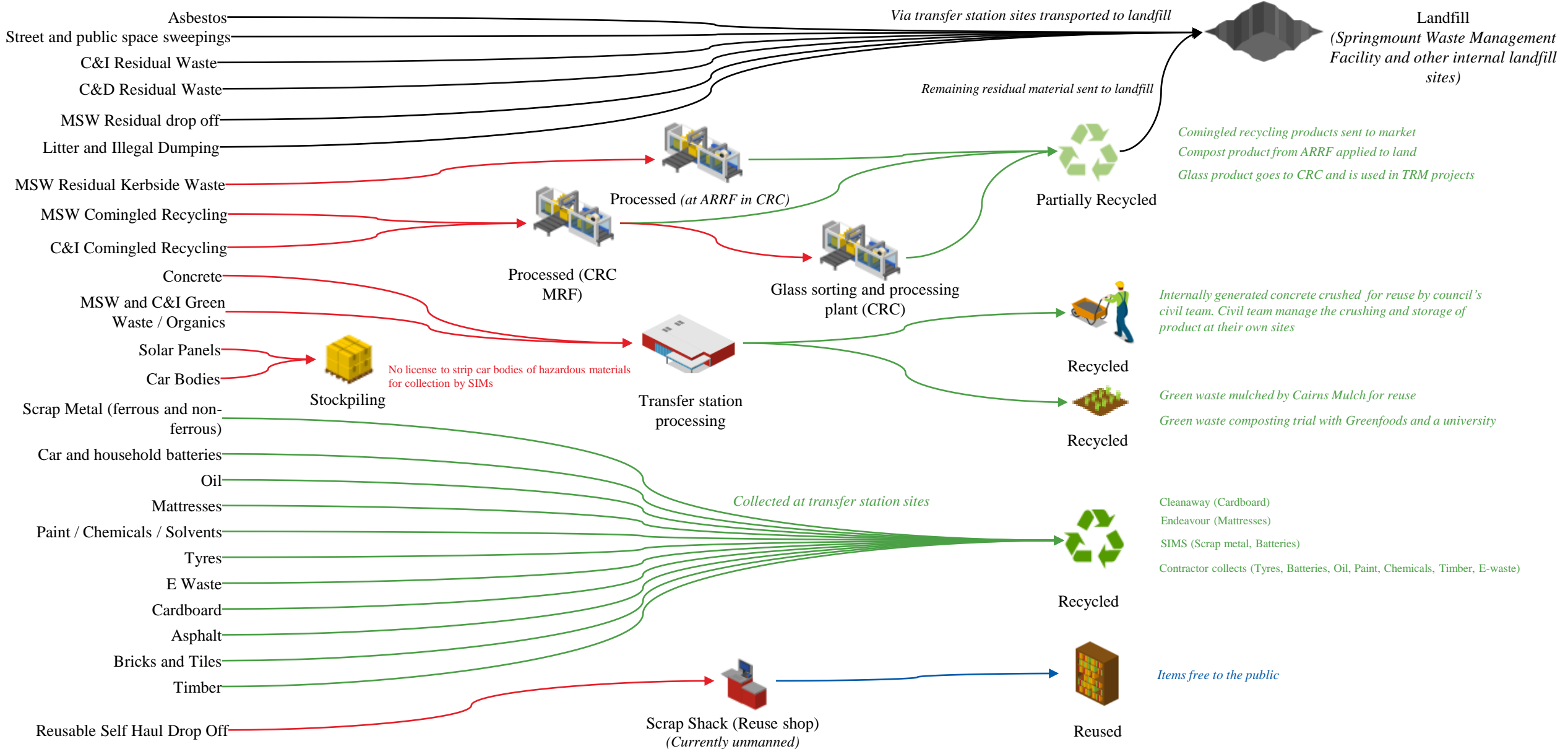


# Current



Collected via Kerbside Pickup (red and yellow bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

Collection contractors, DSC works, businesses and public

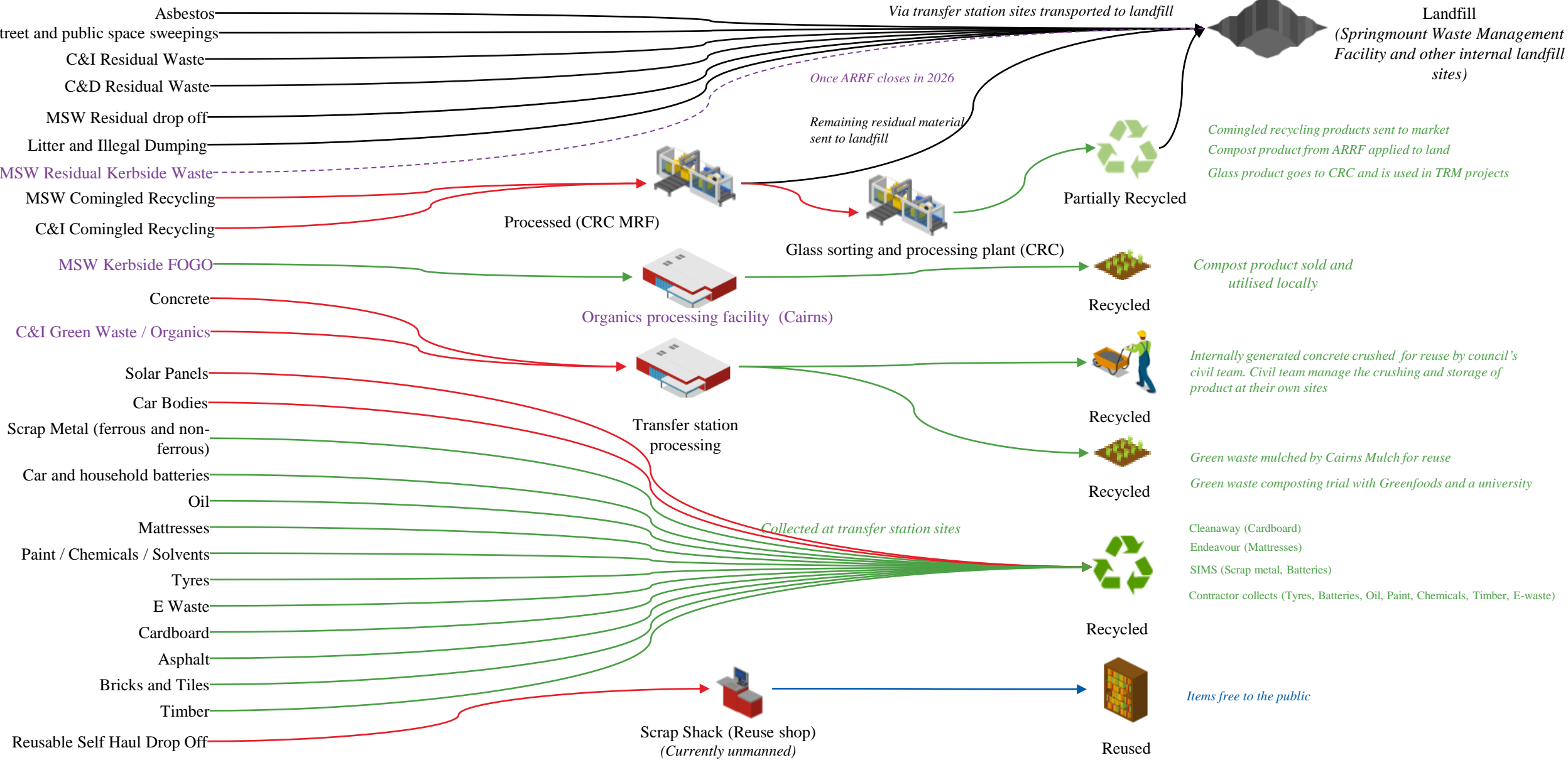


# Proposed



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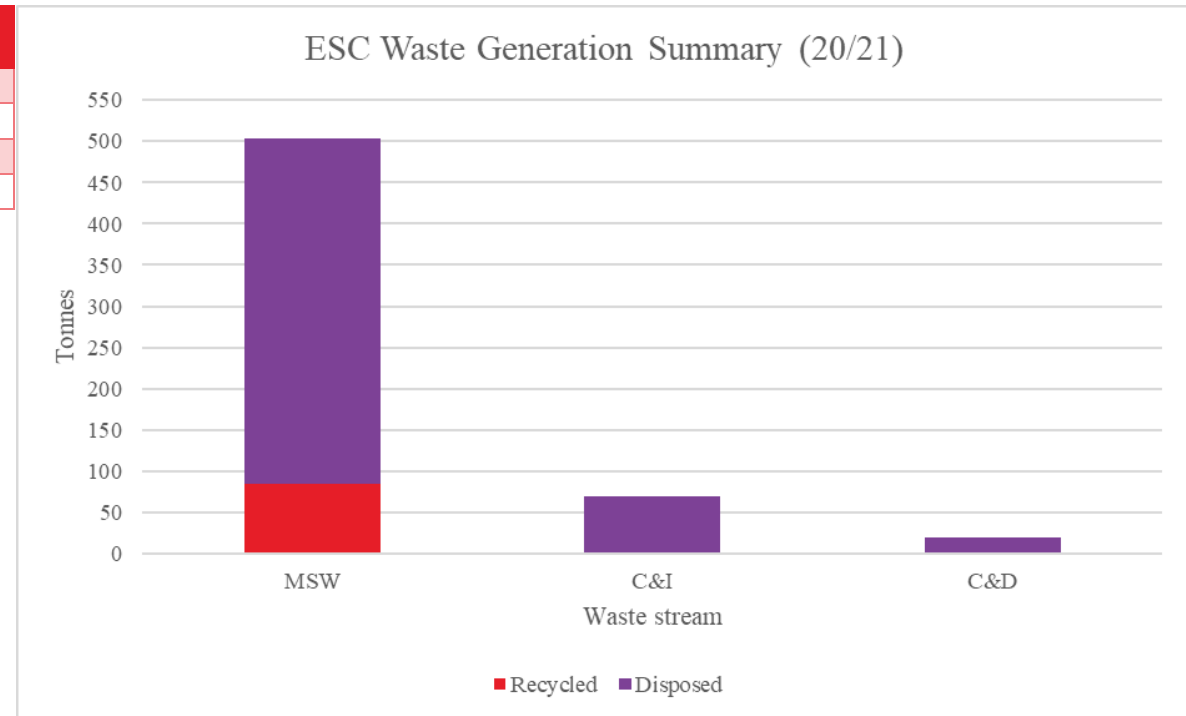
Collection contractors, DSC works, businesses and public



# Etheridge Shire Council

# Current infrastructure and waste generation summary

Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity
Mt Sullivan Landfill	Landfill	<2000	10 Years
Mt Surprise Landfill	Landfill	<2000	10 Years
Forsyth Landfill	Landfill	<2000	10 Years
Einasleigh Landfill	Landfill	<2000	10 Years



# Current

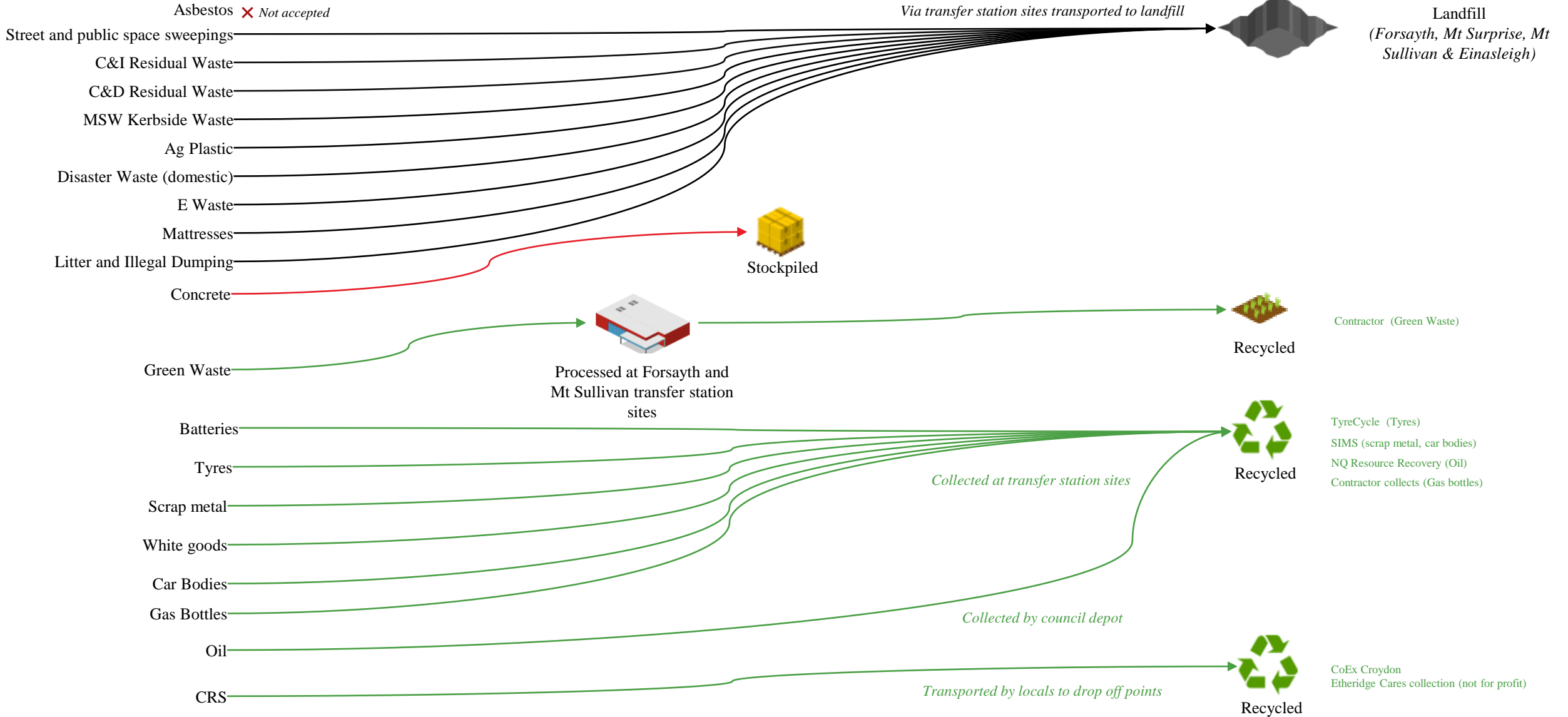


Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, ESC works, businesses and public

# ARUP



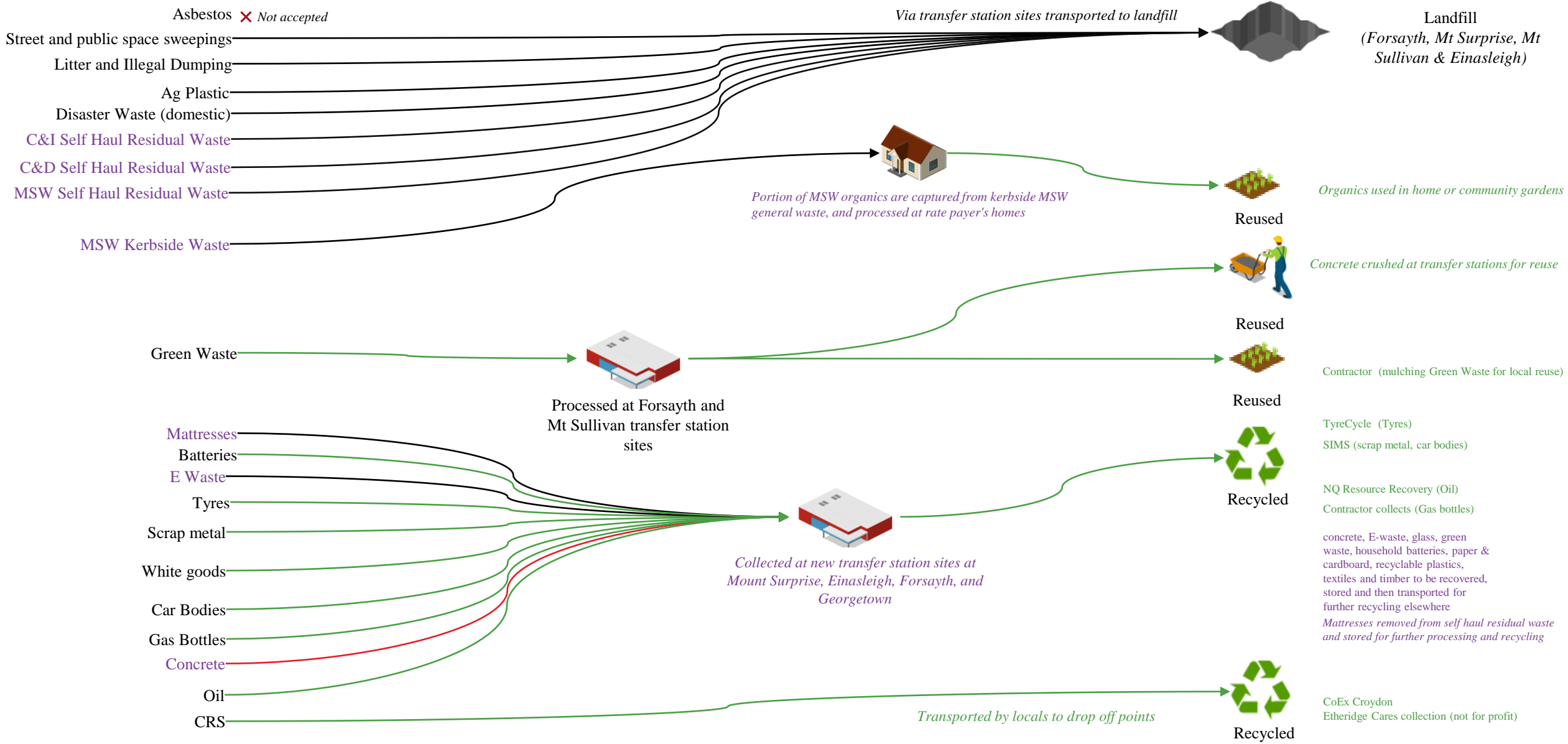
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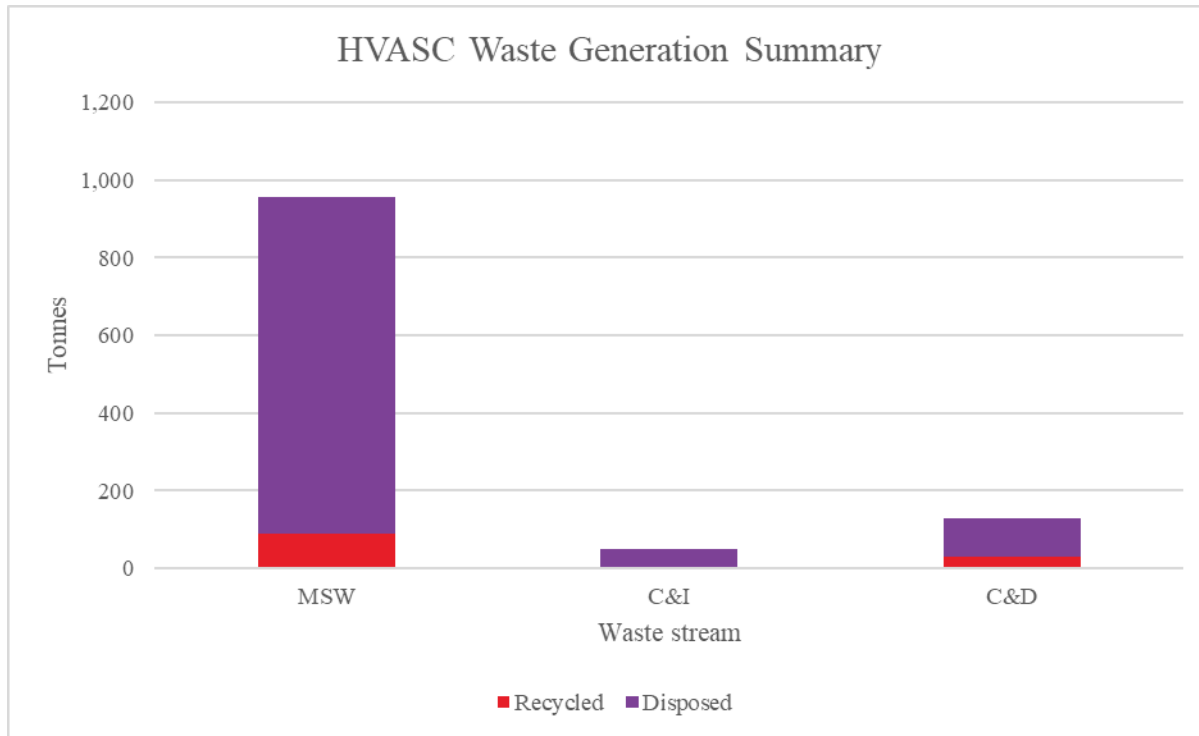


Collection contractors, ESC works, businesses and public



# Hope Vale Aboriginal Shire Council

# Current infrastructure and waste generation summary



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity
Hope Vale Refuse/Landfill	Landfill	2500	6-10 years (possible expansion)



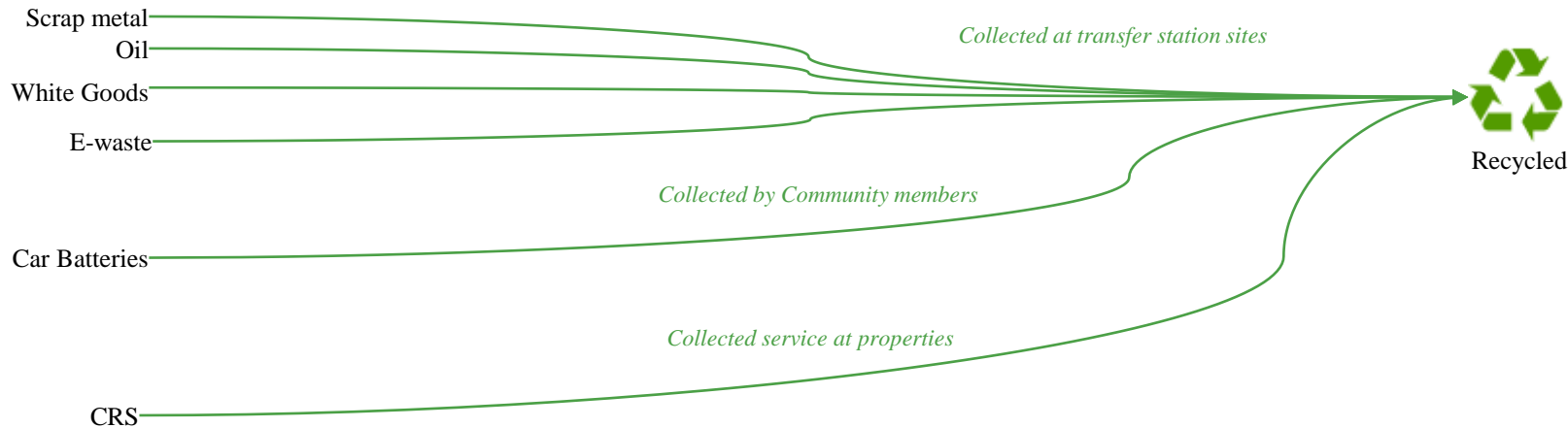
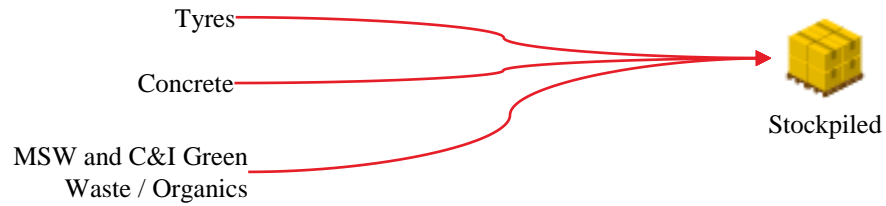
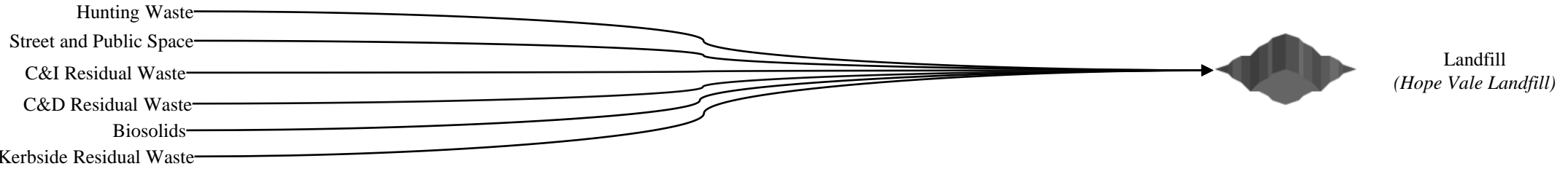
# Current



