



Hunter Central Coast Circular Economy Ecosystem Report

Acknowledgements

Proudly delivered by the Hunter Joint Organisation on behalf of the councils of the Hunter and Central Coast Regions.

This project is a NSW Department of Planning, Industry and Environment, Waste Less Recycle More initiative funded from the waste levy.



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Revision	Amendment	Date	Prepared/Reviewed By	Comments
Draft Report		October 2019	Lexi Crouch, Samantha Cross	
Final Report		29 October 2019	Lexi Crouch, Samantha Cross	
Final Report HJO	Logos and acknowledgements	30 January 2020	Tim Askew	

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1. Executive Summary

Cross Connections Consulting (CCC) was engaged by Hunter Joint Organisation (Hunter JO) to provide a Circular Economy Eco-System project. The key objectives of the project were:

1. To gain an understanding of the status of the circular economy eco-system in the Hunter Central Coast region, as it relates to waste streams and resource recovery.
2. To improve the regional knowledge base of the circular economy.
3. To improve opportunities to collaborate and develop the regional circular economy in general.

Qualitative telephone interviews, desktop research and industry expertise were used to document the participants, opportunities and challenges in the region. A sample of participants in the region were examined with a focus on glass, paper/cardboard and plastic. This report details the status of the Hunter Central Coast circular economy and presents examples of opportunities, initiatives and stakeholders, both existing and emerging, in the region.

The Hunter Central Coast region proudly boasts numerous organisations who are actively participating in the circular economy. Examples of initiatives include:

- Recycled soft plastics, toner, glass and reclaimed asphalt are being used in the manufacture of asphalt, and crushed glass is being used as a sand substitute in concrete.
- A range of plastic polymers are being washed, flaked and sold for recycling into products.
- Scrap steel is being transformed into mining equipment and consumables.
- Timber pallets are being processed into particle board.
- Businesses are designing out non-recyclable packaging materials, going solar and paperless.

Several challenges to progressing the local circular economy were identified, such as logistics, regulation/legislation, funding to commercialise or scale up and the need for more government support to promote sustainable procurement policies, product stewardship and challenge the status quo of landfilling resources.

In summary, several opportunities exist for councils to progress the local circular economy, including:

- Creating increased demand for recovered glass through the procurement of road base, subbase and concrete for local projects.
- Ensuring procurement policies allow recycled materials to be used in their projects as a weighted criterion or mandatory process.
- Attract additional processors/recyclers to invest in the region to provide local opportunities for resource recovery.
- Greater environmental education for businesses around waste avoidance, reuse and recycling opportunities to reduce landfill and disposal costs.

Through the National Circular Economy Hub and NSW Circular, the Hunter Central Coast region will have the opportunity to share local initiatives throughout the State and Nationally. This will provide knowledge of initiatives outside of the region, transfer of learnings and promote consideration of further investment in initiatives that specifically meet the needs of the region. The National Circular Economy Hub will have strong links to international platforms which will provide Hunter JO with the ability to access and tap into global, world leading tools and information.

2. Introduction

1.1 Project Background

Current patterns of resource recovery in NSW and the Hunter Central Coast (HCC) have proven difficult to improve. This impacts businesses, households, the environment, human health, State and Local Government and the NSW economy. The Hunter Region and Central Coast Councils are interested in pursuing a circular economy approach to waste given the significant shock to the market called China National Sword. They formed the Circular Economy Working Group (CEWG) to deal with the issues at hand and develop local projects to further the opportunities provided by the circular economy. Equally, the NSW State Government has developed policy and principles for the furthering the circular economy in NSW. The HCC would like to be a leader in the development of the circular economy and a State leader in its potential future.

There are multiple projects being undertaken by the Hunter Joint Organisation (Hunter JO) (**Figure 1**):