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Public Area



Collection contractors, HVSC works, businesses and public



SIMS (scrap metal, incl. small domestic solar panels and car batteries)  
Tech Collect (e-waste)  
Cat batteries sold outside region  
AusWaste depot for CRS

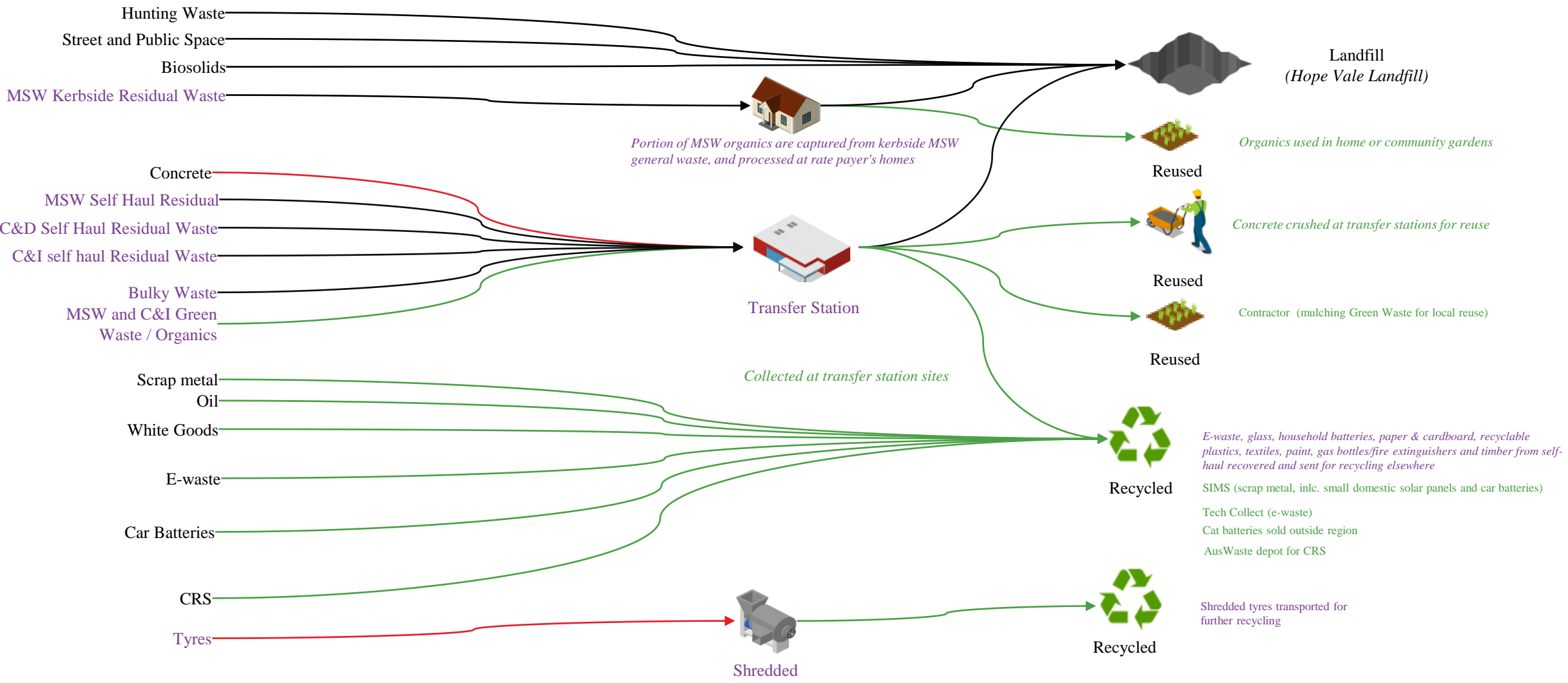
# Proposed



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Public Area



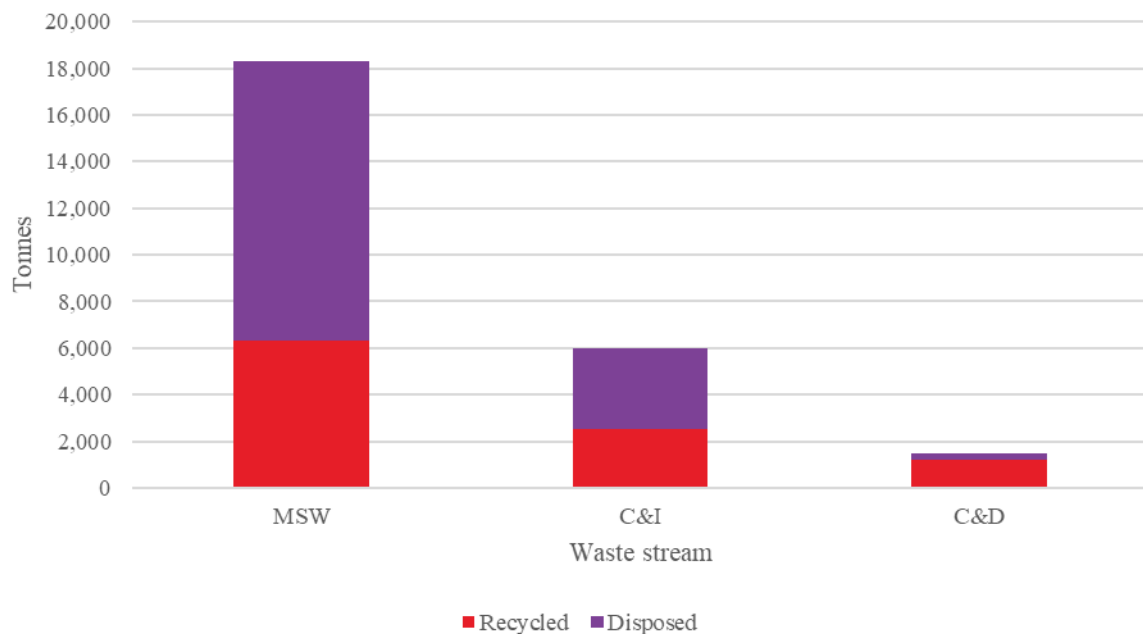
Collection contractors, HVSC works, businesses and public



# Mareeba Shire Council

# Current infrastructure and waste generation summary

MSC Waste Generation Summary (20/21)



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity
<b>Mareeba Transfer Station</b>	Transfer Station	TBC - ERA One site with Landfill so same licenced capacity	Comfortable in terms of capacity
<b>Mareeba Landfill</b>	Landfill	50,000- 100,000	70*-160 Years
<b>Almaden Transfer Station (previously landfill has been capped)</b>	Transfer Station	2000	5000 tpa
<b>Chillagoe Transfer Station (previously landfill has been capped)</b>	Transfer Station	2000	5000 tpa
<b>Dimbulah Transfer Station</b>	Transfer Station	2000	2000 tpa
<b>Irvinebank Transfer Station</b>	Transfer Station	2000	5000 tpa
<b>Julatten Transfer Station</b>	Transfer Station	2000	2000 tpa
<b>Kuranda Transfer Station</b>	Transfer Station	2,000- 11,000	11,000 tpa
<b>Mt Carbine Transfer Station</b>	Transfer Station	2000	2000 tpa
<b>Mt Molloy Transfer Station</b>	Transfer Station	2000	2000 tpa
<b>Mutchilba Transfer Station</b>	Transfer Station	2000	2000 tpa

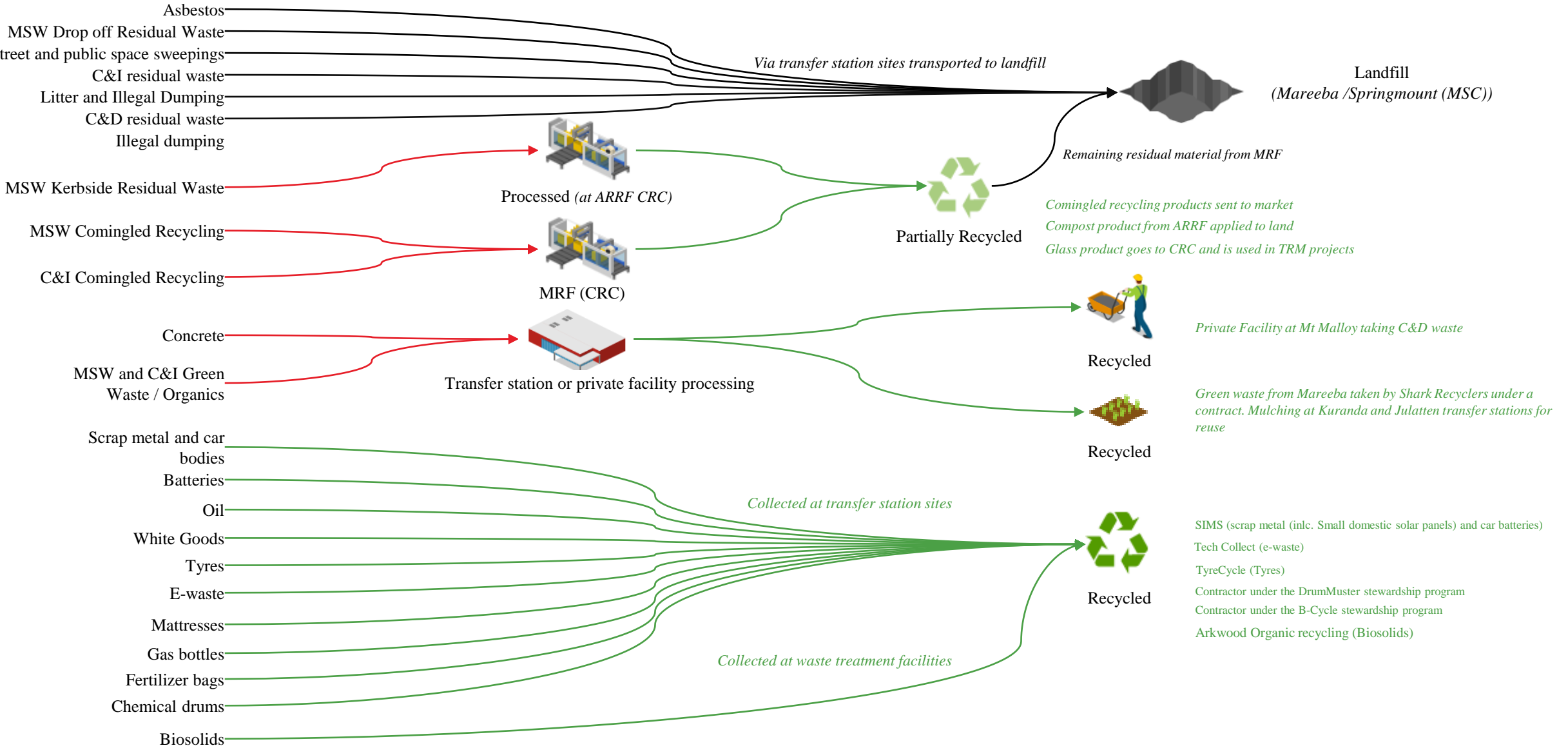
# Current



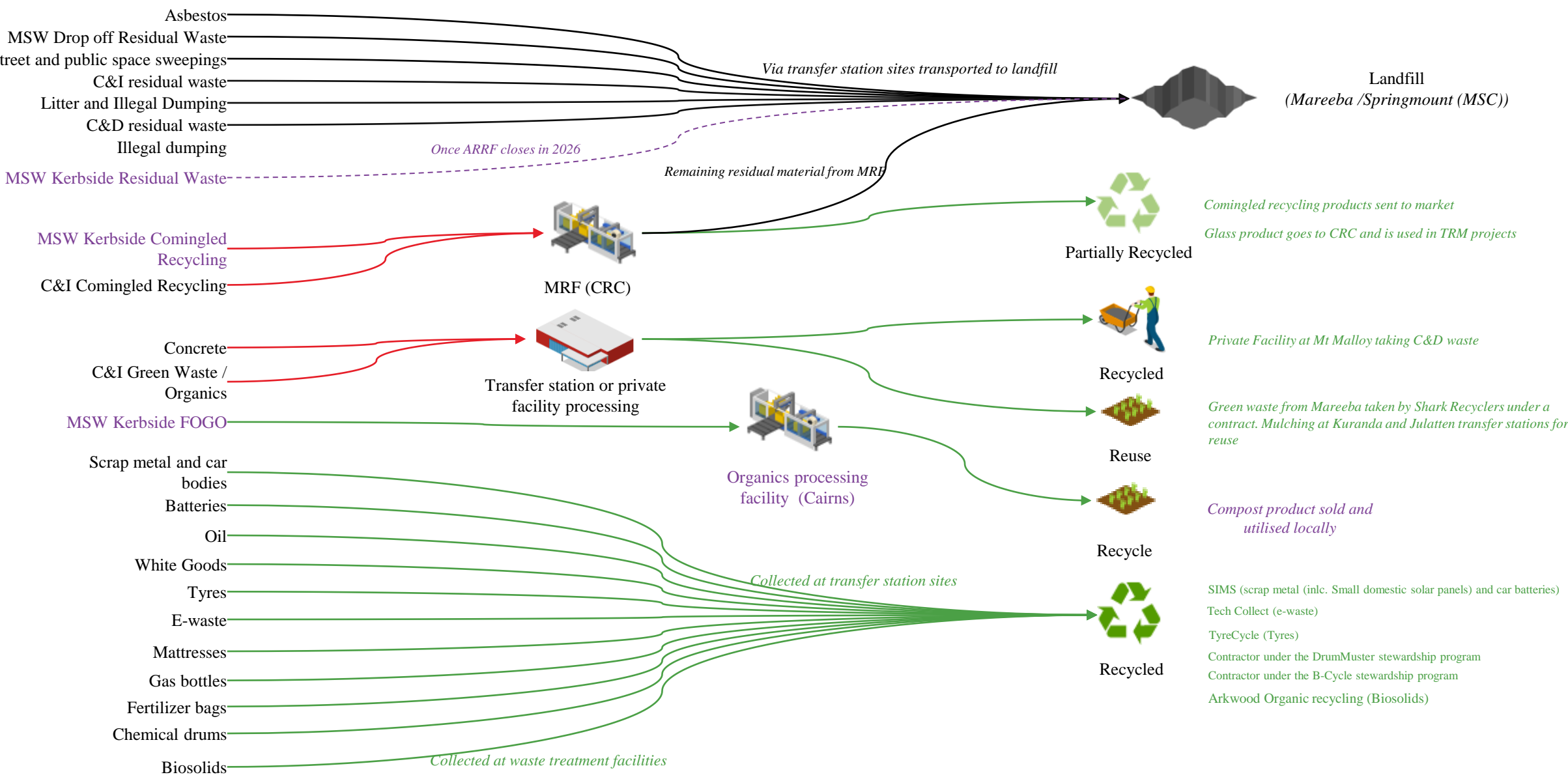
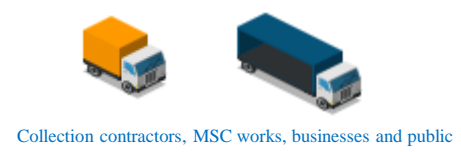
Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, MSC works, businesses and public

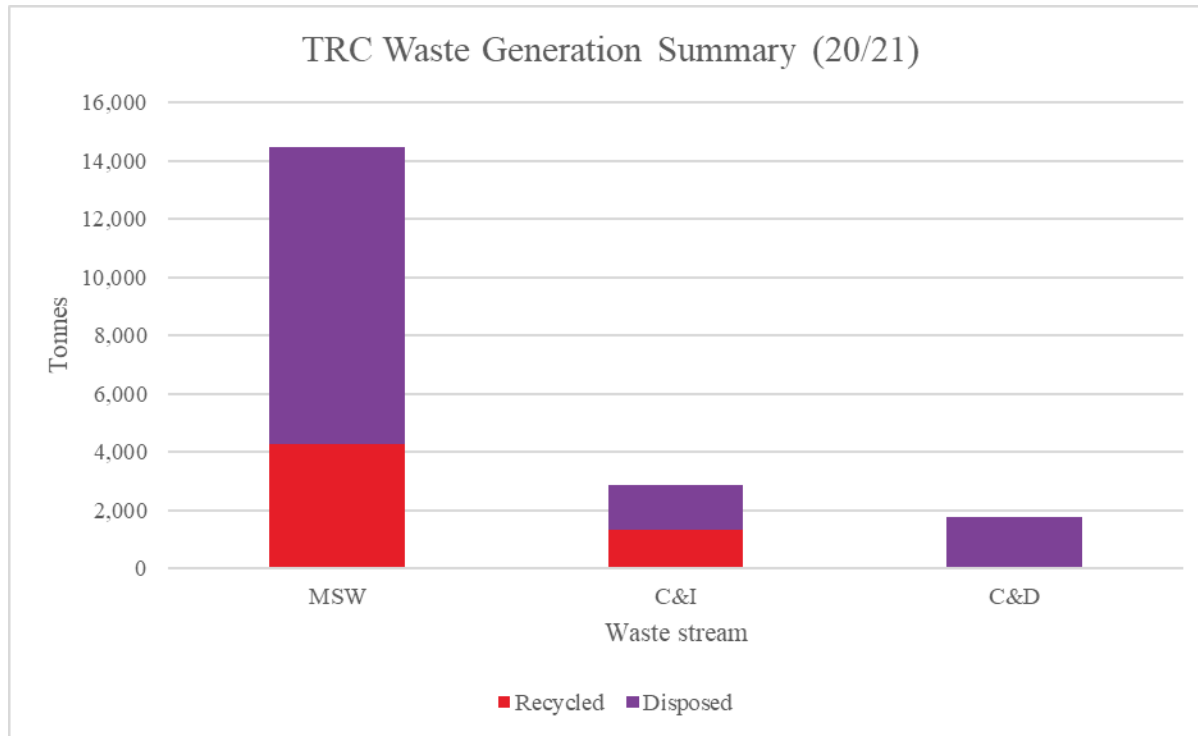


# Proposed



# Tablelands Regional Council

# TRC current infrastructure and waste generation summary



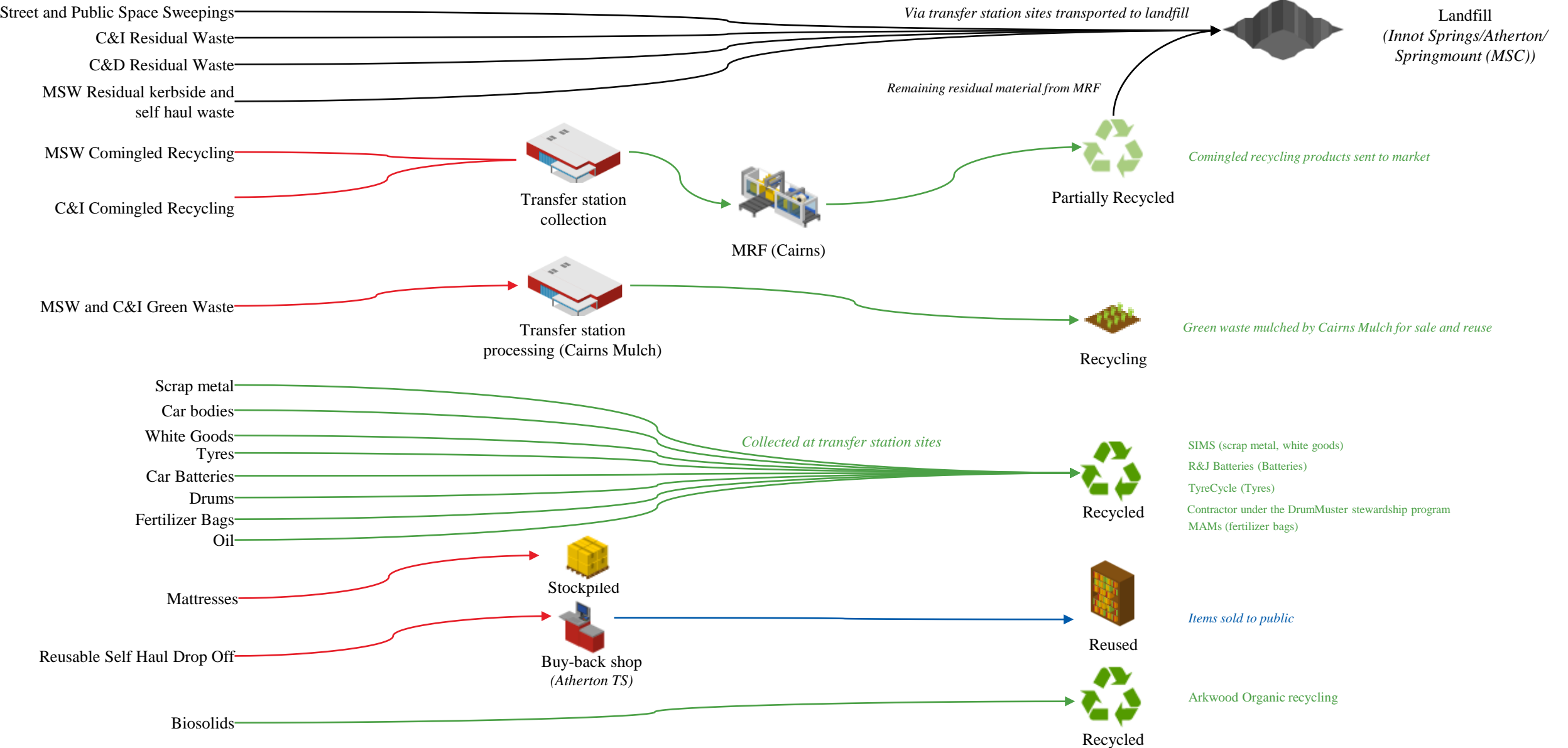
Site Name	Type	Licenced Capacity (Tonnes per Annum)	Maximum Capacity
<b>Atherton Landfill</b>	Landfill	Not provided	4 Years
<b>Atherton Transfer Station</b>	Transfer station	Not provided	Spatially constrained
<b>Malanda Transfer Station</b>	Transfer Station	Not provided	Not provided
<b>Yungaburra Transfer Station</b>	Transfer Station	Not provided	Not provided
<b>Millaa Millaa Transfer Station</b>	Transfer Station	Not provided	Under utilised
<b>Herberton Transfer Station</b>	Transfer Station	Not provided	Not provided
<b>Ravenshoe Transfer Station</b>	Transfer Station	Not provided	Not provided
<b>Innot Hot Springs Landfill</b>	Landfill	Not provided	15 Years
<b>Mt Garnet Transfer Station</b>	Transfer Station	Not provided	Site closed



# Current

Collected via Kerbside Pickup (red and yellow bins) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