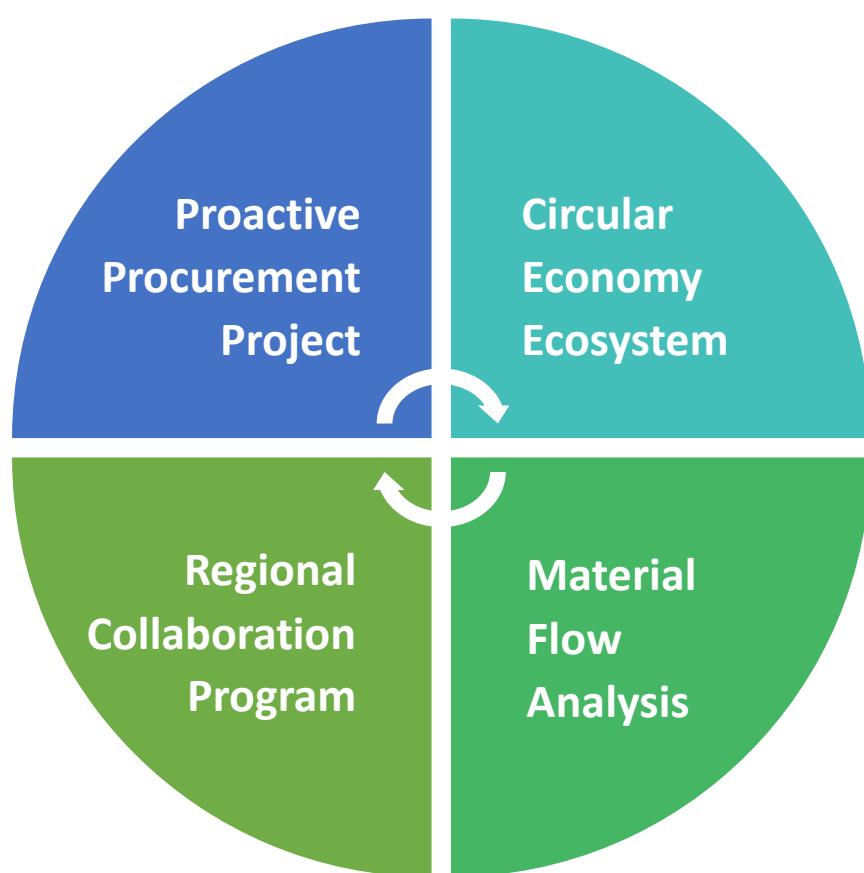


Figure 1. Hunter JO Current Projects

Phase 1 of the Circular Economy Eco-System project will provide a platform to understand the opportunities in the circular economy with goal to improve the level of resource recovery in the HCC region. Cross Connections Consulting (Cross Connections) was engaged by Hunter JO to deliver the Circular Economy Eco-System project.

The 10 HCC Councils are keen to adopt circular economy principles that will minimise these negative impacts and deliver positive economic, social and environmental outcomes for the HCC community.

The HCC economy, like most economies, has traditionally been a mostly linear system ('take, make and dispose'). They extract raw materials, manufacture goods, use them (often for a short period of time), collect and recycle some of them, then dispose of them to landfill. The total amount of waste generated in the HCC has increased rapidly over the last 30 years. This has partly been driven by population growth, but also partly due to changes in consumption patterns, such as increased purchasing of highly packaged goods.

The HCC Councils support this transition through the CEWG, a sub-committee of the Hunter JO Board. The group first identified the need to better understand the context of the circular economy in the local region. Specifically, they want to know who is currently participating in the local circular economy and what benefits can be derived for the region.

1.2 Project Objectives

The overall project objectives of the Circular Economy Eco-System project are:

1. To gain an understanding of the status of the circular economy eco-system in the HCC region, as it relates to waste streams and resource recovery.
2. To improve the regional knowledge base of the circular economy.
3. To improve opportunities to collaborate and develop the regional circular economy in general.

1.3 Project Scope

The project focus will be on resource recovery elements within HCC region or elements that are beneficial to the region. The scope of activities to be provided by the Circular Economy Eco-System project include:

1. Develop an engagement methodology and possibly a survey to gather the necessary information for the project.
2. Capture several case studies when building the database for future communication and identifying circular economy eco-system champions.
3. Understand the local micro-economies and opportunities available for processing of small-scale resource recovery tonnages.
4. Specifically identify opportunities for reuse of recycled plastic and paper/cardboard products in council operations, similar to more advanced approach for glass.
5. Include relevant links to the circular economy outside the region – state-wide and nationally – where it describes the existing situation.
6. To understand the opportunities in the region and where investment is required (i.e. high-level gap analysis required).