Collection contractors, TRC works, businesses and public



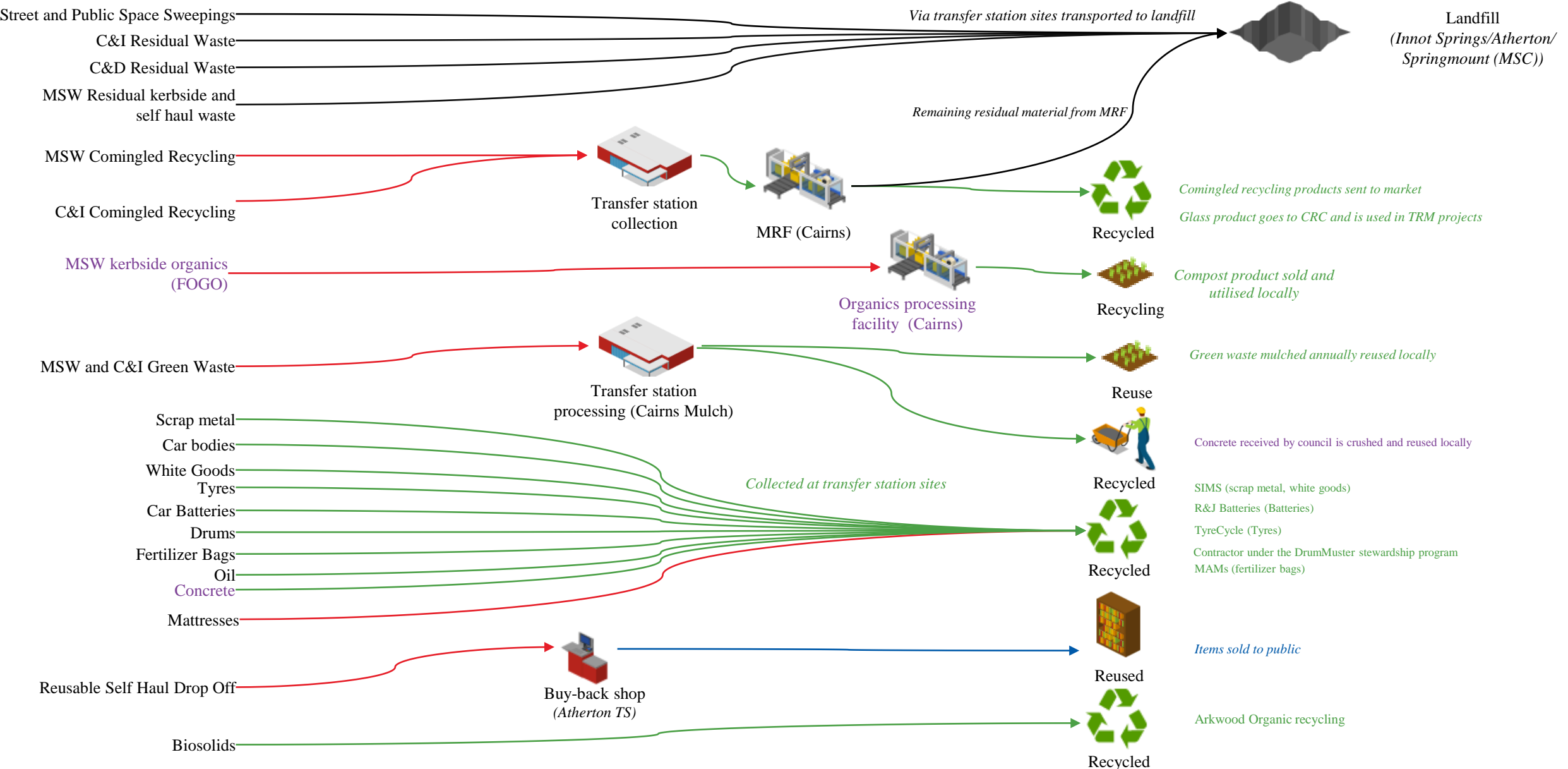
# Proposed



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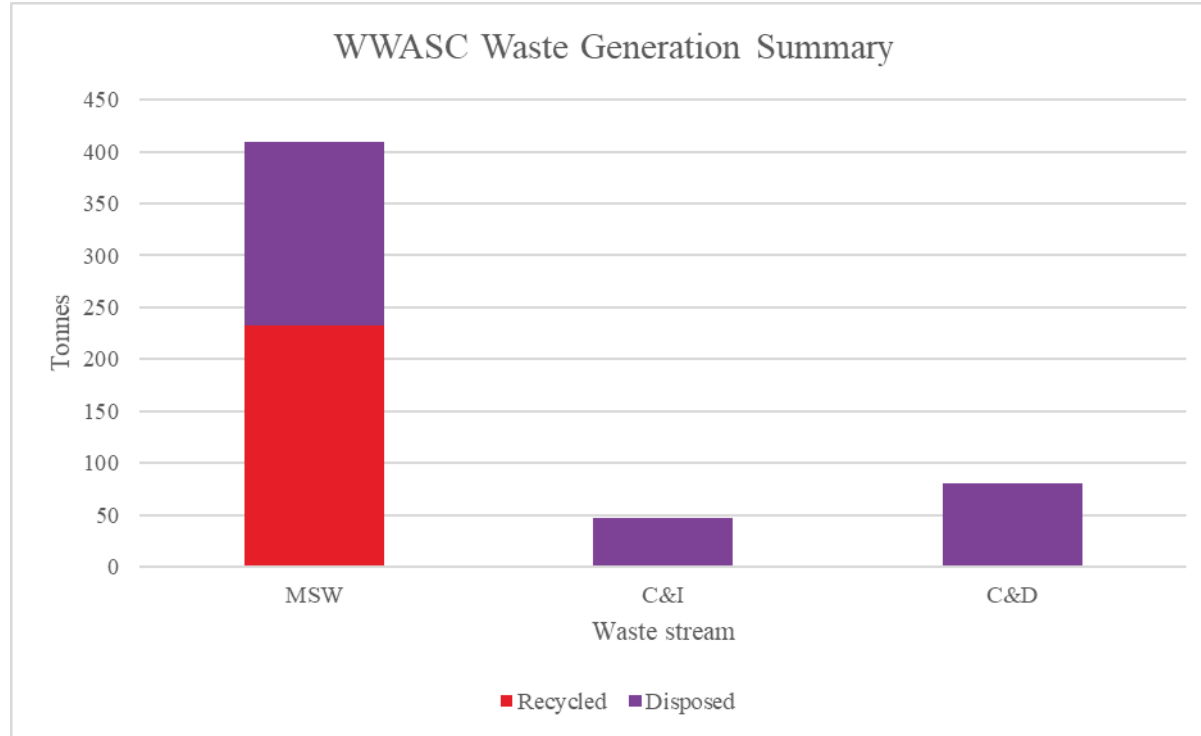


Collection contractors, TRC works, businesses and public



# Wujal Wujal Shire Council

# WWASC current infrastructure and waste generation summary



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum Capacity
<b>Council Depot &amp; Containers For Change</b>	Transfer Station	NA	Not provided
<b>Landfill/Resource recovery area*</b>	Landfill (Closed)	NA	Not provided
<b>Green Waste laydown area (in development)</b>	Green Waste Resource recovery area	NA	Not provided

# Current



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, WWSC works, businesses and public



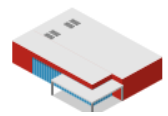
- Street and Public Space Sweepings
- C&I Residual Waste
- C&D Residual Waste
- MSW Residual Waste
- Self Haul Drop Off

*Via resource recovery area site transported to landfill*



Landfill  
(Springmount (MSC))

MSW green waste



Transfer station processing

*Collected at resource recovery area site*



*Green waste mulched by arborist for sale and reuse*

Recycled

- CRS
- Tyres
- Scrap metal
- Car batteries
- Oil

*Collected at resource recovery area and depot site*



SIMS (Scrap metal)  
Auswaste (Oil, CRS)  
Arkwood (Biosolids)

Recycled

Biosolids

*Collected at wastewater treatment plant*

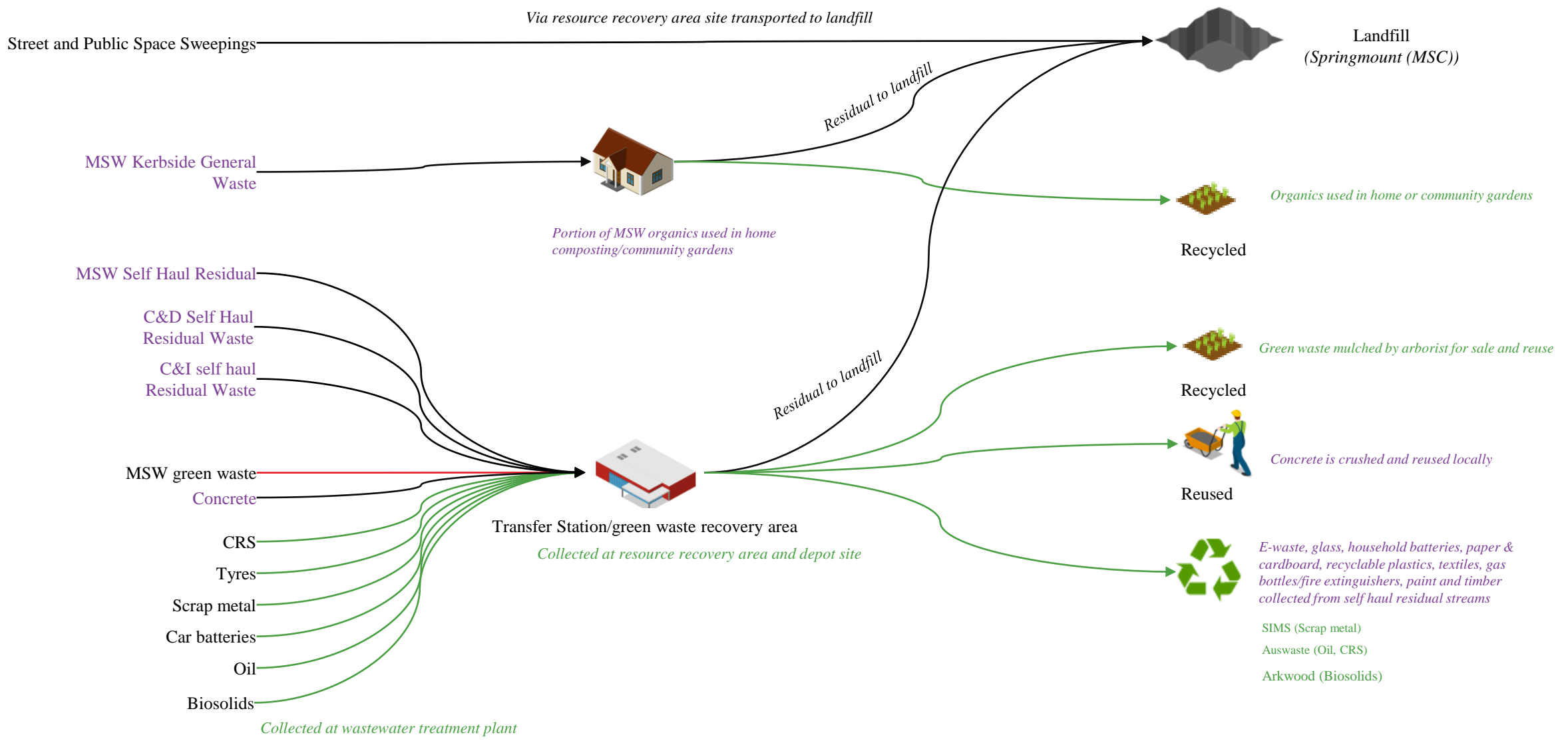
# Proposed



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping

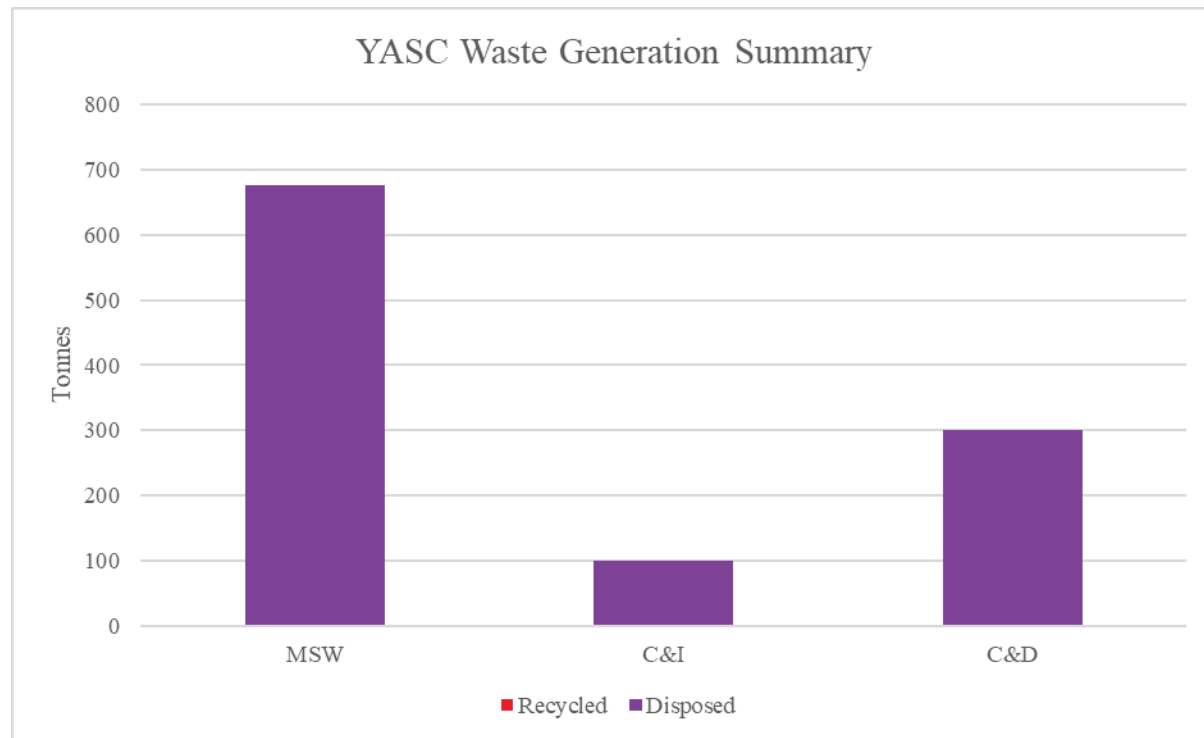


Collection contractors, WWSC works, businesses and public



# Yarrabah Aboriginal Shire Council

# YASC current infrastructure and waste generation summary



Site Name	Type	Licensed Capacity (Tonnes per Annum)	Maximum capacity
<b>Yarrabah Transfer Station</b>	Transfer Station	NA (under licence threshold)	Not provided (site is spatially constrained)



# Current



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, YASC works, businesses and public

# ARUP

Street and public space sweepings

Via waste facility site transported to landfill

C&I Residual Waste

C&D Residual Waste

MSW Residual Waste

Landfill  
(Springmount (MSC))

C&D Recyclables

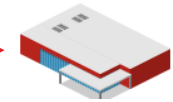
Via waste facility



Partially reused/recycled

Minimal reuse or recycling  
Concrete stockpiled – either mobile crusher processes onsite or transport to Cairns

MSW Green Waste



Transfer station processing



Reused

Mulching by contractor ad-hoc  
Mulch provided for free to community

Scrap Metal

Car Bodies

Collected at waste facility site



SIMS (scrap metal)

Recycled

Copper Wire

Collected by Community members



Recycled

Sold outside region

Car Batteries

Tyres



Stockpiled

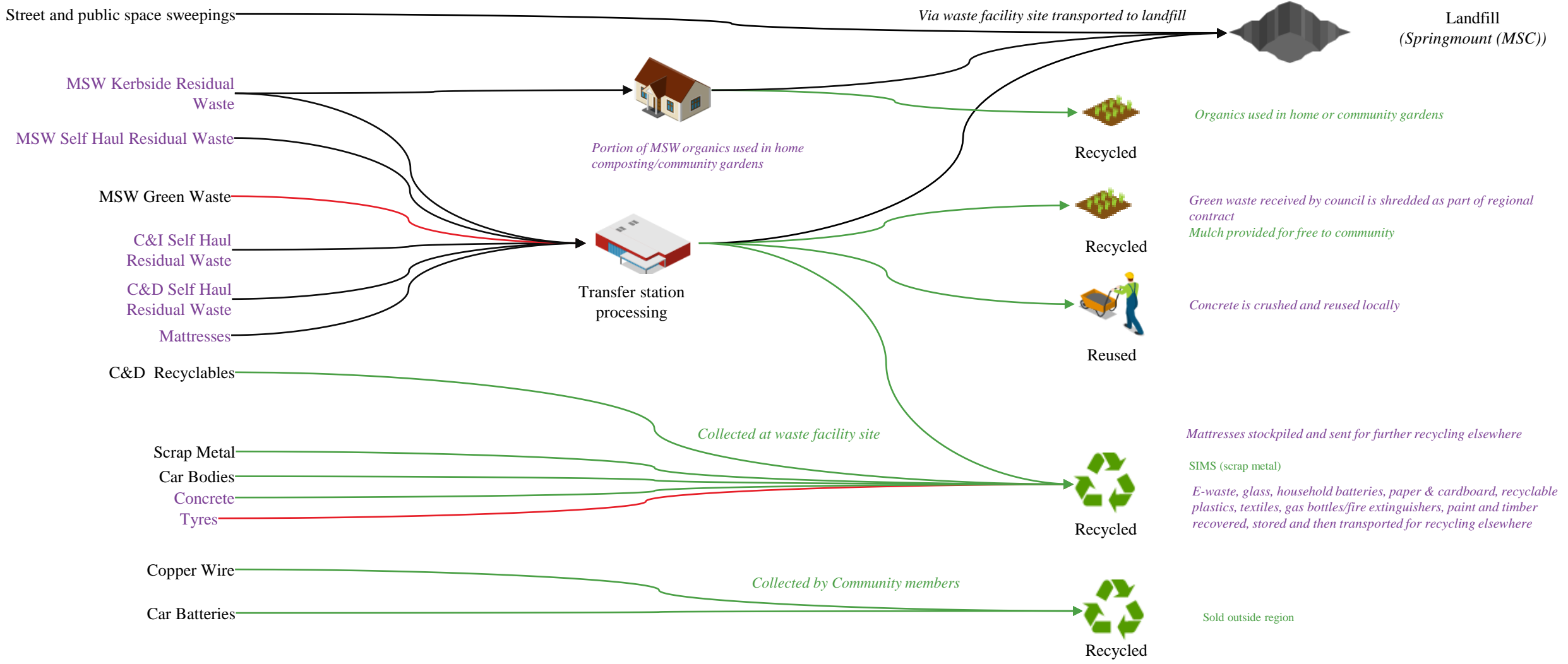
# Proposed



Collected via Kerbside Pickup (red bin) / Self Haul Drop Off / Contractor Drop Off / Public Area / Street Sweeping



Collection contractors, YASC works, businesses and public



Street and public space sweepings

Via waste facility site transported to landfill

Landfill  
(Springmount (MSC))

MSW Kerbside Residual Waste

MSW Self Haul Residual Waste

MSW Green Waste

C&I Self Haul Residual Waste

C&D Self Haul Residual Waste

Mattresses

C&D Recyclables

Scrap Metal

Car Bodies

Concrete

Tyres

Copper Wire

Car Batteries

Transfer station processing

Portion of MSW organics used in home composting/community gardens

Collected at waste facility site

Collected by Community members

Recycled

Recycled

Reused

Recycled

Recycled

Organics used in home or community gardens

Green waste received by council is shredded as part of regional contract  
Mulch provided for free to community

Concrete is crushed and reused locally

Mattresses stockpiled and sent for further recycling elsewhere

SIMS (scrap metal)

E-waste, glass, household batteries, paper & cardboard, recyclable plastics, textiles, gas bottles/fire extinguishers, paint and timber recovered, stored and then transported for recycling elsewhere

Sold outside region

ARUP

# Appendix E - ILM Workshop Outputs



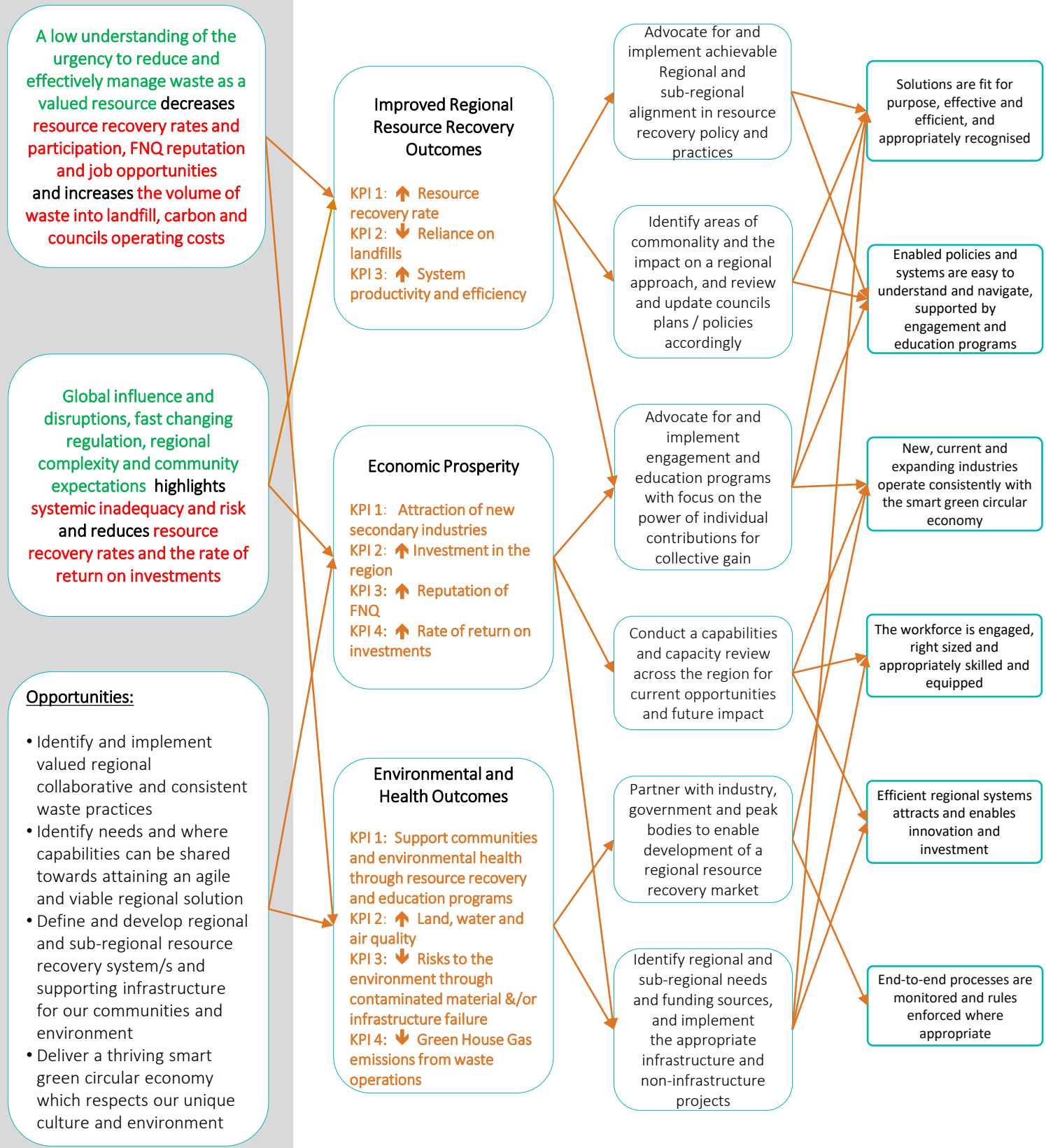
Committing, sharing and cooperating to minimise waste and maximise resilient and effective resource recovery systems in FNQ