3. Methodology

A combination of telephone interviews and desktop research was conducted to obtain high level quantitative and qualitative data from participants to better understand current (and potential) roles of participants, capabilities and capacity within the local HCC circular economy. To maximise participation in the telephone interviews, a stakeholder engagement plan was developed in consultation with Hunter JO and executed by Cross Connections. **Figure 2** provides an overview of the stakeholder engagement and data collection process.

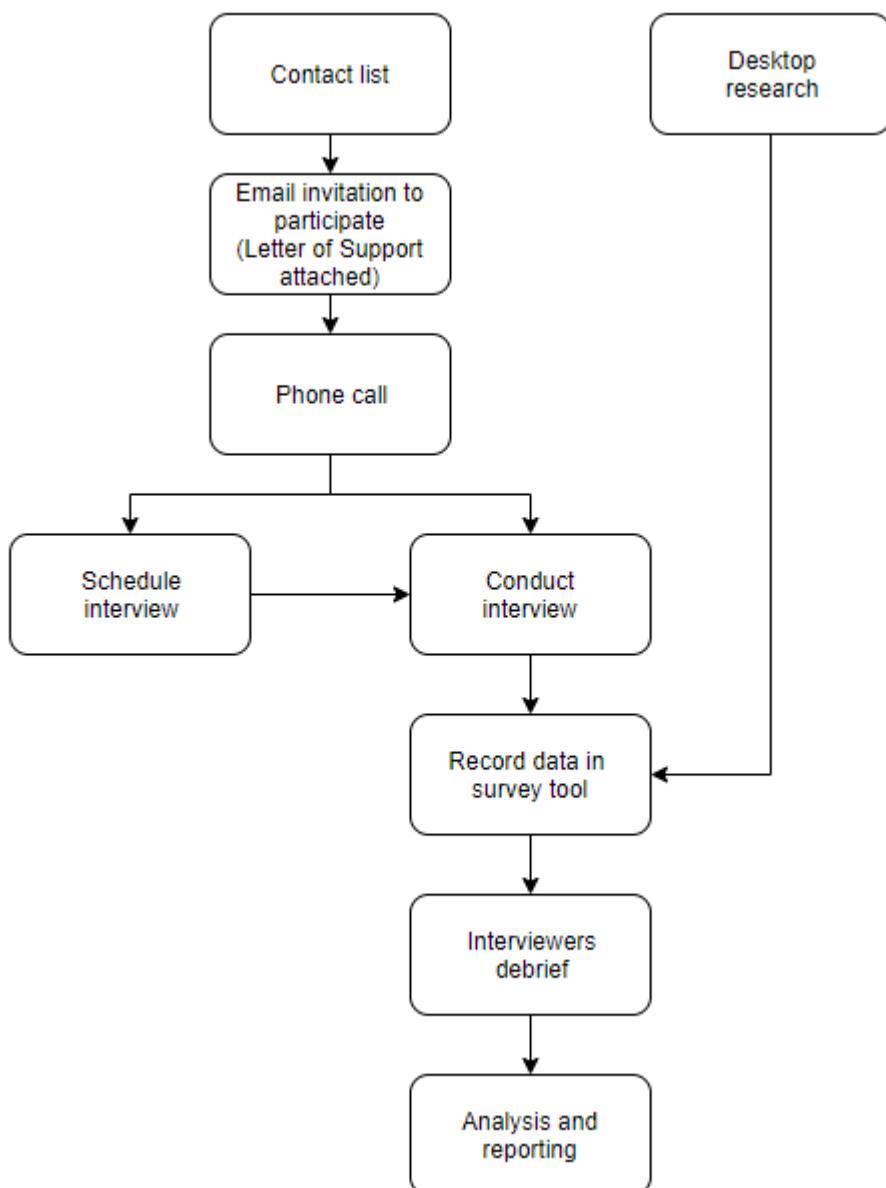


Figure 2. Stakeholder engagement and data collection methodology overview.

2.1 Stakeholder Engagement

A stakeholder engagement process was developed to encourage participation in the project and communicate the objectives of the research. The engagement process involved sending an initial email to stakeholders advising them of the project, objectives, outcomes of participation and next steps (**Appendix 1 – Email Invitation**). The email invitation included a Letter of Support from Hunter JO to provide credibility and communicate the importance of the research and participation from local organisations (**Appendix 2 – Letter of Support**).