PROBLEM/OPPORTUNITY

BENEFITS SOUGHT

STRATEGIC RESPONSE

BUSINESS CHANGES





Committing, sharing and cooperating to minimise waste and maximise resilient and effective resource recovery systems in FNQ

BUSINESS CHANGES

POTENTIAL INITIATIVES

ACTUAL BENEFITS

STATE INFRASTRUCTURE STRATEGY PRIORITY PREFERENCE

Solutions are fit for purpose, effective and efficient, and appropriately recognised

Enabled policies and systems are easy to understand and navigate, supported by engagement and education programs

New, current and expanding industries operate consistently with the smart green circular economy

The workforce is engaged, right sized and appropriately skilled and equipped

Efficient regional systems attracts and enables innovation and investment

End-to-end processes are monitored and rules enforced where appropriate

- Advocate to ensure Statutory Regional Plan reflects the Regional Resource Recovery Strategy
- FNQROC to assess regional capacity and supporting agile strategic planning and investment framework to implement identified solutions
- Frameworks are refreshed for procurements and process alignment
- Review Levels of Service for the community
- Advocate with individual state agencies and local government entities to adopt practices for and compliance with resource recovery

- Conduct data audits, gap analysis process improvements, material flow analysis and asset condition assessments
- Review monitoring and enforcement requirements, capabilities and capacity
- Embrace the use of technology to assist waste monitoring, compliance and behavioural change
- Undertake a regional workforce plan to understand capability challenges and identify options to address these
- Consider consolidation of current sites, optimising latent capacity and process efficiency

- Define options for reduced reliance on single landfill asset
- Identify potential risks (i.e. Climate change, urban heat, cyclone, fire etc) to managing waste and recovery in the region and develop/amend contingency/disaster management plans accordingly
- Brownfield extensions – reconfigure transport connections, optimising traffic flows, site material flow analysis
- Investigate options for organic resource recovery solutions'

- Identify waste streams and their volumes now and into the future (2050) to design and implement appropriate right sized systems and assets for resource recovery (and fleet for mobile processing options)
- Explore options for resource recovery precinct hubs

- Certainty of investment / Business confidence
- Regional alignment and collaboration
- Less public confusion
- Lower waste generation per capita and contamination rates
- Reduce waste to landfill and Greenhouse Gas (GHG) emissions
- Increased services and equitable access
- Higher values/volumes of recovered product

- Efficient operations
- Maximising value of existing assets
- Lower waste generation per capita and contamination rates
- Reduce waste to landfill and Greenhouse Gas (GHG) emissions
- Higher values/volumes of recovered product
- Increased customer satisfaction, engagement and personal responsibility
- Regional alignment and collaboration
- Increased services and equitable access
- Enable secondary markets

- Regional alignment and collaboration
- Higher processing productivity
- Lower waste generation per capita and contamination rates
- Reduce waste to landfill and Greenhouse Gas (GHG) emissions
- Lower contamination rates
- Higher values/volumes of recovered product
- Improved productivity and resilience in operations through reduced system vulnerabilities
- Maximising value of existing assets
- Reduced environmental impact
- Improved workforce engagement
- Improved alignment to circular economy principles
- Improves the reputation of Councils
- Reduce carbon footprint
- Enable secondary markets

- Improved alignment to circular economy principles
- Improves the reputation of Councils
- Enables new suppliers and secondary markets
- Regional alignment and collaboration
- Improved productivity and resilience in operations through reduced system vulnerabilities
- Efficient operations
- Higher values/volumes of recovered product
- Lower waste generation per capita and contamination rates
- Reduce adverse environmental impact
- Improved public health, amenity, liveability
- Improved workforce engagement

Reform

Better Use

Improve Existing

New Build

Increasing preference (from State infrastructure Strategy – Priority preference p13)

# Appendix F - MCA Workshop Memo

**To:** Far North Queensland Regional Organisation of Councils, via FNQROC  
**From:** Arup Australia Pty Ltd  
**Date:** 5 December 2022  
**Ref:** 288017-03  
**Re:** Multi-criteria analysis workshop

## Background

On 25 November 2022, Arup facilitated a multi-criteria analysis (MCA) workshop with members of Far North Queensland Regional Organisation of Councils (FNQROC). The purpose of the workshop was to score a longlist of 15 options (refined by Arup based on initiative outputs from the Investment Logic Map (ILM) workshop and Stage 2 Issues & Options paper, refer to Attachment 1) against a set of criteria developed by Arup. Following the workshop, Arup would apply calculated weightings (based on input from each member councils of FNQROC) to derive a shortlist of preferred options that would be interrogated as part of the economic analysis in the next phase of work.

The criteria for assessment are shown in Table 1. Criteria were developed using the Six Capitals approach and relied on regional appreciation obtained from stakeholder discussions, working group workshops and Arup’s experience and understanding of Queensland Government requirements for investment. Criteria were provided to the FNQROC Working Group on 21 November 2022 as pre-reading material prior to the workshop.

Arup employed MentiMeter for live polling during the MCA workshop to capture the variety of stakeholder views and adopted the most popular score (the mode) for the purposes of scoring. Sensitivity analysis is intended to be undertaken using these scores to ensure a rigorous options shortlisting process has been applied. The scores that deviate from the most popular score will be used (captured in the live polling) to identify whether a change in score would materially alter the shortlist of options. Not all criteria were assessed during the workshop due to time constraints and stakeholder concerns. The criteria that were not assessed are shown in the final column of Table 1

Table 1: Assessment criteria for the MCA

MCA criteria			
Assessed			Not assessed
Option is likely to result in job creation and/or regional investment	Option will create opportunities to access new markets	Option will generate opportunities to engage with local Traditional Owner businesses	Option will maximise community & tourist participation
Option has lowest upfront investment and has potential to minimise ongoing costs	Option will increase system productivity & efficiency	Option will likely result in innovation	Option will result in improvements to land, water & air quality
Option will minimise asset stranding risk	Option has infrastructure that is scalable or flexible	Option is likely to result in improved capability	Option will reduce environmental risks including through littering, nuisance and contamination
Option is financially sustainable	Option can be adapted to meet requirements over the long term (i.e., technology can be used for other products or repurposing can occur)	Option is likely to deliver opportunity for value capture	Option will result in GHG emissions in plant and transport
Option will increase the resource recovery rate	Option will create shift in location of industry or use of new technology	Option will be supported by the community and other stakeholders	Option provides an opportunity for circular economy solutions (either infrastructure or materials)

In a meeting between Arup and FNQROC on 30 November 2022, FNQROC provided feedback that member councils were concerned there were significant outliers in the live polling results and that the MCA had not been completed. The purpose of this memo is to respond to those concerns.



## MCA scores

Arup had conducted an internal MCA workshop prior to the workshop with FNQROC to test the options and criteria. Table 2 shows the workshop score for the options and criteria against the Arup score to demonstrate the outcomes. Table 2 shows that there is some variation between the consensus score and the Arup score, though this is often the difference of one in scoring and is therefore considered appropriate.

The spread of the scores received from member councils is shown in Figure 1. As expected, while there are differences in scores, most responses tended towards similar scores (the most popular), allowing for a robust sensitivity assessment.

## Discussion

The MCA workshop scores were acceptable and aligned to the process Arup set out. There are no material outliers, and the scoring has exhibited the pattern that Arup expected. In aggregate, the scores have tended towards a common popular score (the mode) which has allowed us to use that score for each project option and criteria in our analysis.

As anticipated, there are a small degree of variance in the scoring of options. This difference in scoring ensures that each respondent's input can be considered when scoring project options and significant deviations can be assessed using sensitivity analysis to ensure a robust and rigorous shortlisting process. For most criteria, the divergence is slight (i.e., between a 3 and a 4), which does not reflect an outlier score and was likely caused by a difference in interpretation by different respondents.

Notwithstanding, per our discussion on 30 November 2022, Arup understands that FNQROC does not intend to collect the Match Pair survey from each of the 11 member councils nor collect scoring for the criteria that were not finished during the MCA workshop. As such, Arup will need to consider an alternative approach to developing the sensitivity analysis to ensure a rigorous options evaluation has been undertaken.

## Next steps

Per the discussion between Arup and FNQROC on 30 November 2022, the next steps are:

1. Arup to calculate the weightings to apply to the MCA scores using the four returned Matched Pair surveys as opposed to the complete 11 responses that were intended to be used.
2. Arup to finalise the shortlisting of options using the workshop scores and the weightings.
3. Arup to apply its scoring to the criteria that were not scored during the MCA workshop on 25 November 2022
4. Draft MCA results to be presented in a meeting with member councils on 6 December 2022.
5. Arup to consider an alternative approach to developing the sensitivity analysis to ensure a rigorous options evaluation has been undertaken.

Table 2: MCA Workshop outcomes

Option	Create jobs or investment in the region			Least cost investment			Minimise asset stranding risk			Financial sustainability			Increase the resource recovery rate		
	Arup	Consensus	Diff.	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff
1	4	2	2	4	3	1	5	3	2	5	3	2	1	2	1
2	2	2	0	1	3	2	3	3	0	2	2	0	1	3	2
3	2	3	1	4	3	1	4	3	1	1	2	1	1	4	3
4	5	3	2	1	4	3	1	2	1	3	1	2	1	4	3
5	2	1	1	3	5	2	5	3	2	3	2	1	1	4	3
6	2	5	3	4	2	2	2	4	2	2	1	1	5	4	1
7	3	2	1	2	4	2	4	4	0	1	2	1	1	4	3
8	2	5	3	1	2	1	1	4	3	1	2	1	4	4	0
9	4	4	0	4	3	1	3	3	0	4	3	1	4	4	0
10	5	2	3	4	2	2	1	2	1	2	2	0	5	4	1
11	2	1	1	3	2	1	2	4	2	5	3	2	2	4	2
12	4	5	1	1	2	1	5	3	2	5	2	3	4	5	1
13	2	5	3	2	1	1	1	2	1	1	3	2	1	5	4
14	1	5	4	4	1	3	3	2	1	5	3	2	5	3	2
15	2	1	1	1	3	2	2	0	2	1	3	2	1	4	3

Option	Opportunities to access new markets			Increasing system productivity and efficiency			Infrastructure is scalable and flexible			Technology is adaptable			Will create shift in location of industry or use of new technology		
	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff
1	2	2	0	2	3	1	4	4	0	5	3	2	3	3	0
2	1	2	1	5	4	1	2	4	2	5	3	2	1	3	2
3	4	3	1	2	4	2	2	3	1	4	4	0	2	4	2
4	1	3	2	4	3	1	1	5	4	1	4	3	1	3	2
5	2	4	2	1	5	4	2	5	3	3	4	1	4	3	1
6	4	3	1	5	3	2	1	4	3	4	4	0	1	4	3
7	2	4	2	2	3	1	1	3	2	1	3	2	3	3	0
8	4	3	1	4	4	0	1	1	0	4	3	1	3	3	0
9	2	4	2	4	4	0	4	5	1	1	4	3	5	3	2
10	2	4	2	1	3	2	5	0	5	1	3	2	2	3	1
11	3	4	1	3	5	2	1	0	1	1	4	3	2	2	0
12	3	4	1	4	5	1	3	0	3	5	4	1	2	3	1
13	5	4	1	3	4	1	1	0	1	1	3	2	4	3	1
14	1	4	3	4	3	1	4	0	4	1	3	2	2	3	1
15	2	4	2	2	1	1	2	0	2	2	3	1	3	1	2

Option	Traditional Owner business engagement opportunities			Innovation potential			Improved organisation capability			Deliver value capture opportunities			Community support		
	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff
1	3	2	1	2	3	1	5	5	0	2	3	1	3	5	2
2	4	4	0	5	3	2	1	5	4	5	3	2	5	4	1
3	2	4	2	2	4	2	4	4	0	4	4	0	2	4	2
4	4	2	2	5	4	1	4	4	0	4	3	1	4	4	0
5	2	2	0	4	3	1	3	3	0	5	4	1	1	4	3
6	1	2	1	2	4	2	4	5	1	2	4	2	3	4	1
7	5	1	4	5	3	2	3	3	0	5	4	1	4	4	0
8	3	2	1	3	5	2	5	4	1	1	4	3	1	4	3
9	4	2	2	2	4	2	3	4	1	2	3	1	4	4	0
10	3	3	0	2	3	1	2	3	1	5	4	1	1	3	2
11	4	2	2	5	2	3	4	3	1	5	3	2	1	4	3
12	3	2	1	4	3	1	1	4	3	5	4	1	4	4	0
13	2	2	0	4	3	1	5	4	1	5	3	2	2	3	1
14	1	2	1	1	4	3	1	4	3	3	4	1	5	2	3
15	2	1	1	4	1	3	5	1	4	2	1	1	4	3	1

Option	Maximise community & tourist participation			Improved land, water & air quality			Reduce environmental risks including through littering, nuisance and contamination			Reduce greenhouse gas emissions			Circular economy opportunities		
	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff	Arup	Consensus	Diff
1	2	N/A	N/A	2	N/A	N/A	2	N/A	N/A	2	N/A	N/A	5	N/A	N/A
2	2	N/A	N/A	5	N/A	N/A	2	N/A	N/A	3	N/A	N/A	4	N/A	N/A
3	3	N/A	N/A	4	N/A	N/A	1	N/A	N/A	3	N/A	N/A	3	N/A	N/A
4	4	N/A	N/A	3	N/A	N/A	4	N/A	N/A	4	N/A	N/A	4	N/A	N/A
5	3	N/A	N/A	3	N/A	N/A	1	N/A	N/A	3	N/A	N/A	5	N/A	N/A
6	1	N/A	N/A	4	N/A	N/A	4	N/A	N/A	3	N/A	N/A	2	N/A	N/A
7	4	N/A	N/A	3	N/A	N/A	1	N/A	N/A	4	N/A	N/A	3	N/A	N/A
8	3	N/A	N/A	3	N/A	N/A	2	N/A	N/A	3	N/A	N/A	1	N/A	N/A
9	5	N/A	N/A	4	N/A	N/A	3	N/A	N/A	4	N/A	N/A	2	N/A	N/A
10	3	N/A	N/A	5	N/A	N/A	2	N/A	N/A	1	N/A	N/A	1	N/A	N/A
11	4	N/A	N/A	3	N/A	N/A	3	N/A	N/A	2	N/A	N/A	3	N/A	N/A
12	3	N/A	N/A	4	N/A	N/A	2	N/A	N/A	2	N/A	N/A	2	N/A	N/A
13	4	N/A	N/A	1	N/A	N/A	4	N/A	N/A	2	N/A	N/A	5	N/A	N/A
14	3	N/A	N/A	5	N/A	N/A	2	N/A	N/A	1	N/A	N/A	1	N/A	N/A
15	1	N/A	N/A	5	N/A	N/A	2	N/A	N/A	5	N/A	N/A	4	N/A	N/A

Figure 1 MCA scoring results



Attachment 1

Options long list

Refined ID	Waste Hierarchy	Initiative
1	Governance/Recycle and compost	Roll out regional and subregional kerbside collection and processing contracts to improve economies of scale and management of existing infrastructure.
2	Avoid and Reduce	Implement soft infrastructure including education programs across residents and businesses, agricultural and tourism industries, and standardisation of signage. Undertake data capture, waste monitoring/tracking technologies, for use in reporting, compliance, behaviour change programs, and tracking against targets.
3	Reuse Materials	Broker sharing and service opportunities - B2B, opportunistic recycling, product reuse, sharing and leasing models with the community and businesses.
4	Reuse Materials	Implement distributed processing technologies with local scale infrastructure to improve remote/rural resource reuse efficiency of problematic waste streams.
5	Reuse Materials	Establishment of buy back shops at existing transfer station facilities.
6	Reuse Materials	Development of a new centralised resource recovery precinct.
7	Recycle and Compost	Consolidation of current sites, optimising latent capacity and increase process efficiency to leverage existing assets and maximise resource recovery and operational efficiency (e.g. minor improvements to optimise transport connections, traffic flows, increased volumes or site material flows).
8	Recycle and Compost	Development of new transfer station and recovery facilities to provide the opportunity to design sites focused on resource recovery and recycling capture.
9	Recycle and Compost	Maximise collection of recyclables and problematic wastes by regional approach to consolidating waste streams using hub and spoke transfer station network.
10	Recycle and Compost	Mobile processing technology options for recyclables based on waste streams and volumes now and in the future.
11	Recycle and Compost	Expansion of comingled recycling bins to councils without this service. Where this isn't possible there may be options to enhance CDS (or similar product return schemes) to improve recovery.
12	Recycle and Compost	Implement a kerbside organics collection stream (e.g. combination of FOGO, GO or home/community composting based on current service level).
13	Recycle and Compost	Organics processing options and/or for recovery of biosolids through composting (open windrow, aerated static pile, in-vessel and/or vermicomposting), fermentation and/or mulching, anaerobic digestion (wet/dry) (e.g. processing of organic waste through EfW Bioenergy precincts integrated with existing facilities in the region).
14	Residual Waste Management	Management of residual waste through development of an EfW facility which utilises physical and/or chemical mechanisms or incineration to recover energy.
15	Residual Waste Management	Management of residual waste through disposal to new or existing landfill facilities (with or without LFG capture and energy recovery).

# Appendix G - FNQROC Economic Report



**FNQROC**

# Regional Resource Recovery Plan

## Economic Analysis Report

Reference:

V1.2 | 31 March 2023

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number

Arup Australia Pty Ltd | ABN 76 625 912 665

**Arup Australia Pty Ltd**  
Wurundjeri Woiwurrung Country  
Sky Park One Melbourne Quarter  
699 Collins Street  
Docklands VIC 3008  
Australia  
[arup.com](http://arup.com)

## Document Verification

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**Document title**    Economic Methodology Paper  
**Job number**  
**Document ref**  
**File reference**

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			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Laura Morgan	Jacqui Marshall	
		<b>Signature</b>			
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			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Ashan Jayawardana	Laura Morgan	
		<b>Signature</b>			
V1.2	31/03/2023	<b>Filename</b>	FNQROC Economic Report_v1.2		
		<b>Description</b>	Final report including sensitivities		
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Ashan Jayawardana	Laura Morgan	
		<b>Signature</b>			

**Signature**

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Issue Document Verification with Document



## Disclaimer

This report has been prepared specifically for and under the instructions and requirements, of Far North Queensland Regional Organisation of Councils (the “Client”) in connection with the FNQROC Regional Resource Recovery Plan.

In preparing this report we have relied on information provided by others, and we do not accept responsibility for the content, including the accuracy and completeness, of such information. In no circumstances do we accept liability in relation to information provided by others.

We emphasise that any forward-looking projections, forecasts, or estimates are based upon interpretations or assessments of available information at the time of writing. The realisation of the prospective financial information is dependent upon the continued validity of the assumptions on which it is based. Actual events frequently do not occur as expected, and the differences may be material. For this reason, we accept no responsibility for the realisation of any projection, forecast, opinion or estimate.

Findings are relevant only to current conditions at the time of writing. We will not be under any obligation to update the report to address changes in facts or circumstances that occur after the date of our report that might materially affect the contents of the report or any of the conclusions set forth therein.

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# 1. Introduction

## 1.1 Background / Project Overview

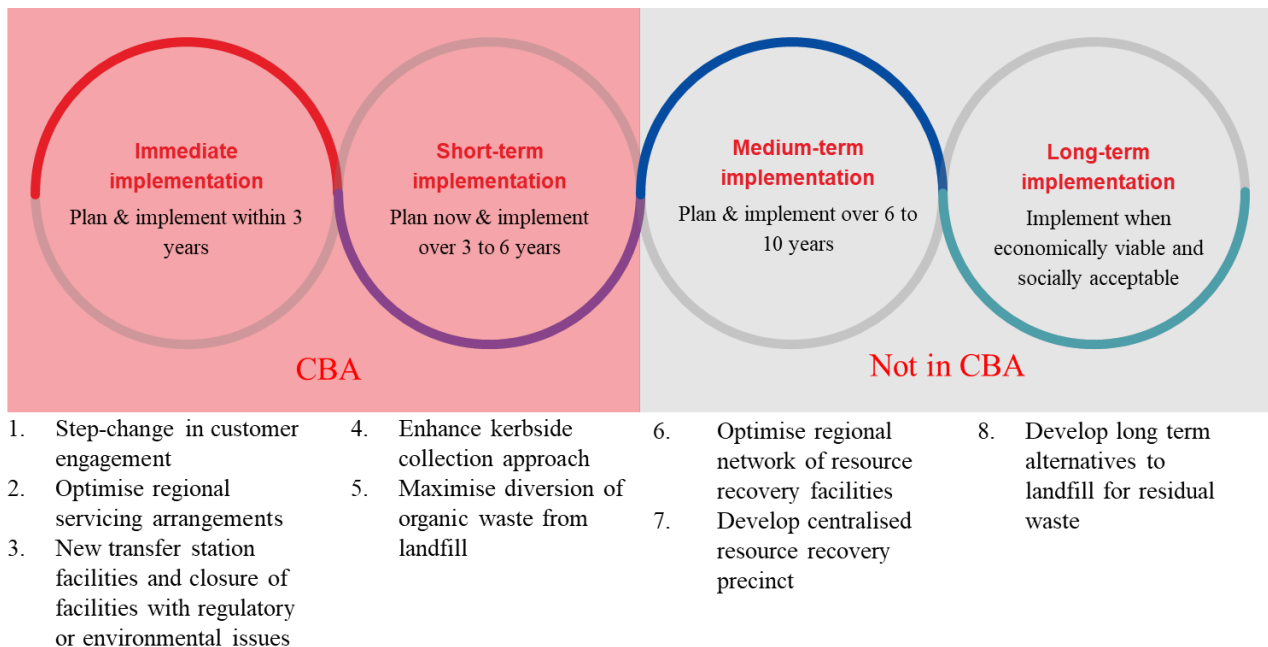
Arup was engaged by Far North Queensland Regional Organisation of Councils (FNQROC) to develop a Regional Resource Recovery Plan (RRR Plan) for the 11 participating councils. The purpose of the FNQROC RRR Plan is to develop a regional, long-term and co-ordinated strategy that identifies options and opportunities, to support the planning for and investment in waste and resource recovery infrastructure and non-infrastructure solutions in the Far North Queensland region.

List of 15 options was produced to address the issues and risks identified for FNQROC, to achieve the overall aims and goals of the project and the final RRR Plan. This list was assessed through engagement and a multi-criteria analysis (MCA) process to identify suitable infrastructure and non-infrastructure solutions for the region.

The results demonstrated the diversity of needs and drivers for resource recovery among individual councils and the need to vary the implementation approach across the region. The 11 councils were grouped based on landfill levy liability zoning, waste volumes and the influence of other policies and plans. Priorities for each cluster in the short, medium and long term were then identified with 5 actions for immediate and short-term implementation being progressed for CBA (shown in Figure 1).

**Table 1 Sub-regional groups**

Group	Councils
Group 1	Cairns
Group 2	Mareeba, Tablelands, Douglas, Cassowary Coast
Group 3	Etheridge, Croydon, Cook
Group 4	Yarrabah, Hope Vale, Wujal Wujal



**Figure 1 - Regional collective actions**



## 1.2 Structure of this report

This report details the assumptions, methodology and results of the CBA completed for the RRR Plan. The analysis considers all impacts of the short-listed options including the economic, social, environmental and financial impacts. It assesses the economic viability of the proposed project options by comparing the anticipated benefits to the costs.

This report should be read in conjunction with the FNQROC Regional Resource Plan and associated Waste Flow Model FNQROC.

The document is structured as follows:

- **Section 1** provides the background to the project.
- **Section 2** presents an overview of the approach to the economic appraisal and outlines the key economic appraisal assumptions.
- **Section 3** provides an overview of the key inputs to the analysis.
- **Section 4** outlines the methodology for estimating the economic impacts.
- **Section 5** outlines the Actions assessed, cost assumptions and potential impacts.
- **Sections 6 and 7** present the CBA outputs and the sensitivity analysis.

## 2. Approach to Economic Analysis

### 2.1 Purpose of the economic appraisal

The objective of this economic appraisal is to assess the extent of the economic, social and environmental impacts resulting from the 5 Actions identified for the RRR Plan. This is done by demonstrating how the economic benefits generated by the Actions compare to the costs of implementing those options.

The appraisal is comprised of a Cost Benefit Analysis (CBA), which compares the incremental changes in costs and benefits between the Base Case and Project Case, and a qualitative assessment of the non-measurable impacts of the options. For example, avoided landfill disposal costs are estimated by comparing the total disposal costs in the base case (without the Action) and the disposal costs following implementation (Project case). Benefits and costs are presented in real terms to account for inflation, and present value to reflect the long-term social opportunity cost of capital.

The options are expected to address the problems identified in the accompanying Regional Resource Recovery Plan. Key benefits that are monetised as part of the CBA include:

1. Avoided landfill disposal costs.
2. Reduced greenhouse gas emissions (GHGs) from diverted landfill.
3. Resource recovery value.
4. Cost-efficiencies.

### 2.2 Key inputs and outputs

The key inputs into this appraisal are the waste flow modelling outputs from the Waste Flow Model FNQROC and benchmark cost estimates developed by Arup. As a result of the reliance on benchmark costs from Arup's experience, supplied by councils, or through third-party information, Arup has low confidence in the level of accuracy of the cost data used to inform the CBA. Cost assumptions have not specifically accounted for overheads, staff oncosts or contingency and no risks assessment has been completed. For a more complete view of the costs associated with each of the Actions for each of the individual councils more detailed cost analysis is required.

Outputs of the economic appraisal include the following for each project option considered:

- Total Cost (present value),
- Total Benefits (present value),
- Direct Jobs, and
- Recovery rates.

### 2.3 Modelling assumptions (CBA parameters)

Table 2 outlines the key assumptions and parameters applied within the modelling calculations that have been drawn from a range of State and Federal government guidance documents.

**Table 2 Key economic modelling assumptions**

Element	Value	Unit	Notes / Source
<b>Economic Factors</b>			
Discount rate (real)	7.00%	% real	Infrastructure Australia
Discount year	FY23	date	
Price base	FY23	date	
Escalation factors	See Notes	index	All relevant metrics will be escalated to the price base year based on Queensland Treasury: Consumer Price Index: All

			groups, Brisbane and weighted average of eight capital cities, financial year, 1948–49 to 2021–22
Waste levy escalation	CPI	%	Queensland government guidance states the levy will be increased in alignment with CPI. Forecast CPI is based on the Federal Budget for FY24 and RBS mid-point forecast.
<b>Project Timeline Inputs</b>			
Capital costs start date		<i>date</i>	Capital cost start dates vary by option depending on their proposed timing. Start dates for each option are outlined in Section 5.
Operations start date		<i>date</i>	Operations start dates vary by option depending on their proposed timing as outlined in Section 5.
Appraisal period	2023 to 2050	<i>years</i>	Aligned with QLD’s <i>Waste Management and Resource Recovery Strategy</i>
<b>Waste Flow Data</b>			
Waste tonnage data	Waste Generated, tonnes sent to landfill and tonne recovered	<i>Tonnes</i>	Extracted from the Waste Flow Model FNQROC based on data provided by council, industry metrics and accepted assumptions.

## 2.4 Base case

The base case represents the business-as-usual situation that would occur if none of the investment opportunities identified in the RRR Plan were to proceed. This is a key element of the CBA as it represents the benchmark against which the each of the options is compared. The CBA will assess the incremental changes delivered from the proposed Actions in terms of costs and benefits, compared to the base case.

The base case includes all expected costs and benefits if the current approach to waste management and resource recovery were continued over the appraisal period, but does not include any major maintenance costs. It also assumes that once the Bedminster facility closes in 2026, that MSW for this facility is redirected to landfill. It is assumed that the Actions in the project case do not impact on the operating, maintenance or staffing costs in the base case, that is, all costs are incremental to the base case.

## 3. Key inputs

### 3.1 Baseline waste flows

A key input to the economic analysis is the forecast waste flows for the region i.e. the estimated tonnes of waste streams/materials and waste recovery rates for each council over the appraisal period.

The Waste Flow Model FNQROC developed by Arup was used to estimate the future volume of waste produced by the FNQ council regions. Waste volumes were forecast to determine the regional annual tonnage produced and recovered by each council region for key waste streams (MSW, C&I and C&D). Baseline waste volumes over the appraisal period to 2050 were estimated using the following approach.

Growth in MSW waste was forecast in line with population projections produced by the Queensland Government Statistician's Office. Population projections are reported in 5-yearly periods and annual population growth was assumed to be spread evenly over the 5-years. As population projections extend only to 2041, but are reasonably linear, population counts from 2042 to 2050 were estimated by applying the 'least squares' method to generate a linear equation to extrapolate the population counts to 2050.

For commercial waste streams, C&I and C&D, growth in Gross Regional Product (GRP) was considered a more appropriate determinant of growth than population. As there are no publicly produced GRP forecasts for the FNQ regions, a linear regression was used to assess the historical relationship between population growth and GRP growth. The relationship between these two factors was used to estimate future GRP growth and applied to the commercial waste streams to forecast future tonnage over the appraisal period.

### 3.2 Impacts on waste flows

Impacts on baseline waste flows resulting from the Actions outlined in the RRR Plan were estimated using the Waste Flow Model FNQROC model developed by Arup. The assumptions and approach to estimating these outputs are outlined in the model. The waste flow impacts, including the tonnes of waste diverted from landfill and the tonnes of resources recovered, were used to estimate the benefits from the Actions.

## 4. Benefits methodology

The objective of the cost-benefit analysis is to assess the extent of the economic, social and environmental impacts of the Actions. This section outlines the approach to the benefits considered in this analysis including those that have been monetised for the CBA and additional non-monetised impacts.

### 4.1 Economic impacts

The reduction in tonnes of waste sent to landfill and increased recycling rates resulting from the Actions were used to quantify and monetise the economic impacts of the Actions. The approach to monetising these benefits is outlined below.

#### 4.1.1 Avoided landfill disposal costs

This benefit represents the reduced landfill costs resulting from diverting waste from landfill. Costs associated with landfill disposal include gate fees or establishment of the landfill site, ongoing operation, and closure and rehabilitation. Additionally, this impact captures the waste levy costs to council of disposing of landfill waste.

Avoided landfill disposal costs were estimated by comparing the total disposal costs in the base case (without the Action) and the disposal costs following implementation (Project case). Disposal costs were estimated by multiplying the tonnes of waste disposed to landfill by the relevant gate fee or internal disposal fee. Waste levy costs were similarly estimated and accounted for costs reimbursed by the Government. Overall economic value was estimated through discounting the landfill costs when incurred across the appraisal period.

**Table 3 Landfill disposal costs parameters**

Item	Value	Source
Landfill Waste	Tonnes of MSW to landfill	Waste Flow Model FNQROC developed by Arup
Springmount WMF Gate Fee	\$70	Average gate fee charged across councils for a conservative approach
Disposal cost	Small Sized Facility: \$70  Medium Sized Facility: \$87	Applicable to Croydon, Etheridge and Hope Vale. Based on BDA Group report prepared for the Department of the Environment, Water, Heritage and the Arts in 2009 and indexed to expected 2022 rates  Applicable to Cassowary Coast and Tablelands. Based upon BDA report above.
Waste levy	\$88 per tonne escalated by CPI	Queensland Waste disposal levy charges
Reimbursement rate	Cairns – reduced in line with changes to annual payments to councils  Regional – 100%	Queensland Waste disposal levy charges

An alternative waste levy scenario was also completed as part of the economic analysis that considers the impacts of changes to the local government annual payments over time. The central case follows the current Queensland Government guidance where the annual payment for Cairns is reduced year on year until 20% of the baseline is reached in FY2030/31, and the annual payment for all other regional councils continues at 100%. These rates are assumed to continue over the forecast period to 2050.

The alternative waste levy scenario assumes that rates continue to fall to 0% over time. For Cairns this means a reduction to 0% in FY2032/33. For all other eligible councils, it is assumed that the annual payment starts to decline following FY205/26, reducing by 10% each year to reach 0% in FY2035/36.

The impact of this alternative scenario is shown in the results. The change in annual payments to councils is shown in the benefits through a change in the avoided disposal costs. In the alternative scenario, more waste levy costs are avoided than in the central case, as the cost of disposing to landfill increases for any given tonne of waste.

#### 4.1.2 Reduced Greenhouse Gas emissions from landfill

Waste disposed to landfill can produce a number of negative externalities, particularly emissions of GHGs. Organic waste in landfill produces methane and carbon dioxide as it breaks down over time. The reduction in organic waste reaching landfill due to better education, improved sorting and processing, and kerbside collection practices will mean less organic waste ends up in landfill, and less GHGs are produced in comparison to the base case.

The change in GHG emissions was monetised by applying the price of carbon to the tonnes of CO<sub>2</sub>e produced in the project (Action) cases compared to the base case. The amount of GHGs released into the atmosphere (in tonnes of CO<sub>2</sub> equivalent) were estimated using a waste emissions factor for Municipal Solid Waste from the Australian National Greenhouse Accounts Factors. Additional GHG emissions from processing organic waste to produce compost were also captured in the analysis.

**Table 4 Reduced GHG emission parameters**

Item	Value	Source
MSW Emissions Factor	1.6	National Greenhouse Accounts Factors 2022, Table 14
Compost Emissions Factor	0.046	National Greenhouse Accounts Factors 2022, Table 17
Social cost of carbon	\$60 per tCO <sub>2</sub> e	ATAP PV5 Environmental Parameter Values. Escalated over time in line with UK Department for Business, Energy and Industrial Strategy: Valuation of greenhouse gas emissions for policy appraisal and evaluation.

#### 4.1.3 Resource recovery value

Better sorting and processing of materials through the Actions can result in increased resource recovery and generate additional economic value. The Actions can improve resource recovery through improve contracts, better use of transfer stations, and introducing additional kerbside collection of comingled recycling and food organics, garden organics (FOGO) material. Comingled recyclables can be processed to extract reusable materials such as cardboard, plastics, steel and aluminium. FOGO waste can be converted into high quality compost.

Where possible, resource recovery value was measured by estimating the monetary value of materials recovered based on the commodity value of those materials. It should also be noted the resource recovery values used in the analysis does not represent the resell value of the material that a council would be able to obtain. It instead applies a nuanced approach where values are used as a proxy to represent the benefit value toward society in monetary terms.

For simplicity, the split of materials in a tonne of comingled recyclables was assumed to be constant, based on bin audit data from Cairns Regional Council. This is outlined in Table 6.

**Table 5 Resource recovery value parameters**

Item	Value	Unit	Source
Cardboard	200	\$, FY2023 / tonne	Data provided to Arup from Cairns Regional Council
Plastic 1 - PET	150	\$, FY2023 / tonne	
Plastic 2 – HDPE	300	\$, FY2023 / tonne	
Plastic 4 – LDPE	0	\$, FY2023 / tonne	
Plastic 5 - PP	100	\$, FY2023 / tonne	
Ferrous metal (Steel)	150	\$, FY2023 / tonne	
Non-ferrous metal (Aluminium)	2,000	\$, FY2023 / tonne	
Compost	58.28	\$, FY2023 / m <sup>3</sup>	Arup Assumption based on market information from Integrated Crop Protection: <a href="https://www.soilwealth.com.au/imagesDB/news/ICP_SW_Composteconomics_v3.pdf">https://www.soilwealth.com.au/imagesDB/news/ICP_SW_Composteconomics_v3.pdf</a>
Green waste	10	\$, FY2023 / tonne	Arup estimate based on market knowledge
Tyres	46	\$, FY2023 / tonne	Arup assumption based on 20% of HDPE/Rubbers from the 2019 DBCT Rehabilitation Plan and Rehabilitation Cost Estimate to reflect degree of contamination and reuse value
Concrete	8.67	\$, FY2023 / tonne	Arup assumption based on Rawlinsons Australian Construction Handbook.

**Table 6 Breakdown of materials recovered from one tonne of commingled recycling**

Item	Proportion of material in one tonne of commingled recycling
Cardboard	23.09%
Plastic 1 - PET	4.01%
Plastic 2 – HDPE	3.83%
Plastic 4 – LDPE	0.05%
Plastic 5 - PP	1.42%
Ferrous metal (Steel)	2.22%
Non-ferrous metal (Aluminium)	0.90%
Glass	34.39%
Contamination	14.80%

Source: Cairns Regional Council Comingled Recyclable bin audit data

#### 4.1.4 Cost efficiencies from consolidation

A key opportunity for councils in FNQ is to reduce the cost of recovering and recycling certain materials through the use of a single waste disposal contract. This can drive down costs for waste collection and recovery, particularly for smaller councils, where large distances and/or smaller waste volumes can make this cost prohibitively high. Competitively tendering a single contract can reduce costs per council through competition and higher total volumes of waste delivering economies of scale.

Cost efficiencies were estimated by comparing business-as-usual contract costs in the base case, to more efficient costs in the project case. The reduced costs in the project case were estimated based on the cost efficiencies provided by FNQROC based on experience implementing other similar types of contracts. It was assumed that cost efficiencies of 8 per cent were achieved for larger councils, with a maximum of 20 per cent achieved for smaller or remote councils.

**Table 7 Assumed cost efficiencies**

Council	Reduction
Cairns Regional Council	8 %
Cassowary Coast Regional Council	15 %
Cook Shire Council	20 %
Croydon Shire Council	20 %

Council	Reduction
Douglas Shire Council	15 %
Etheridge Shire Council	20 %
Hope Vale Aboriginal Shire Council	20 %
Mareeba Shire Council	15 %
Tablelands Regional Council	15 %
Wujal Wujal Aboriginal Shire Council	20 %
Yarrabah Aboriginal Shire Council	20 %

## 4.2 Non-monetised impacts

In addition to the monetised impacts, there are a number of additional impacts that are expected to be delivered in the FNQROC region as a result of the actions in the RRR Plan.

### 4.2.1 Employment and jobs

Investment in waste recovery facilities and new transfer stations will create employment opportunities during construction and operations. Soft infrastructure and education programs will require additional staff to deliver these through regional councils. Similarly, new FOGO collection services and increased collection of comingled recycling will create additional jobs. Direct jobs resulting from the Actions were estimated as part of this analysis and are outlined in the results.

Furthermore, as the government investments in greener policies, supports circular based economies and creates better waste management systems, additional jobs are expected to be created. The CSIRO's National Circular Economy Roadmap notes that the recycling sector generates 9.2 jobs per 10,000 tonnes of waste, compared to 2.8 jobs for the amount sent to landfill.<sup>1</sup>

These employment opportunities, higher in the waste hierarchy, also create opportunities for higher skilled work. The transition however will be reliant on upskilling of workers through providing necessary skills and training.

### 4.2.2 Transport impacts

Costs associated with long-haul transport of waste include the vehicle operating costs which captures fuel, oil, tyres and repair and maintenance costs of transport vehicles. It can also include driver costs. A change in transport costs will also have an associated impact on GHG emissions from the change in kilometres travelled and fuel burned.

For some Actions the transport impacts are expected to be a benefit as there may be a reduction in the kilometres travelled in comparison to the base case. Reduction in the volume of waste travelling to landfill sites, and new and improved transfer facilities in more strategic locations can result in a reduction in kilometres travelled and long-haul transport costs.

However, for a number of the Actions this may present an additional cost or disbenefit as more waste is collected and required to be transported to Material Recycling Facilities (MRF) and processing plants.

The transport costs of the Actions were not quantified for this analysis, however, should be considered as part of any further analysis assessing the feasibility of the Actions.

### 4.2.3 Environment

Waste disposal via landfill has a number of other environmental impacts in addition to GHG emissions including potential leachate discharges, loss of visual amenity, odour, and increase risk of attracting disease carrying pests.

Leachate is a generated by water passing through solid waste and if not captured and contained corrected can pose risk of migration and contamination of groundwaters and soils. Depending on local circumstances,

<sup>1</sup> National Circular economy roadmap for plastics, glass, paper and tyres (2021) CSIRO



leachate can find its way into the water table, which can result in considerable risk to community health and the environment. By improving transfer facilities and diverting waste from landfill the risk of soil and water impacts can be mitigated and the cost reduced.

Windblown litter around waste and transfer facilities has the potential to enter waterways or the marine environment if not properly managed. It can also increase the risk of opportunistic scavenging by wildlife. Transfer stations replacing landfill sites and more effective waste management and reduce these risks and lead to better environmental outcomes.

#### 4.2.4 Social

A number of the Actions present opportunities for councils to improve engagement with waste management and resource recovery in their communities. New and upgraded facilities, and better processes, can diversify waste management practices, improve recovery and recycling and increase services for residents in regional areas. Improved layouts can make it easier for the community to practice better waste management enhancing reuse and recovery. Upgraded facilities can also improve amenity and provide better management of health and safety risks around waste disposal and materials recovery facilities.

Educational and marketing campaigns around waste management can have lasting community impacts. Effective campaigns provide opportunities to teach children and young people about the benefits of reusing and recycling materials and can develop better waste management behaviours that continue throughout their lives. These campaigns can also be used to reach tourists in the region, educate them about specific waste practices and enable better management of waste at the source.

## 5. Actions

This section outlines the Actions that were progressed for cost-benefit analysis. It includes the timing and the costs for each of the Actions that were input into the CBA as well as their expected impacts. How the Action applies at a regional level and to individual councils is also covered.

### 5.1 Action 1 | Step-change in customer engagement

#### 5.1.1 Description

Action 1 focuses on soft infrastructure to reduce household waste generation and decrease landfill rates. The action includes employing Education Officers, and ongoing delivery of marketing and education campaigns. The Action is aimed at reducing per capita waste generation in line with the Queensland Government Waste Management and Resource Recovery Strategy. All councils are expected to implement Action 1.

#### 5.1.2 Timing

Action 1 is an immediate Action that is assumed to commence in FY2023/24.

#### 5.1.3 Costs

Costs for Action 1 include the salary costs for regional and council-based education engagement and data management officers, and the development of a regional education and marketing strategy. The number of officers was based on the size of the council region and whether a council already had an existing officer. An average salary for council workers was used to estimate additional staff costs. This was assumed to be \$75,225 per officer based on Cairns 2021-2022 Annual Report and escalated. Cost assumptions by Council are outlined in the table below.

**Table 8 Action 1 Cost elements**

Council	Capital costs	Operating Costs
Regional	Regional marketing strategy Regional marketing budget (includes marketing, educational materials, signage)	2 x regional marketing manager 2 x data management officer
Cairns Regional Council	N/A	1 x engagement officer 1 x data management officer
Cassowary Cost Regional Council	N/A	1 x engagement officer 1 x data management officer
Douglas Shire Council	N/A	0.5 engagement officer 0.5 x data management officer
Mareeba Shire Council	N/A	1 x engagement officers 1 x data management officer
Tablelands Regional Council	N/A	1 x engagement officers 1 x data management officer
Cook Shire Council	N/A	0.5 x engagement officers 0.5 x data management officer
Croydon Shire Council	N/A	0.5 x engagement officers 1 x data management officer
Etheridge Shire Council	N/A	0.5 x engagement officers 0.5 x data management officer
Hope Value Aboriginal Shire Council	N/A	0.5 x engagement officers 0.5 x data management officer
Wujal Wujal Aboriginal Shire Council	N/A	0.5 x engagement officers 0.5 x data management officer

Council	Capital costs	Operating Costs
Yarrabah Aboriginal Shire Council	N/A	0.5 x engagement officers 0.5 x data management officer

#### 5.1.4 Impacts

Effective implementation of this Action has the potential to significantly reduce household waste generation in the region and impact landfill rates. The Queensland Government has set a household waste reduction target of 25% by 2050. A number of factors can influence the level of waste generation including technological interventions, economic conditions and changes to product design and packaging. Evidence suggests that appropriately delivered education and marketing campaigns can also result in significant changes in behaviour and lead to reduction in waste.<sup>2</sup> For this analysis it was assumed that FNQ regions would reach the Queensland target reduction in household waste and that up to 50% of this reduction could be generated from soft infrastructure solutions.

The reduction in household waste generation and associated diversion of waste from landfill may deliver the following monetised benefits:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as total waste generated by households decreases
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.

The Action is also anticipated to deliver a range of non-monetised impacts including:

- **Reduced long-haul transport costs** – Reduction in total waste generated means less truck loads are required to transport waste, reducing the kilometres travelled and associated transport costs. On the other hand, there may be increased waste haulage as people recover more resources, which would increase transport costs.
- **Employment and jobs** – Direct jobs will be created by the employment of additional engagement officers to deliver the regional education and marketing strategy.
- **Environmental** – Reduction in the volume of landfill waste can reduce risk of leachate and associated soil and water impacts.
- **Social** – The education and marketing strategy is expected to improve community engagement with resource recovery.

## 5.2 Action 2 | Optimise regional servicing arrangements

### 5.2.1 Description

Action 2 is aimed at optimising regional servicing arrangements. A contract between all 11 councils is formed, which involves a contractor driving between councils with a mobile shredder and shredding stockpiled green waste and tyres currently collected by councils. Shredded green waste is left at the council site to be removed by the general public for garden use, and shredded tyres are transported offsite for further processing.

### 5.2.2 Timing

Action 2 is assumed to be achievable in the short term, commencing in FY2023/24.

<sup>2</sup> G7 Alliance for Resource Efficiency (2021) Best Practice Examples on Reducing Household Food Waste. Accessed from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/993206/g7-alliance-resource-efficienc-best-practice.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/993206/g7-alliance-resource-efficienc-best-practice.pdf)

### 5.2.3 Costs

Costs for Action 2 include the developing of a regional servicing strategy that is updated every 5 years. The regional contract includes the cost of green waste mulching for local use, tyre shredding and concrete crushing for local use. An allowance for transporting shredded tyres to Brisbane has also been included.

**Table 9 Action 2 Cost elements**

Council	Capital costs	Operating Costs
Regional	Regional servicing strategy	0.5 x regional FTE for contract co-ordination
Cairns Regional Council	N/A	Regional contract costs Tyre transport allowance
Cassowary Cost Regional Council	N/A	Regional contract costs
Douglas Shire Council	N/A	Regional contract costs Tyre transport allowance
Mareeba Shire Council	N/A	Regional contract costs Tyre transport allowance
Tablelands Regional Council	N/A	Regional contract costs Tyre transport allowance
Cook Shire Council	N/A	Regional contract costs Tyre transport allowance
Croydon Shire Council	N/A	Regional contract costs Tyre transport allowance
Etheridge Shire Council	N/A	Regional contract costs Tyre transport allowance
Hope Value Aboriginal Shire Council	N/A	Regional contract costs Tyre transport allowance
Wujal Wujal Aboriginal Shire Council	N/A	Regional contract costs Tyre transport allowance
Yarrabah Aboriginal Shire Council	N/A	Regional contract costs Tyre transport allowance

### 5.2.4 Impacts

In the base case scenario, a number of councils already collect green waste and tyres for processing. The aim of this Action is to reduce the costs associated with this process across all councils. There are small benefits associated with improved resource recovery and diversion from landfill for those councils that do not already collect this waste. The key impact from this Action is cost efficiencies driven by the competitive tender of a single contract. Contract cost reductions are assumed to range from 8-20% depending on council size as outlined in Table 7.