A discussion guide was developed to ensure consistent information was gathered from respondents and to guide the interview (**Appendix 3 – Discussion Guide**). The interview questions were a combination of qualitative and quantitative questions. Qualitative open-ended questions were asked to understand opinions and experiences regarding opportunities and challenges in the circular economy space. Additional closed-ended questions were asked to capture organisational profiling data.

Following the email invitation, stakeholders were contacted via phone to conduct or schedule a phone interview.

During the project, several industry events were held in the region including the Hunternet Resources Forum, AMGC Road to the Circular Economy (Central Coast) and the Supply Chain and Logistics Forum (Newcastle and Central Coast) attended by key project stakeholders. At each of these events the Hunter JO projects were communicated, and these events identified additional participants and opportunities for the local circular economy eco-system, which have been captured in the report.

2.2 Data Collection

A total of 13 formal phone interviews were completed in September 2019 with organisations including manufacturers, research and educational institutions, social enterprises, start-ups and government. The interviews ranged from 20 minutes to 60 minutes in duration, depending on responses and respondent availabilities.

Responses were recorded in an online survey tool developed by Hunter iF. This tool was based on the discussion guides. Respondents were advised that any information shared could be made publicly available in the future via the online database tool (**Appendix 4 – Hunter iF Survey Tool**). It should be noted that the qualitative questions relating to this project are not intended to be shared in current format and prior to sharing any information publicly it is recommended that project feedback is provided to participants, a copy of information that will form the public-facing database is provided and approval sign-off received in writing from the participant organisations (or a link to review and approve their information).

2.3 Desktop Research

Alongside phone interviews, desktop research was conducted to obtain additional information on other participants in the local circular economy eco-system and wider circular economy initiatives within Australia (relevant to the priority streams). A limited selection of information was entered into the survey tool for these organisations, including a general overview of activities, circular economy role and contact details. Supplementing interviews with desktop research enabled for more representative local eco-system participant data to be collected in a timely manner. High level publicly available information on 37 additional participants was captured and entered in the survey tool as a result of the desktop research component. Further stakeholder engagement activities will be required prior to the proposed database being launched.

From both the phone interviews and desktop research, over 50 participants in the HCC circular economy were recorded in the database.

2.4 Analysis

The results of the telephone interviews informed the development of a data collection tool to obtain key information from stakeholders via a website currently being developed by Hunter iF. A draft online database tool was developed and is in **Appendix 5**.

The data collected was analysed to identify opportunities and develop case studies for communication as part of the Circular Economy Eco-System project. Case studies developed as part of this project can be found in **Appendix 6**.

4. Context and interactions in the emerging circular economy

The HCC circular economy eco-system is seen as an important element of the developing circular economy in Australia. **Figure 3** depicts how the local HCC circular economy eco-system can interact within the wider eco-system. The ability to transfer learnings to and from the local ecosystem and leverage opportunities that exist within and outside the region will be a valuable opportunity as a result of the Hunter JO initiative.

The circular economy is an alternative to a linear system of ‘take, make and waste’. It aims to maximise the value of resources by keeping products and materials in use for as long as possible. Moving to a circular economy will provide long-term economic, social and environmental benefits for the HCC. The transition will enhance the environment, increase the robustness of the economy by creating new markets and jobs, increase accessibility to goods, maximise the value of resources, reduce waste and improve how we use finite natural resources.

To strengthen the circular economy eco-system within the HCC, extensive collaboration is required across the key stakeholder organisations within and outside the region, including with State and National Circular Economy Hubs. This collaboration will ensure capacity building and identify opportunities for further investment to transition to a circular economy.