The following impacts were also monetised for Councils (Croydon and Etheridge) that currently do not recover all materials in the CBA:

- **Avoided disposal costs** - Costs associated with landfill disposal will reduce as green waste, tyres and concrete material that would otherwise have gone to landfill are diverted
- **Avoided GHG emissions** - The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case
- **Resource recovery value** - The market value of the additional resources recovered through the regional contract services
- **Cost efficiencies** – Implementing a single contract is expected to provide cost efficiencies to all councils.

Non-monetised impacts are limited for this Action as the benefits centre around cost-efficiencies rather than broader economic or environmental impacts. Small environmental impacts would be expected for those councils that reduce waste to landfill as a result of the Action.

### 5.3 Action 3 | New transfer facilities and closure of facilities with regulatory or environmental issues

#### 5.3.1 Description

Action 3 involves developing new transfer station facilities for a select number of councils, to optimise their performance and encourage improvements in resource recovery. The aim of this Action is to bring every council up to a standard level of service, enabling segregation of waste and suitable to support future initiatives such as hub and spoke transfer station arrangements.

The following facilities have been assumed for each council:

- Cairns – New transfer facility and equipment to increase network capacity and accommodate future growth
- Cook – New transfer facility and equipment to replace existing facility in Cooktown
- Croydon – New transfer facility constructed at Croydon Landfill with custom infrastructure.
- Etheridge – new transfer stations to be progressively built to convert existing landfill sites at Mt Surprise, Einasleigh and Forsayth. A further new transfer facility to be constructed at the Mt Sullivan landfill site. One set of mobile equipment to be shared across the sites
- Hope Vale – Site upgrade with new transfer station sized to accommodate future growth and resource recovery
- Wujal Wujal – Site upgrade with new transfer station sized to accommodate future growth and resource recovery
- Yarrabah - Site upgrade with new transfer station sized to accommodate future growth and resource recovery.

#### 5.3.2 Timing

This Action is intended to commence in the short-term which start dates varying across councils:

- FY2023/24 – Etheridge, Hope Vale, Wujal Wujal, Yarrabah
- FY2024/25 – Cairns, Cook
- FY2025/26 – Croydon.

#### 5.3.3 Costs

Costs for Action 3 include the capital and operating costs of new transfer stations across 7 of the 11 FNQ councils. Benchmark capital costs capture the costs of planning and design, infrastructure and equipment.

Operating costs include the costs of running the facilities and FTE costs for staffing. The FTE salaries were based on the *MA000043 Waste Management Award 2020* by the *Fair Work Commission*. This included an assumed annual salary of \$47,050 for level 4 workers (Relevant to Cook, Croydon, Etheridge, Hope Vale, Wujal Wujal, and Yarrabah transfer station facilities) and \$55,026 for level 8 workers (Cairns transfer station facilities).

Costs for Croydon Shire council are based on a custom transfer facility and do not have separate equipment and associated operating and maintenance costs.

**Table 10 Action 3 Cost elements**

Council	Capital costs	Operating Costs
Regional	N/A	N/A
Cairns Regional Council	Large scale transfer station Equipment	Operating and maintenance costs 11 FTEs
Cassowary Cost Regional Council	N/A	N/A
Douglas Shire Council	N/A	N/A
Mareeba Shire Council	N/A	N/A
Tablelands Regional Council	N/A	N/A
Cook Shire Council	Medium scale transfer station Equipment	Operating and maintenance costs 2 FTEs
Croydon Shire Council	Custom transfer station	0.5 FTE
Etheridge Shire Council	4 x small scale transfer station Equipment	Operating and maintenance costs 0.5 FTE
Hope Value Aboriginal Shire Council	Small scale transfer station Equipment	Operating and maintenance costs 0.5 FTE
Wujal Wujal Aboriginal Shire Council	Small scale transfer station Equipment	Operating and maintenance costs 0.5 FTE
Yarrabah Aboriginal Shire Council	Small scale transfer station Equipment	Operating and maintenance costs 0.5 FTE

#### 5.3.4 Impacts

New transfer stations are expected to improve the ability to the communities to recover and recycle waste rather than sending it directly to landfill. This is expected to improve resource recovery rates and divert waste from landfill. The introduction of a new transfer facility is assumed to enable a blanket 25 to 50% improvement in the recovery of materials assumed to be present in the MSW, C&I and C&D self-haul residual streams historically received by councils. For specific details on waste recovery assumptions see the Waste Flow Model FNQROC.

The following benefits were monetised for the councils receiving updated transfer stations:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as more waste is directed through the transfer facilities and sorted appropriately
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case.

The Action is expected to deliver a range of non-monetised impacts, particularly for smaller councils through improved waste management practices. These include:

- **Improved resource recovery** - The Action is expected to improve resource recovery for councils receiving new transfer stations. However, given the unique nature of the solutions for each of the councils, the value of the recovered resources has not been estimated at this stage. Further investigation is required to identify the specific materials and tonnages likely to be recovered for each council area.
- **Employment and jobs** - New jobs will be created at each of the upgraded transfer facilities associated with supervising and running processing equipment. As the sites are not expected to grow significantly over time the number of jobs created remains constant.
- **Environmental** - Reduction in the volume of landfill waste can reduce risk of leachate and associated soil and water impacts. Upgraded facilities may also improve visual amenity, reduce windblown litter and decrease potential for scavenging.

- **Social** - Better facilities can make it easier for the community to engage in better waste management practices increasing reuse and recycling of materials. It can also improve health and safety for individuals working at the sites.

## 5.4 Action 4 | Enhance kerbside collection approach

### 5.4.1 Description

Action 4 enhances the kerbside collection approach across the FNQ region. Specifically, it introduces kerbside recycling services for councils where this is not currently provided, being:

- Cassowary Coast Regional Council
- Mareeba Shire Council
- Cook Shire Council.

This Action involves engaging a waste collections contractor to provide the service, and the roll out of new yellow-lid recycling bins to households. Comingled recyclables that would otherwise have gone to landfill are sent to Cairns MRF for processing. This Action assumes that no additional waste is generated by households as a result of introducing a new kerbside recycling service i.e. only comingled recycling that was previously placed in general household waste bins is transferred to and collected in the yellow bin.

### 5.4.2 Timing

Timing for implementation of Action 4 differs by council as follows:

- Cassowary Coast Regional Council – FY2023/24
- Mareeba Shire Council – FY2026/27
- Cook Shire Council – FY2029/30

### 5.4.3 Costs

Costs to implement this Action include the cost of new yellow lid bins for households, the kerbside comingled recycling contract and the cost of processing comingled recyclables at the Cairns MRF. The operating costs of processing are estimated using the gate fee charged by the facility. As there is a difference between the current gate fee and the total operating costs incurred, this additional cost is captured in the appraisal as a cost to Cairns Regional Council.

**Table 11 Action 4 Cost elements**

Council	Operating Costs
Cairns Regional Council	Operating costs over and above gate fees
Cassowary Cost Regional Council	New yellow lid bids Kerbside comingled recycling contract (cost of servicing kerbside bins) Processing recyclables at MRF
Mareeba Shire Council	New yellow lid bins Kerbside comingled recycling contract (cost of servicing kerbside bins) Processing recyclables at MRF
Cook Shire Council	New yellow lid bins Kerbside comingled recycling contract (cost of servicing kerbside bins) Processing recyclables at MRF

### 5.4.4 Impacts

Comingled recyclables that would otherwise be present in kerbside general waste and sent to landfill are collected and sent to Cairns MRF for processing. This improves the recycling rates of the 3 councils for which this Action is applicable. Specific assumptions on the impact on waste flows are provided in the Waste Flow Model FNQROC.

The introduction of a kerbside recycling service will deliver the following benefits:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as commingled recyclables that would otherwise have gone to landfill are diverted
- **Resource recovery value** – The market value of the additional resources recovered at the MRF
- **Avoided GHG emissions** – The reduction in tonnes of waste disposed of to landfill will reduce GHG emissions from landfill in comparison to the base case

The following non-monetised impacts are also expected to be delivered by this Action:

- **Jobs and employment** – Additional jobs will be created through the provision of the kerbside collection service. There may also be additional jobs created at the processing facility due to the increased volume of waste at the facility.
- **Environment** – Reduction in landfill waste may reduce the risk of leachate and associated soil and water impacts.
- **Social** – Enabling households in smaller regional / rural areas to better engage with waste recovery and recycling.

## 5.5 Action 5 | Maximise diversion of organic waste from landfill

### 5.5.1 Description

Action 5 is aimed at maximising the diversion of organic waste from landfill. It introduces a new kerbside FOGO service to:

- Cairns Regional Council
- Cassowary Coast Regional Council
- Douglas Shire Council
- Mareeba Shire Council
- Tablelands Regional Council.

Organic waste collected via the service is sent to a new processing facility located in Cairns LGA, which converts the organic waste from households, that would previously have gone to landfill, to compost.

### 5.5.2 Timing

FOGO services are assumed to be introduced in the following years:

- Cairns Regional Council – FY2025/26
- Cassowary Coast Regional Council – FY2027/28
- Douglas Shire Council – FY2027/28
- Mareeba Shire Council – FY2027/28
- Tablelands Regional Council – FY2027/28.

### 5.5.3 Costs

Costs associated with Action 5 include costs to Cairns to construct and run a new organics processing facility as well as FOGO kerbside collection costs for all councils. Operating costs for the facility are assumed to be covered by the gate-fee charged to councils.



**Table 12 Action 4 Cost elements**

Council	Capital costs	Operating Costs
Cairns Regional Council	New organics processing facility Processing equipment	New green-lid organics bins for households Operating organics processing facility and equipment Salary costs for running organics processing facility Kerbside collection contract costs
Cassowary Coast Regional Council	N/A	New green-lid organics bins for households Kerbside collection contract costs Gate fee
Douglas Shire Council	N/A	New green-lid organics bins for households Kerbside collection contract costs Gate fee
Mareeba Shire Council	N/A	New green-lid organics bins for households Kerbside collection contract costs Gate fee
Tablelands Regional Council	N/A	New green-lid organics bins for households Kerbside collection contract costs Gate fee

#### 5.5.4 Impacts

Collection of food and organic waste from households can be processed at the new organics processing facility in Cairns to create high quality compost. It is assumed that by year 7 following the commencement of the kerbside FOGO program the following capture rates are achieved:

- food organics capture rate of 39%
- garden organics capture rate of 92%
- contamination rate of 2%.

This waste would otherwise have made its way to landfills, therefore, the Action can also result in a reduction in landfill waste. Further details on the assumptions behind the waste flow impacts are included in the Waste Flow Model FNQROC.

The introduction of a FOGO kerbside service may deliver the following monetised benefits:

- **Avoided disposal costs** – Costs associated with landfill disposal will reduce as food and organic waste that would otherwise have gone to landfill is diverted
- **Resource recovery value** – The market value of the compost produced at the new organics processing facility
- **Avoided GHG emissions** – While the production of compost from food and organic waste produces some GHG emissions, the GHG emissions from a similar tonnage of landfill waste are greater. The reduction in tonnes of waste disposed of to landfill can reduce GHG emissions overall in comparison to the base case

Non-monetised impacts of the Actions include:

- **Jobs and employment** – Additional jobs will be created to collect the FOGO waste from households. New jobs will also be created at the FOGO processing facility. This Action may also result in a number of indirect jobs to produce goods and services needed to support the processing facility and workers.
- **Environment** – Reduction in landfill waste can reduce the risk of leachate and associated soil and water impacts. The production of high-quality compost may have additional benefits through improved soil and agricultural outcomes.
- **Social** – The opportunity to collect and separate food and organic waste will enable households in smaller regional / rural areas to better engage with waste recovery and recycling.

## 6. Results

### 6.1 Action 1 | Step-change in customer engagement

Action 1 is a regional solution that has costs and benefits for all councils as well as costs incurred by FNQROC at the regional level.

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Costs and benefits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 2 - Action 1 Councils impacted

#### 6.1.1 Total results

Total results represent the costs and benefits of the Action as a whole. The results are presented for an initial period to 2030 and the total appraisal period to 2050. Total costs to implement the Action are around \$20 million, with the majority of costs being the ongoing staffing and material costs. Total monetised benefits over the appraisal period to 2050 are around \$25 million. These benefits are dependent on the reduction in household waste generated resulting in a material reduction in waste disposed to landfill and associated costs.

Table 13 Action 1 - Total Cost-Benefit Analysis results (\$'000, FY2023, PV)

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Capex</b>			
Development of regional education and marketing strategy	23	23	23
<b>Opex</b>			
Regional marketing strategy updates	18	51	51
Media and materials	1,755	4,270	4,270
FTE costs	7,095	15,780	14,878
<b>Total Costs</b>	<b>8,890</b>	<b>20,124</b>	<b>19,222</b>
<b>Benefits</b>			
Avoided disposal costs	1,987	10,357	13,882
Avoided carbon costs	3,401	14,743	14,743
<b>Total Benefits</b>	<b>5,388</b>	<b>25,100</b>	<b>28,625</b>

Incorporating the alternative waste levy scenario, the avoided disposal costs increase by 34% and increase the total benefits by 14% to a total of \$29 million. The higher cost to dispose of waste in the base case, means that there are greater costs avoided with the Action, for the same tonnes of waste diverted from landfill.

As outlined in section 5.1.4 Action 1 is also expected to deliver a number of non-monetised impacts. These are summarised in the table below.

**Table 14 Action 1 - Regional non-monetised impacts**

	Results
Direct Jobs	19.5 direct jobs created
Waste reduction	12.5% of household waste generated by 2050
Environmental	Reduced in leachate risk Reduced soil, water and marine impacts
Social	Improved community engagement with resource recovery and waste management
Transport	Reduced transport costs due to lower volumes of waste being transported to landfill

### 6.1.2 Council results

The results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. Results are presented for FY2023/24 to FY2029/30 and for the entire forecast period to 2050.

**Table 15 Action 1 - Council cost-benefit analysis results, FY24-FY30 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	VASC	WASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	811	811	405	811	811	405	608	405	405	405	405
Media and materials	464	303	198	219	218	90	50	60	50	53	50
<b>Total Costs</b>	<b>1,275</b>	<b>1,113</b>	<b>604</b>	<b>1,029</b>	<b>1,029</b>	<b>496</b>	<b>658</b>	<b>466</b>	<b>455</b>	<b>459</b>	<b>455</b>
<b>Benefits</b>											
Avoided disposal costs	1,426	181	55	85	185	18	5	5	14	3	11
Avoided carbon costs	1,846	435	177	469	341	55	9	12	29	5	23
<b>Total Benefits</b>	<b>3,272</b>	<b>616</b>	<b>232</b>	<b>555</b>	<b>526</b>	<b>73</b>	<b>14</b>	<b>17</b>	<b>43</b>	<b>8</b>	<b>34</b>

**Table 16 Action 1 - Council cost-benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	VASC	WASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	1,803	1,803	902	1,803	1,803	902	1,353	902	902	902	902
Media and materials	1,237	641	419	470	467	238	153	175	154	161	155
<b>Total Costs</b>	<b>3,040</b>	<b>2,445</b>	<b>1,321</b>	<b>2,273</b>	<b>2,270</b>	<b>1,140</b>	<b>1,506</b>	<b>1,077</b>	<b>1,056</b>	<b>1,063</b>	<b>1,056</b>
<b>Benefits</b>											
Avoided disposal costs	8,391	593	223	347	623	58	15	15	46	8	38
Avoided carbon costs	8,606	1,615	756	1,959	1,309	207	34	41	107	17	91
<b>Total Benefits</b>	<b>16,997</b>	<b>2,209</b>	<b>979</b>	<b>2,307</b>	<b>1,932</b>	<b>265</b>	<b>48</b>	<b>55</b>	<b>153</b>	<b>26</b>	<b>129</b>

For larger councils, the total monetised benefits are larger than the costs of the Action. This is because there is a relatively larger reduction in landfill waste due to significantly more households in these areas. For smaller councils, the ongoing operational costs outweigh the benefits generated due to the smaller number of households and therefore smaller absolute tonnes of landfill waste reduced. The waste recovery rate for each of the councils is consistent across all councils.

A small number of jobs are also expected to be created across the councils with new engagement officer roles created to deliver the education and marketing strategy. Non-monetised impacts outlined in Table 14 the table below are also applicable at the council level.

**Table 17 Non-monetised impacts by council**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HCASC	WWASC	YASC
Direct Jobs	2.0	2.0	1.0	2.0	2	1.0	1.5	1.0	1.0	1.0	1.0
Waste reduction	12.5% of household waste generated by 2050										

## 6.2 Action 2 | Optimise regional servicing arrangements

Action 2 is a regional solution that aims to optimise regional servicing arrangements across councils. Cost efficiencies have been estimated for all councils with additional benefits estimated for two of the 11 councils.

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Cost efficiencies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Avoided disposal costs	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
Recovered resource value	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗

**Figure 3 - Action 2 councils impacted**

### 6.2.1 Total results

Total results represent the costs and benefits of the Action as a whole. The results are presented for an initial period to 2030 and the total appraisal period to 2050. Costs of this Action include the FTE costs to FNQROC of running the contracts and an allowance for the transport costs of shredded tyres. Contractor costs are captured under benefits, as these typically represent a cost saving to councils. Avoided contractor costs account for the majority of the benefits delivered by the Action.

**Table 18 Action 2 - Total Cost-Benefit Analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Opex</b>			
FTE costs	203	451	451
Tyre Transport Allowance	2,517	5,597	5,597
<b>Total Costs</b>	<b>2,719</b>	<b>6,048</b>	<b>6,048</b>
<b>Benefits</b>			
Avoided contractor costs	2,290	5,600	5,600
Avoided disposal costs	10	24	50
Avoided carbon costs	14	35	35
Recovered resource value	3	8	8

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Total Benefits</b>	<b>2,318</b>	<b>5,667</b>	<b>5,693</b>

For this Action, incorporating the alternative waste levy scenario increases the avoided disposal costs by approximately 26k. This has a minor impact on total benefits as avoided contractor costs are not impacted by the change in the waste levy reimbursement rate.

Non-monetised impacts of the Action were outlined in section 5.2.4 and are summarised in the table below.

**Table 19 Action 2 - non-monetised impacts**

	Results
Direct Jobs	0.5 jobs created
Waste recovery rate	2% average increase in MSW recovery across councils impacted
Environmental	Reduced risks of leachate and associated soil and water impacts for Croydon and Hope Vale.
Social	Enhanced product sharing and reuse of materials

### 6.2.2 Council results

Results of the CBA were also estimated at the council level to demonstrate the potential impacts for individual councils implementing the Action. Only two councils are expected to have increased resource recovery as a result of this Action. This includes Croydon Shire Council and Hope Vale Aboriginal Shire Council who are expected to have an improved ability to recover green waste, tyres and concrete.

Additional costs at a council level are limited to the allowance for transport of shredded tyres to Brisbane. Reduced contractor costs resulting from the Action are captured in the benefits. Each of the councils is expected to experience avoided contractor costs relative to the size of the council and current waste disposal costs.

**Table 20 Action 2 - Council cost-benefit analysis results, first 5 years (\$'000, FY2023, PV)**

	CRC	CRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	-	-	-	-	-	-	-	-	-	-	-
Tyre Transport Allowance	438	331	331	331	331	127	127	127	125	125	125
<b>Total Costs</b>	<b>438</b>	<b>331</b>	<b>331</b>	<b>331</b>	<b>331</b>	<b>127</b>	<b>127</b>	<b>127</b>	<b>125</b>	<b>125</b>	<b>125</b>
<b>Benefits</b>											
Avoided contractor costs	1,079	450	148	203	251	102	41	9	2	1	5
Avoided disposal costs	-	-	-	-	-	-	5	-	5	-	-
Avoided carbon costs	-	-	-	-	-	-	5	-	8	-	-
Recovered resource value	-	-	-	-	-	-	2	-	1	-	-
<b>Total Benefits</b>	<b>1,079</b>	<b>450</b>	<b>148</b>	<b>203</b>	<b>251</b>	<b>102</b>	<b>54</b>	<b>9</b>	<b>17</b>	<b>1</b>	<b>5</b>

**Table 21 Action 2 - Council cost-benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24	FY24
<b>Costs</b>											
<b>Opex</b>											
FTE costs	-	-	-	-	-	-	-	-	-	-	-
Tyre Transport Allowance	975	736	736	736	736	282	282	282	277	277	277
<b>Total Costs</b>	<b>975</b>	<b>736</b>	<b>736</b>	<b>736</b>	<b>736</b>	<b>282</b>	<b>282</b>	<b>282</b>	<b>277</b>	<b>277</b>	<b>277</b>
<b>Benefits</b>											
Avoided contractor costs	2,716	1,047	359	496	603	247	94	18	6	3	11
Avoided disposal costs	-	-	-	-	-	-	12	-	12	-	-
Avoided carbon costs	-	-	-	-	-	-	14	-	22	-	-
Recovered resource value	-	-	-	-	-	-	5	-	3	-	-
<b>Total Benefits</b>	<b>2,716</b>	<b>1,047</b>	<b>359</b>	<b>496</b>	<b>603</b>	<b>247</b>	<b>125</b>	<b>18</b>	<b>42</b>	<b>3</b>	<b>11</b>

Waste recovery rates for Croydon and Hope Vale are shown in Table 22. These represent the total increase in MSW for that council region driven by the Action. The only additional direct job created by this Action is at the regional level therefore these have not been outlined here. Environmental and social impacts are the same as those outlined at the whole region level.

**Table 22 Action 2 non-monetised impacts by council**

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Waste recovery	N/A	N/A	N/A	N/A	N/A	N/A	2%	N/A	1%	N/A	N/A

### 6.3 Action 3 | New transfer station facilities and closure of facilities with regulatory or environmental issues

Action 3 applies to seven of the 11 FNQ Councils to bring them up to a baseline standard of service across the region.

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Costs and benefits	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓

**Figure 4 - Action 3 Councils impacted**

#### 6.3.1 Total results

Results at a regional level include the total costs and benefits across all applicable councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050. Action 3 involves significant infrastructure improvements which has resulted in the total costs of the Action being higher than the benefits over the forecast period.

**Table 23 Action 3 - Total Cost-Benefit Analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Capex</b>			
Transfer facilities	43,010	43,010	43,010
Equipment	1,169	2,098	2,098
<b>Opex</b>			
Facility (operations and maintenance)	238	596	596
Equipment (operations and maintenance)	1,411	3,358	3,358
FTEs	3,707	9,097	9,097
<b>Total Costs</b>	<b>42,865</b>	<b>58,159</b>	<b>58,159</b>
<b>Benefits</b>			
Avoided disposal costs	1,003	2,773	6,205
Avoided carbon costs	1,510	4,679	4,679
<b>Total Benefits</b>	<b>2,512</b>	<b>7,453</b>	<b>10,884</b>

Under the alternative waste levy scenario, the avoided disposal costs increase by 124% to \$6.2 million and increase total benefits by 46%. Roughly \$3 million additional costs are avoided by implementing the action if the waste levy reimbursements were to change to this scenario.

Non-monetised impacts expected to be delivered by this Action are included in section 5.3.4 and summarised below. Bringing all council regions up to a standard level of waste management, improving waste recovery rates and better community engagement with waste management are key non-monetised benefits. This Action also delivers the most additional direct jobs of the Actions considered by the CBA.

**Table 24 Action 3 - non-monetised impacts**

	Results
Direct Jobs	15.5 jobs created
Waste recovery rate	Average 2% increase in recovery of MSW across impacted councils
Environmental	<ul style="list-style-type: none"> <li>- Reduced leachate risk</li> <li>- Reduced soil, water and marine impacts</li> <li>- Reduced windblown litter</li> <li>- Improved visual amenity</li> <li>- Reduced opportunity for scavenging</li> </ul>
Social	<ul style="list-style-type: none"> <li>- Improved community engagement with waste</li> <li>- Improved health and safety for workers</li> </ul>

### 6.3.2 Council results

Results at the council level are outlined below. In all cases the majority of costs are made up of the costs to construct the transfer facilities. Although the benefits are relatively much lower over the forecast period, the Action provides significant opportunities to improve waste management and there are important non-monetised impacts that provide broader benefits to the community.

**Table 25 Action 3 - Council cost-benefit analysis results, FY24 – FY30 (\$'000, FY2023, PV)**

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24/25	FY24/25	FY25/26	FY23/24	FY23/24	FY23/24	FY23/24
<b>Costs</b>							
<b>Capex</b>							
Transfer facilities	14,029	5,617	367	3,944	1,252	234	1,252
Equipment	550	245	-	93	93	93	93
<b>Opex</b>							
Facility (operations and maintenance)	120	50	2	23	13	3	13
Equipment (operations and maintenance)	561	290	-	140	140	140	140
FTE costs	2,696	419	84	127	127	127	127
<b>Total Costs</b>	<b>17,957</b>	<b>6,620</b>	<b>453</b>	<b>4,327</b>	<b>1,626</b>	<b>597</b>	<b>1,626</b>
<b>Benefits</b>							
Avoided disposal costs	845	74	3	9	16	13	43
Avoided carbon costs	1,361	80	4	13	10	19	23
<b>Total Benefits</b>	<b>2,206</b>	<b>154</b>	<b>7</b>	<b>22</b>	<b>26</b>	<b>32</b>	<b>66</b>

**Table 26 Action 3 - Council cost-benefit analysis results, total to 2050 (\$, FY2023, PV)**

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Commencement Date	FY24/25	FY24/25	FY25/26	FY23/24	FY23/24	FY23/24	FY23/24
<b>Costs</b>							
<b>Capex</b>							
Transfer facilities	14,029	5,617	367	4,344	1,352	334	1,352
Equipment	974	436	-	172	172	172	172
<b>Opex</b>							
Facility (operations and maintenance)	298	124	7	89	30	6	30
Equipment (operations and maintenance)	1,393	718	-	312	312	312	312
FTE costs	6,690	1,040	239	282	282	282	282
<b>Total Costs</b>	<b>23,384</b>	<b>7,935</b>	<b>612</b>	<b>5,199</b>	<b>2,148</b>	<b>1,105</b>	<b>2,148</b>
<b>Benefits</b>							
Avoided disposal costs	2,354	204	9	25	40	33	108
Avoided carbon costs	4,239	245	15	35	28	53	63
<b>Total Benefits</b>	<b>6,593</b>	<b>450</b>	<b>24</b>	<b>60</b>	<b>69</b>	<b>86</b>	<b>171</b>

Direct jobs created by this Action and the waste recovery rates at a council level are outlined below. Additional jobs include the cost of staff to operate and maintain the new facilities. For this Action, there are expected improvements to C&I and C&D waste recovery rates in addition to MSW. Environmental and social benefits are similar across councils and are summarised in Table 24.

**Table 27 Action 3 non-monetised impacts by council**

	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Direct Jobs	11.0	2.0	0.5	0.5	0.5	0.5	0.5
Waste recovery - MSW	2%	4%	0.2%	1%	3%	0%	1%



	CRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Waste recovery – C&I	7%	20%	15%	23%	23%	23%	23%
Waste recovery – C&D	-	5%	-	25%	18%	25%	25%

## 6.4 Action 4 | Enhance kerbside collection approach

Action 4 is aimed at delivering kerbside comingled recycling to councils that do not currently have this service. Additional costs are incurred by Cairns under this option due to the gate fee not covering the total costs of processing the additional waste at the Cairns MRF facility.

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Costs	✓	✓	✗	✓	✗	✓	✗	✗	✗	✗	✗
Benefits	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✗

Figure 5 - Action 4 Councils impacted

### 6.4.1 Total results

Results at a regional level include the total costs incurred to implement the Action as well as the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050. The Action will require purchasing of new yellow lid bins, however, the majority of the cost is driven by the ongoing servicing costs of collecting the comingled recycling from individual households. Monetised benefits are largely driven by avoided GHG emissions and carbon costs, as well as the value of recovered resources.

Table 28 Action 4 – Total Cost-Benefit Analysis results (\$'000, FY2023, PV)

	FY24 - FY30	Total to 2050	Total Waste Levy annual payment reduction scenario
<b>Costs</b>			
<b>Opex</b>			
Servicing costs	6,260	16,308	16,308
Yellow-lid recycling bins	2,049	2,139	2,139
Recycling costs (MRF processing cost)*	3,138	8,245	8,245
<b>Total Costs</b>	<b>11,446</b>	<b>26,692</b>	<b>26,692</b>
<b>Benefits</b>			
Avoided disposal costs	594	1,650	3,449
Avoided carbon costs	833	2,693	2,693
Resource recovery value	1,233	3,239	3,239
<b>Total Benefits</b>	<b>2,660</b>	<b>7,582</b>	<b>9,382</b>

In the alternative waste levy scenario avoided disposal costs increase by 109% and total benefits increase to \$9.4million. Approximately \$1.8 million further disposal costs are avoided in this scenario due to higher disposal costs in the base case.

This Action also delivers a number of non-monetised benefits as described in section 5.4.4. These are summarised below. Direct jobs are generated through additional drivers required to service kerbside collection of comingled recyclables.

**Table 29 Action 4 - non-monetised impacts**

	Results
Direct Jobs	1.5 direct jobs created
Waste recovery rate	5% on average across the three councils impacted
Environmental	<ul style="list-style-type: none"> <li>- Reduced leachate risk</li> <li>- Reduced soil, water and marine impacts</li> </ul>
Social	Enabling households to better engage with waste recovery and recycling

### 6.4.2 Council results

Council level impacts demonstrate the additional cost to Cairns to process the material collected CCRC, MSC and CSC as a result of the current gate fee. As noted for the total results, the majority of cost is from the ongoing servicing costs associated with kerbside collection. The largest benefit categories vary dependent on council.

**Table 30 Action 4 - Council cost-benefit analysis results, FY24-FY30 (\$'000, FY2023, PV)**

	CRC	CCRC	MSC	CSC
Commencement Date	-	FY23/24	FY26/27	FY29/30
<b>Costs</b>				
<b>Opex</b>				
Servicing costs	-	4,753	1,441	66
Yellow-lid recycling bins	-	1,305	652	92
Recycling costs (MRF processing cost)	856	1,975	294	13
<b>Total Costs</b>	<b>856</b>	<b>8,033</b>	<b>2,387</b>	<b>171</b>
<b>Benefits</b>				
Avoided disposal costs	-	490	99	4
Avoided carbon costs	-	657	169	8
Resource recovery costs	-	1,067	159	7
<b>Total Benefits</b>	<b>-</b>	<b>2,214</b>	<b>427</b>	<b>19</b>

**Table 31 Action 4 - Council cost-benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	MSC	CSC
Commencement Date	-	FY23/24	FY26/27	FY29/30
<b>Costs</b>				
<b>Opex</b>				
Servicing costs		10,653	4,885	770
Yellow-lid recycling bins		1,316	731	92
Recycling costs (MRF processing cost)	2,249	4,488	1,302	206
<b>Total Costs</b>	<b>2,249</b>	<b>16,457</b>	<b>6,919</b>	<b>1,068</b>
<b>Benefits</b>				
Avoided disposal costs		1,115	461	75
Avoided carbon costs		1,653	892	148
Resource recovery costs		2,425	704	111
<b>Total Benefits</b>	<b>-</b>	<b>5,192</b>	<b>2,056</b>	<b>334</b>

The Action's impact on direct jobs and waste recovery rates are shown below. The Action is estimated to increase the total MSW recovered by these councils by 4-5%. An additional part-time job is expected to be created within each region to support collection of kerbside waste. Environmental and social impacts summarised for whole region are also applicable to each of the councils.

**Table 32 Action 4 - non-monetised impacts by council**

	CCRC	MSC	CSC
Direct Jobs	0.5	0.5	0.5
Waste recovery	5%	4%	5%

## 6.5 Action 5 | Maximise diversion of organic waste from landfill

Under this Action kerbside FOGO collection is introduced at five of the 11 FNQ councils.

	CRC	CCRC	DSC	MSC	TRC	CSC	CrSC	ESC	HVASC	WWASC	YASC
Costs	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗
Benefits	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗

**Figure 6 - Action 5 Councils impacted**

### 6.5.1 Total results

Results at a regional level include the total costs incurred to implement the Action including the costs and benefits for all individual councils. The results are presented for an initial period to 2030 and the total appraisal period to 2050.

This Action involves significant start-up costs to construct the new organics processing facility and introduce new green-lid organics bins across the five councils. Ongoing servicing costs across the forecast period to 2050 account for almost half the total costs to implement the Action. The majority of benefits come from avoided disposal costs and reduced GHG emissions. There is a small disbenefit from the GHGs emitted through the composting process, however, this is offset by the benefit delivered by diverting waste from landfill.

**Table 33 Action 5 - Regional Cost-Benefit Analysis results (\$'000, FY2023, PV)**

	FY24 - FY30	Total to 2050	Total Waste Levy Scenario
<b>Costs</b>			
<b>Capex</b>			
New organics processing facility	29,391	29,391	29,391
Processing equipment	3,057	6,633	6,633
<b>Opex</b>			
Servicing costs (kerbside collection)	22,899	71,736	71,736
Green-lid organics bins	10,241	10,397	10,397
Facility (operations and maintenance)	2,479	7,059	7,059
Equipment (operations and maintenance)	2,507	7,125	7,125
FTEs	1,146	3,256	3,256
<b>Total Costs</b>	<b>71,721</b>	<b>135,598</b>	<b>135,598</b>
<b>Benefits</b>			
Avoided disposal costs	8,266	37,287	47,262
Avoided carbon costs	8,513	34,611	34,611
Carbon Cost Disbenefit (compost processing)	(73)	(299)	(299)
Resource recovery value (compost)	2,519	9,099	9,099
<b>Total Benefits</b>	<b>19,225</b>	<b>80,698</b>	<b>90,673</b>

In the alternative waste levy scenario, avoided disposal costs increase by 27%, increasing the total benefits to over \$90 million. This suggests that the Action could save an additional \$10 million in waste levy fees if the reimbursement rates change.

In addition to the monetised results. The total non-monetised impacts for the Action are captured in the following table. Direct jobs include additional jobs created at the processing facility and drivers required to provide the kerbside collection service.

**Table 34 Action 5 - non-monetised impacts**

	Results
Direct Jobs	9.5 direct jobs created
Waste recovery rate	12% average recovery rate across impacted councils
Environmental	<ul style="list-style-type: none"> <li>- Reduced risk of leachate</li> <li>- Reduced soil, water and marine impacts</li> <li>- Compost benefits through improved soil and agricultural outcomes</li> </ul>
Social	<ul style="list-style-type: none"> <li>- Increase opportunities for household engagement in waste management activities</li> </ul>

### 6.5.2 Council results

Results at a council level are shown below. Cairns has significantly higher costs under this option as it bears the costs of delivering and running the new organics processing facility. Operating costs for the facility and equipment for processing organic waste from other councils are assumed to be borne by the respective council through gate fee charges.

For most councils the largest portion of benefits comes from reduced greenhouse gas emissions from diverted landfill. For Cairns the largest driver of benefits is avoided disposal costs due to higher waste levy benefits from diverting waste from landfill.

**Table 35 Action 5 - Council cost-benefit analysis results, FY24 – FY30 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC
Commencement Date	FY25/26	FY27/28	FY27/28	FY27/28	FY27/28
<b>Costs</b>					
<b>Capex</b>					
New organics processing facility	29,391	-	-	-	-
Processing equipment	3,057	-	-	-	-
<b>Opex</b>					
Servicing costs (kerbside collection)	16,324	2,443	2,273	1,441	418
Green-lid organics bins	7,118	1,066	719	628	711
Facility (operations and maintenance)	1,767	233	109	88	283
Equipment (operations and maintenance)	1,787	236	110	89	286
FTEs	817	108	50	41	131
<b>Total Costs</b>	<b>60,260</b>	<b>4,086</b>	<b>3,260</b>	<b>2,286</b>	<b>1,828</b>
<b>Benefits</b>					
Avoided disposal costs	7,315	282	132	125	412
Avoided carbon costs	7,021	481	226	214	570
Carbon Cost Disbenefit (compost processing)	(61)	(4)	(2)	(2)	(5)
Resource recovery costs (compost)	2,083	141	66	62	167
<b>Total Benefits</b>	<b>16,359</b>	<b>899</b>	<b>423</b>	<b>399</b>	<b>1,145</b>

**Table 36 Action 5 - Council cost-benefit analysis results, total to 2050 (\$'000, FY2023, PV)**

	CRC	CCRC	DSC	MSC	TRC
Commencement Date	FY25/26	FY27/28	FY27/28	FY27/28	FY27/28
<b>Costs</b>					
<b>Capex</b>					
New organics processing facility	29,391				
Processing equipment	6,633				
<b>Opex</b>					
Servicing costs (kerbside collection)	47,097	8,343	6,559	4,885	4,852
Green-lid organics bins	7,246	1,078	732	629	712
Facility (operations and maintenance)	5,031	664	309	250	805
Equipment (operations and maintenance)	5,078	670	312	253	813
FTEs	2,321	306	143	115	371
<b>Total Costs</b>	<b>102,798</b>	<b>11,061</b>	<b>8,053</b>	<b>6,133</b>	<b>7,553</b>
<b>Benefits</b>					
Avoided disposal costs	32,638	1,344	668	615	2,022
Avoided carbon costs	26,414	2,579	1,287	1,184	3,147
Carbon Cost Disbenefit (compost processing)	(228)	(22)	(11)	(10)	(27)
Resource recovery costs (compost)	6,969	671	334	307	817
<b>Total Benefits</b>	<b>65,793</b>	<b>4,572</b>	<b>2,278</b>	<b>2,095</b>	<b>5,959</b>

The direct jobs and waste recovery rates at a council level are summarised below. Additional jobs are assumed to be created to operate the new facility and to service kerbside collection. Environmental and social impacts for each council are similar to those summarised for the whole region in Table 34.

**Table 37 Action 5 - non-monetised impacts by council**

	CRC	CCRC	DSC	MSC	TRC
Direct Jobs	7.5	0.5	0.5	0.5	0.5
Waste recovery	17%	11%	11%	5%	17%

## 7. Sensitivity analysis

Sensitivity analysis was undertaken on key assumptions and inputs to reflect the reality of inherent uncertainty associated with the Project and future conditions. It is a vital component of economic modelling which reflects the reality of uncertain features. The following sensitivities were tested individually with respect to the Central Case.

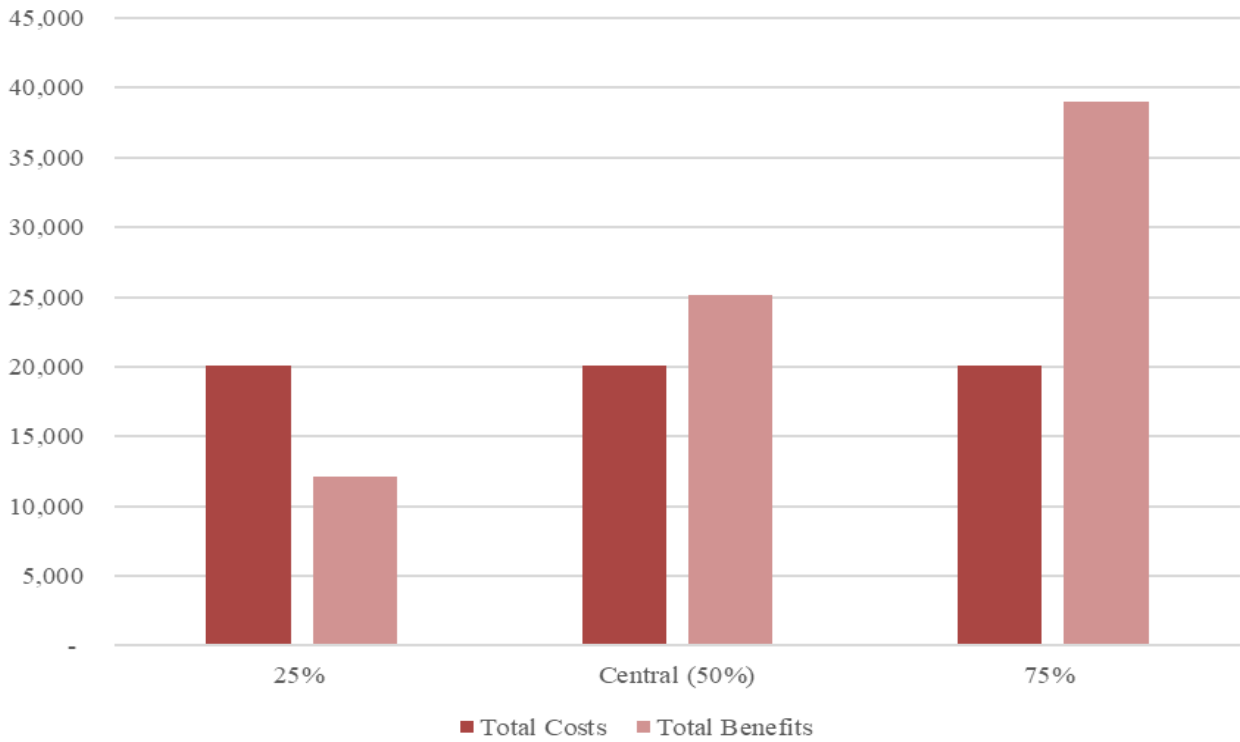
**Table 38 Sensitivity Testing**

Element	Sensitivity
Efficacy of Action 1	25%
	<b>50% (Central Case)</b>
	75%
Discount Rate (real)	4%
	<b>7% (Central Case)</b>
	10%
Social cost of carbon (baseline cost)	\$30
	<b>\$60 (Central Case)</b>
	\$200

### 7.1 Efficacy of Action 1

To reflect the number of factors that can influence the level of household waste generation, a lower and upper bound of the efficacy of the proposed education and marketing campaign has been applied to test the impact on the benefits of Action 1. Applying a lower bound of 25% effectiveness, dropped the total benefits to \$12 million over the appraisal period while an upper bound of 75% increased the total benefits by 55% to a value of approximately \$39 million. The impacts of the lower and higher bounds are shown below for Action 1.

**Figure 7 - Efficacy of Action 1 sensitivity results (\$'000, FY2023, PV)**



## 7.2 Discount Rate

Discounting is used to ensure a fair comparison of costs and benefits over various timescales between options. Applying a lower discount rate of 4%, increases the benefits and cost values for all actions in comparison to the Central Case. Inversely, increasing the discount rate to 10%, decreases both values. This is intuitive as the value of benefits and cost streams in the future is higher in present-day terms under a lower discount rate. The impacts of the lower and higher discounts are shown below for each Action.

**Figure 8 - Action 1 | discount rate sensitivity results (\$'000, FY2023, PV)**

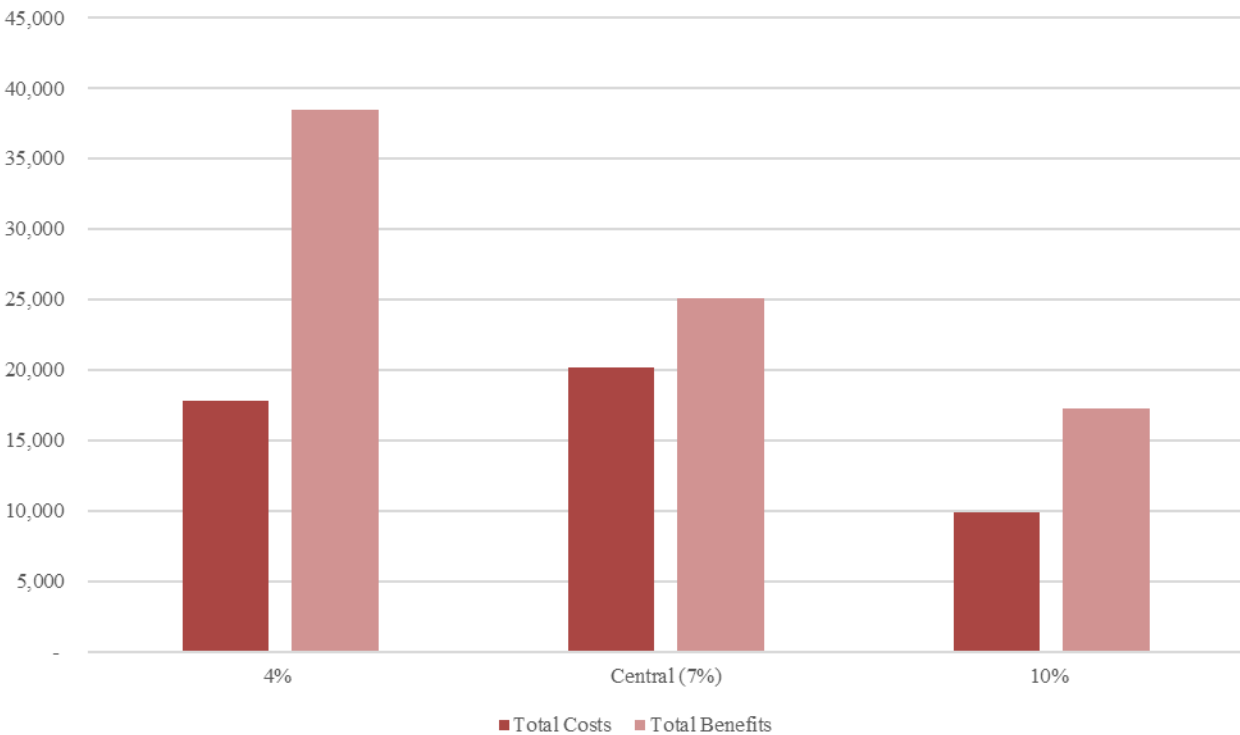


Figure 9 - Action 2 | discount rate sensitivity results (\$'000, FY2023, PV)