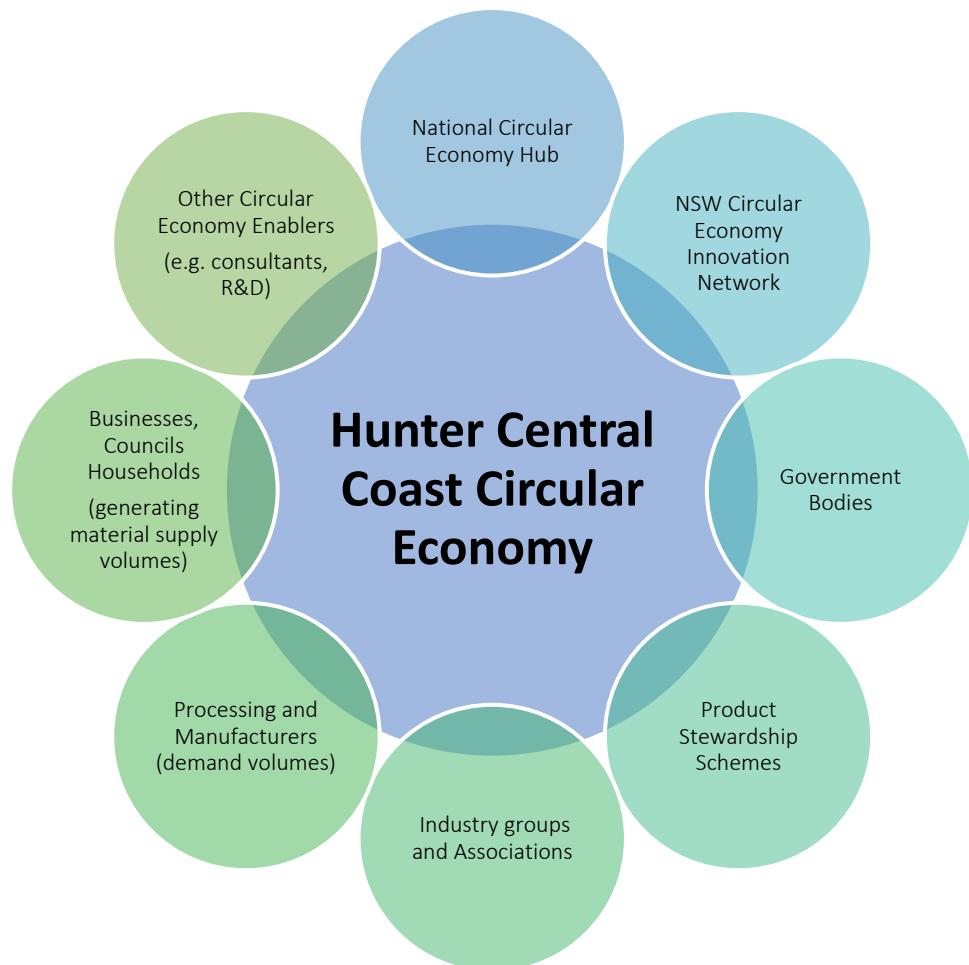


Figure 3. Graphical representation of how the local HCC circular economy eco-system can interact within the wider eco-system.

5. Key Findings

4.1 Overall Status of the local circular economy

The HCC region demonstrates strong foundations to accelerate a local circular economy, with a diverse cross-section of industries and organisations, a strong history of manufacturing and a recognised testing ground for innovative new products and models. There is significant capacity and interest from current stakeholders and potential participants across the region to continue to develop circular economy solutions. The current eco-system is supported by progressive councils who have demonstrated a willingness to trial recycled materials in new applications, strong research and development capacity through the University of Newcastle (Newcastle Innovations) and CSIRO, along with Government and industry associations, including the Department of Planning, Industry and Environment (Sustainability Advantage Program), Advanced Manufacturing Growth Centre (AMGC), AiGroup, HunterNet and the Hunter Business Chamber. This supports increased awareness and collaboration to facilitate the development of the circular economy and work with organisations to develop new technologies and processes that progress circular economy solutions in the region.

This project aligns with initiatives being undertaken by Circular NSW and the development of the National Circular Economy Hub (Planet Ark Foundation). Collaboration between the HCC Circular Economy Connect (the online database tool) and State and National circular economy organisations is of the utmost strategic importance and will improve the regional knowledge base of the circular economy, improve opportunities to collaborate and develop the regional economy in general. Through the links the online database has with other interstate bodies and international links, it will allow the HCC to keep up to date with new circular economy initiatives and provide opportunities for local implementation of additional initiatives and investment. It is also considered a shared value collaboration, as the initiatives and success stories originating in the HCC can be showcased to stakeholders and collaborators outside the region.

This report provides a snapshot of the status of the circular economy eco-system in the HCC region, as it relates to priority waste streams, resource recovery and the key stakeholders required to progress a circular economy eco-system. An overview of high level (perceived) constraints identified during the stakeholder interviews have been included for further discussion and/or investigation.