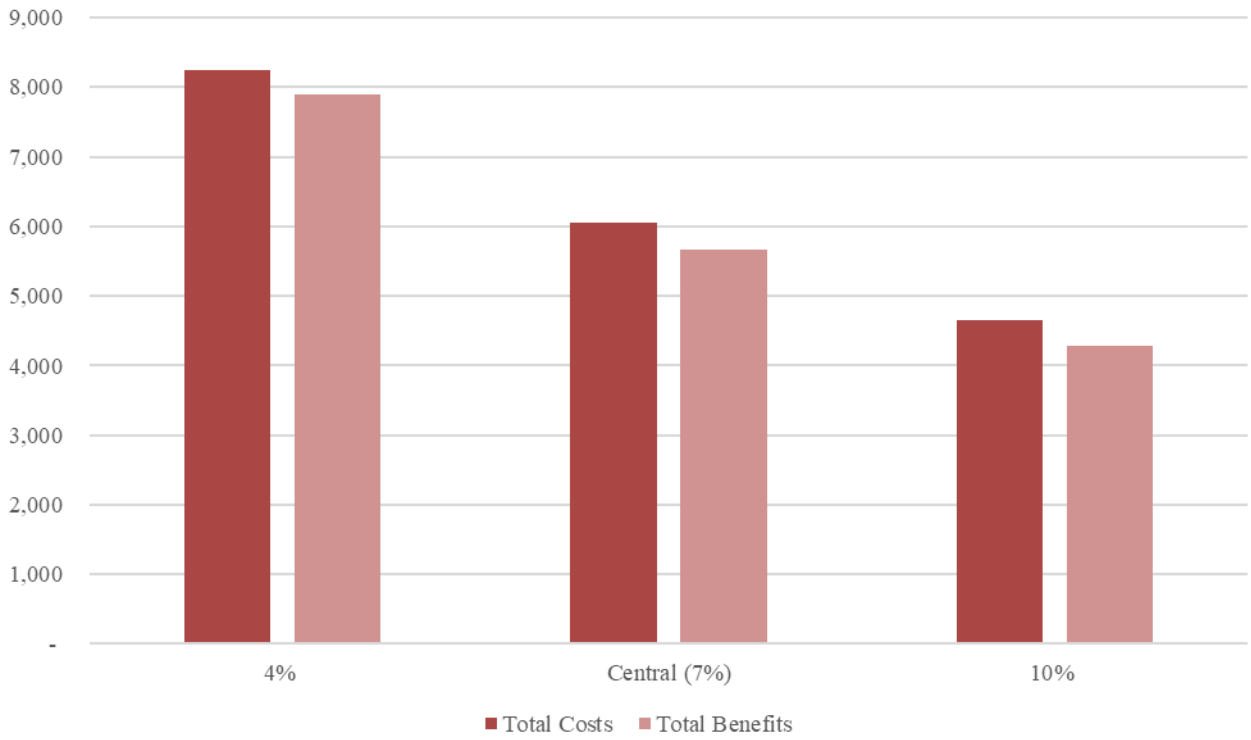
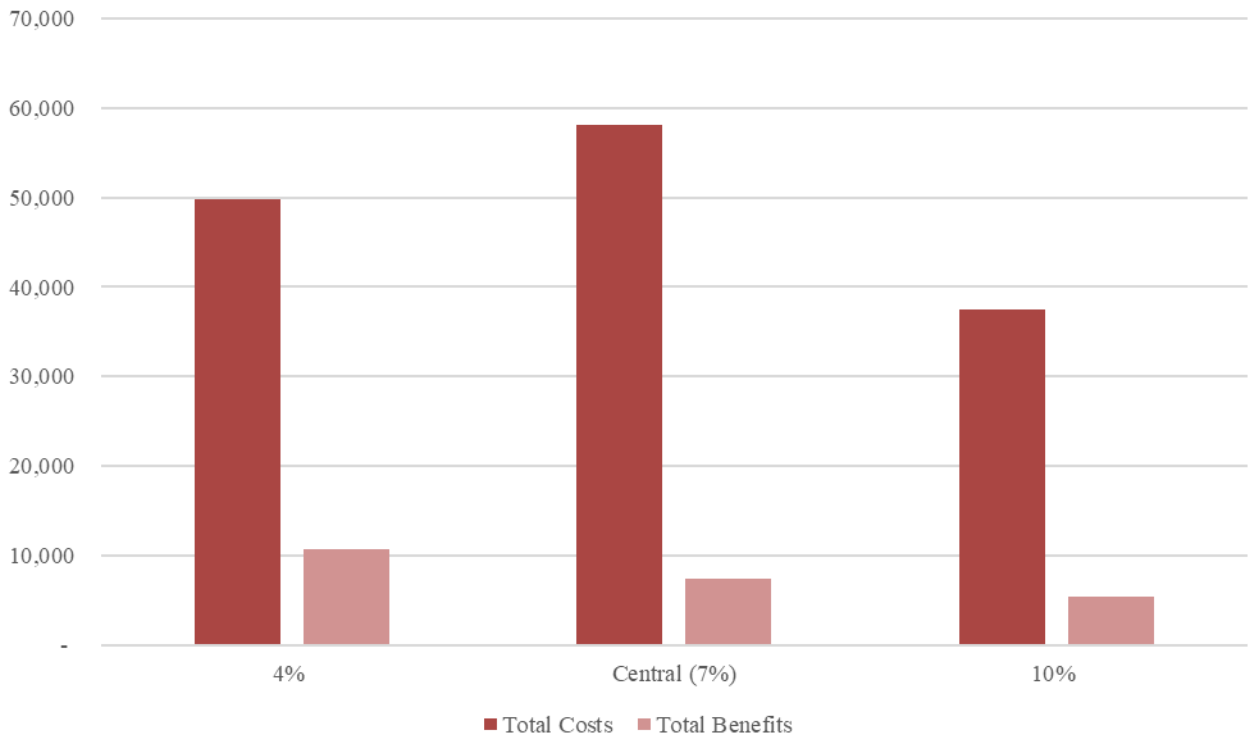
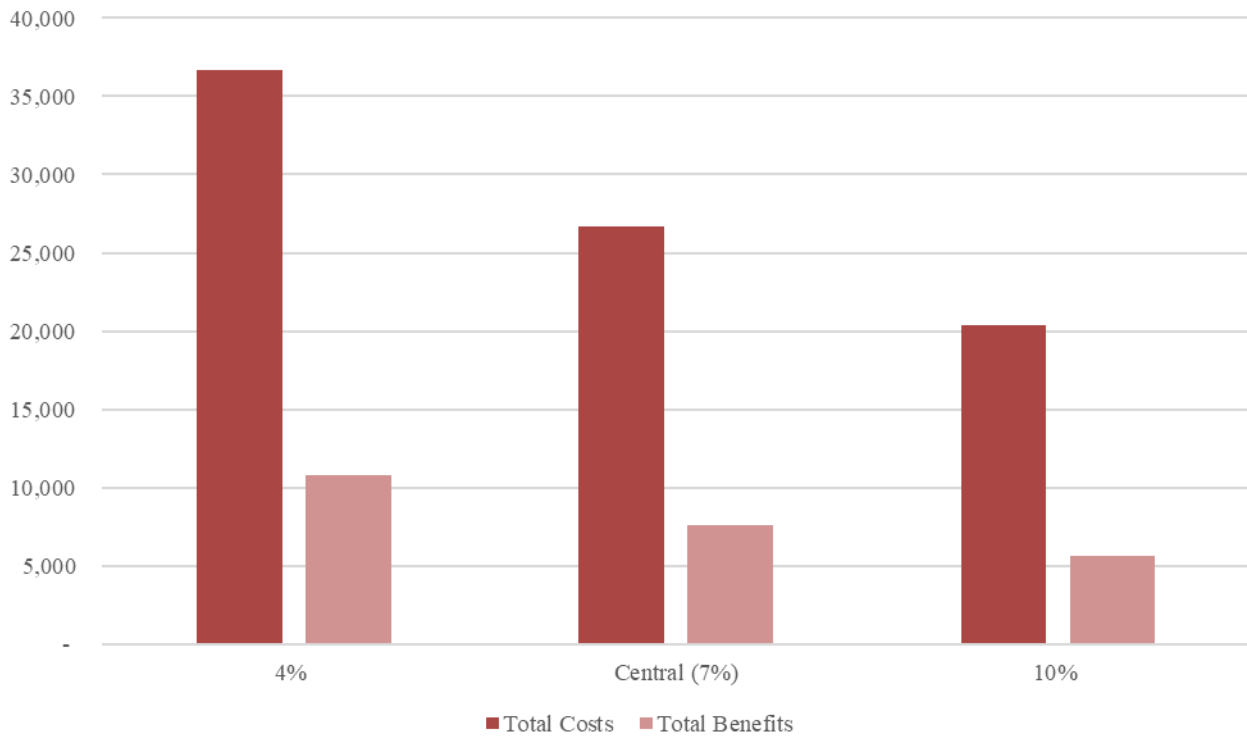


Figure 10 - Action 3 | discount rate sensitivity results (\$'000, FY2023, PV)

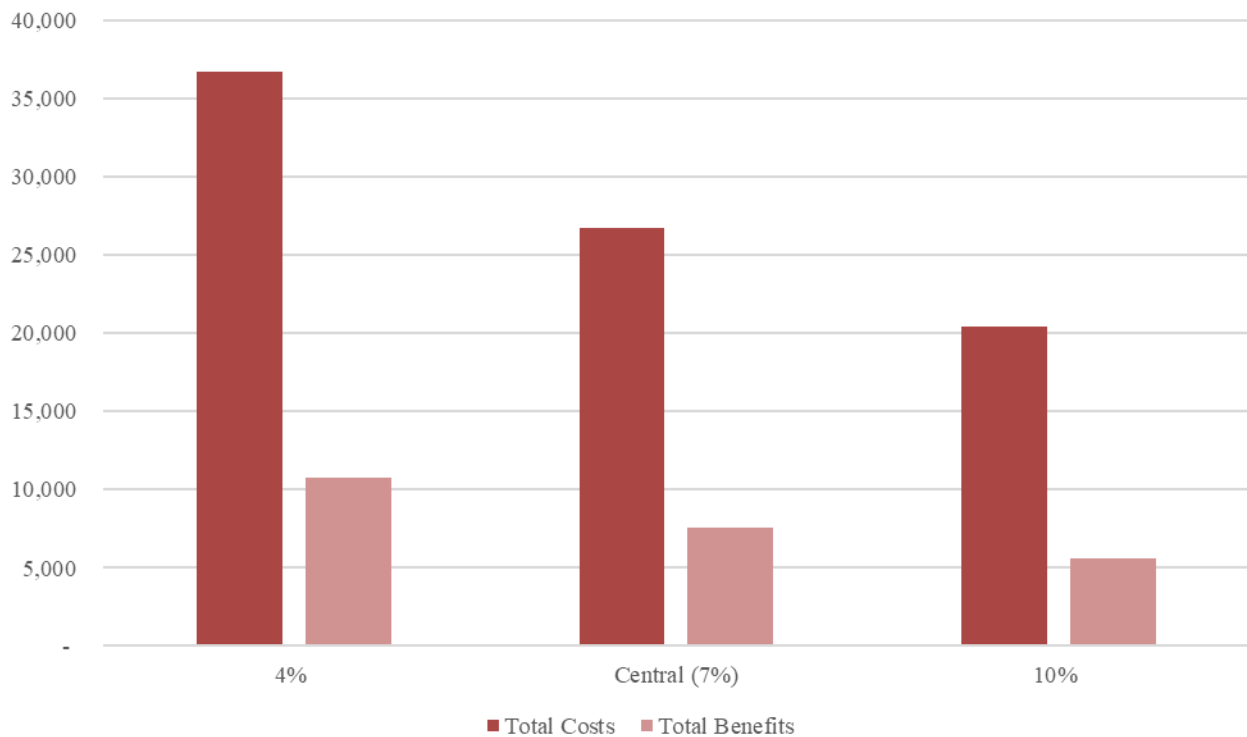




**Figure 11 - Action 4 | discount rate sensitivity results (\$'000, FY2023, PV)**



**Figure 12 - Action 5 | discount rate sensitivity results (\$'000, FY2023, PV)**

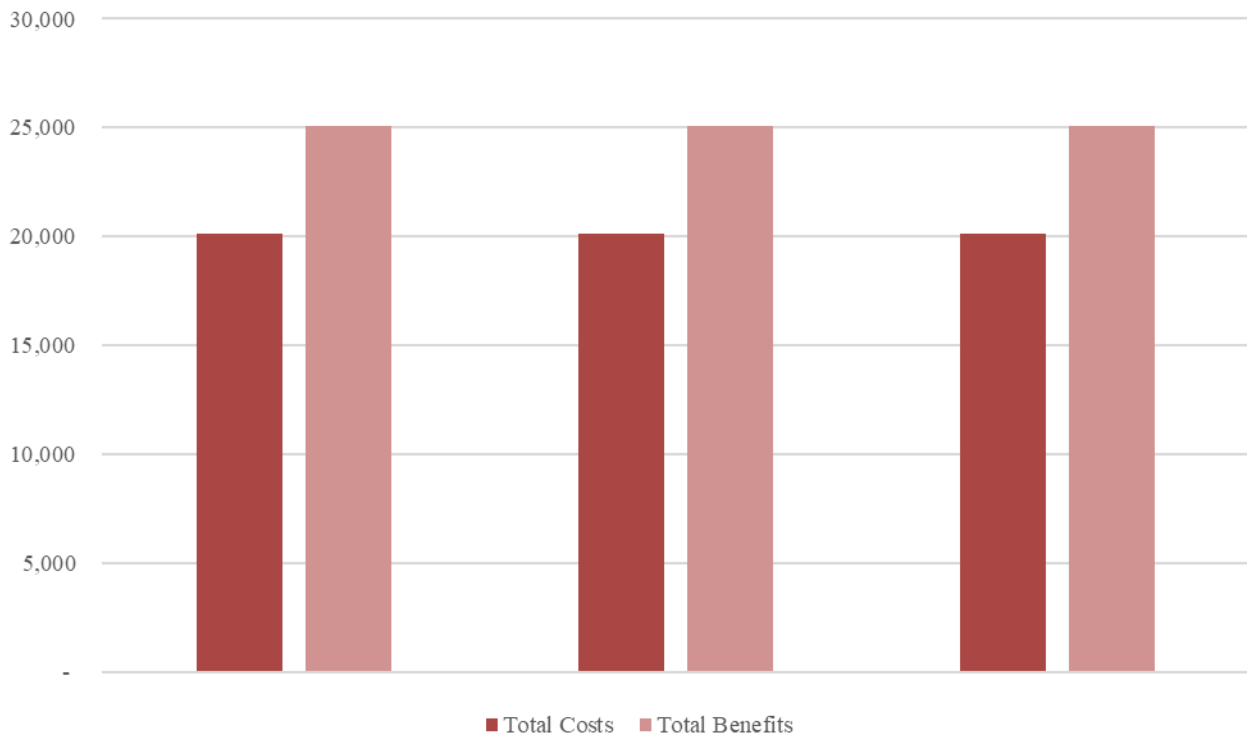


### 7.3 Social cost of carbon (baseline cost)

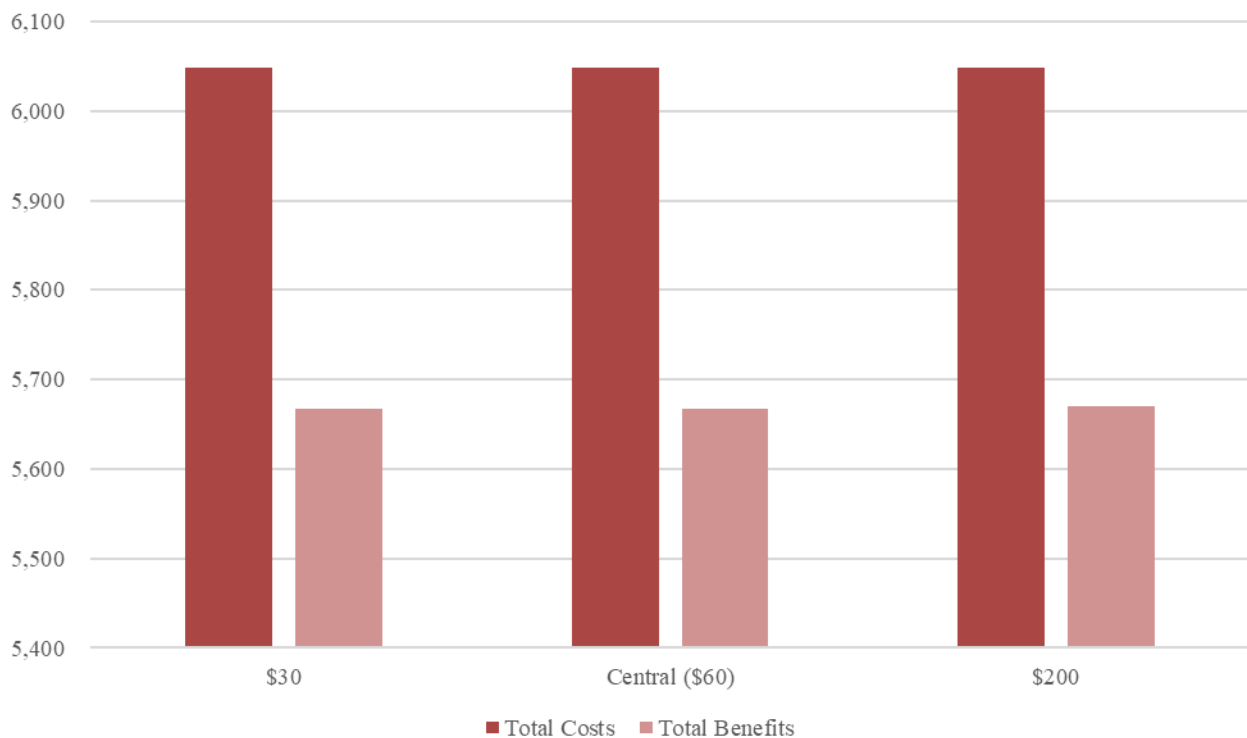
Given the high uncertainties surround the cost per tonne of CO<sub>2</sub>-e, sensitivity testing was applied on the baseline cost that is used for the avoided carbon cost benefit. Provided by ATAP, a lower bound of \$30 to an upper bound of \$200 per tonne were utilised. Applying the lower bound value of \$30, decreases the benefits

for all actions in comparison to the Central Case (\$60 per tonne of CO2-e). Inversely, the upper bound increases these benefits. The impacts of the lower and higher bounds are shown below for each Action.

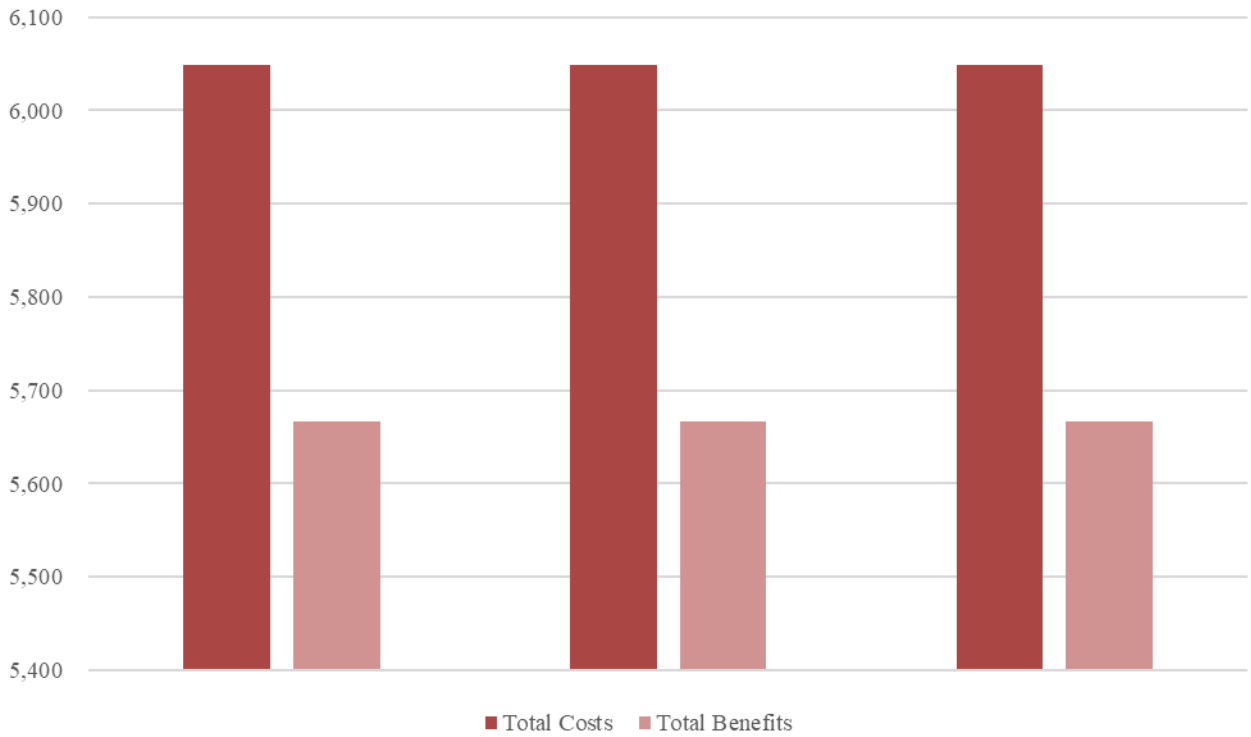
**Figure 13 - Action 1 | social cost of carbon sensitivity results (\$'000, FY2023, PV)**



**Figure 14 - Action 2 | social cost of carbon sensitivity results (\$'000, FY2023, PV)**



**Figure 15 - Action 3 | social cost of carbon sensitivity results (\$'000, FY2023, PV)**



**Figure 16 - Action 4 | social cost of carbon sensitivity results (\$'000, FY2023, PV)**

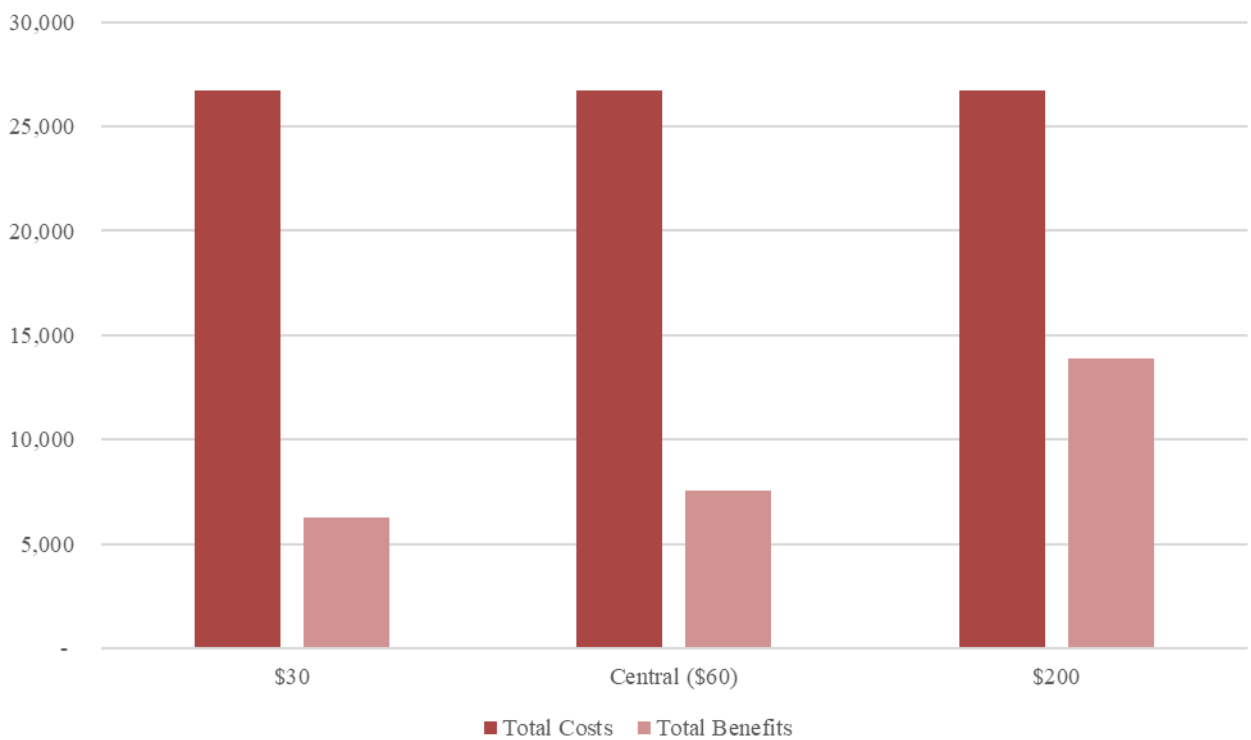


Figure 17 - Action 5 | social cost of carbon sensitivity results (\$'000, FY2023, PV)