A snapshot of the types of participants interviewed, or identified through high-level desktop review, is included in **Table 1**. There is great opportunity to continue to build upon the high-level findings of this project and identify where the opportunities and gaps exist, that may accelerate (or hamper) the transition to a circular economy. From the table below there is greater opportunity to identify and engage with organisations to locally manufacture and design products to investigate opportunities to incorporate more recycled content, use more sustainable packaging and design out waste. Collaborating with various local and national industry groups and circular economy networks will provide Hunter JO with greater opportunities to connect with local businesses to engage and educate them on the local HCC online database. A selection of local and national industry groups and support organisations (Enablers) have been identified in **Table 2**. Links with these organisations can accelerate the transition to a circular economy. The opportunity to showcase local initiatives to these groups (who have significant memberships or connections to the business community) will provide shared value and identify further opportunities to progress the circular economy.

There is opportunity to tap into the existing forums and networking events held in the region to assist in the transition to the circular economy. Opportunities exist for capacity building, knowledge sharing,

identification of potential participants in the local circular economy eco-system and showcasing the HCC as a leading regional circular economy hub.

Table 1. Snapshot summary of database (participants identified) by primary circular economy role.

Primary Circular Economy Role	#	%
Reuse (share, reuse/redistribute, donate, re-sell, lease/rent)	17	23%
Repair (maintain/prolong, refurbish/remanufacture)	15	20%
Enable & Support (research and development, education, industry groups, consulting, government)	18	24%
Recycle (recycle, compost, process, sort, energy from waste)	14	19%
Manufacture & Design	10	14%
Total	74	100%

Table 2. A selection of Enabler and Support Organisations identified

Further contact details on identified organisations will be made available in the developing database.

Examples of enabling and support organisations		Relevant networking and capacity building events/forums examples
Hunter Joint Organisation	National Circular Economy Hub	Lean Manufacturing Forum
HunterNet	NSW Circular	Supply Chain & Logistics Forum
Hunter Business Chamber	University of Newcastle (e.g. Newcastle Innovation, NIER)	Manufacturing Innovation Cluster Forum
Central Coast Business Chamber	CSIRO	Hunter Circular Hub Events
Australian Industry Group (AI Group)	Australian Packaging Covenant Organisation (APCO)	The Chartered Institute of Logistics and Transport
Australian Manufacturing Growth Centre (AMGC)	Circular Economy Lab (QLD), COREO (QLD)	Waste Management Association (NSW & National)
Central Coast Industry Connect	Green Industries (SA)	Local Government NSW
Central Coast Food Alliance	Ellen MacArthur Foundation	Examples of enabling suppliers and consultants
AusIndustry (Entrepreneurs Program)	SITRA	
Master Builders Association	NSW EPA	Waste management organisations
Housing Industry Association	Department of Planning, Industry and Environment (NSW OEH)	Equipment suppliers e.g. Waste Initiatives, Miltek, TW Woods
Australian Asphalt Pavement Association (AAPA)	Waste Management and Resource Recovery (WMRR)	NSW EPA Bin Trim assessors and other local consultants
National Waste and Recycling Industry Council (NWRIC)	UTS – Sustainable Futures Institute	Transport operators (reverse logistics)
Tyre Stewardship Australia (TSA)	UNSW SMaRT Centre	Other organisations listed in AusIndustry Innovation Ecosystem (October 2017)
NACRO	TAFE NSW	

4.2 Circular economy initiatives and examples for priority waste streams

Opportunities, initiatives and examples for keeping glass, paper/cardboard and plastics in the productive economy are outlined in the tables below. **Table 3** provides an overview of the opportunities for glass, **Table 4** for paper/cardboard and **Table 5** lists the opportunities for plastics. Opportunities for additional waste streams were also identified during the interviews and desktop research and these can be found in **Table 6**. Further initiatives, examples and opportunities can be found in the database. **Table 7** provides an overview of some of the organisations in the local region that provide an enabling and supporting function to help progress local circular economy opportunities, projects and collaborations. Included are relevant links to the circular economy outside the region, where it describes the existing situation.

Each of the opportunities identified are classified into a ‘Primary Circular Economy Role’ to easily pinpoint how the organisation participates in the circular economy ecosystem. Five Primary Circular Economy Roles were identified from analysis of the database as well as desktop research on the circular economy (e.g. analysis of the roles identified by Circular Economy Club and Ellen MacArthur Foundation). The roles are shown in **Figure 4** below.

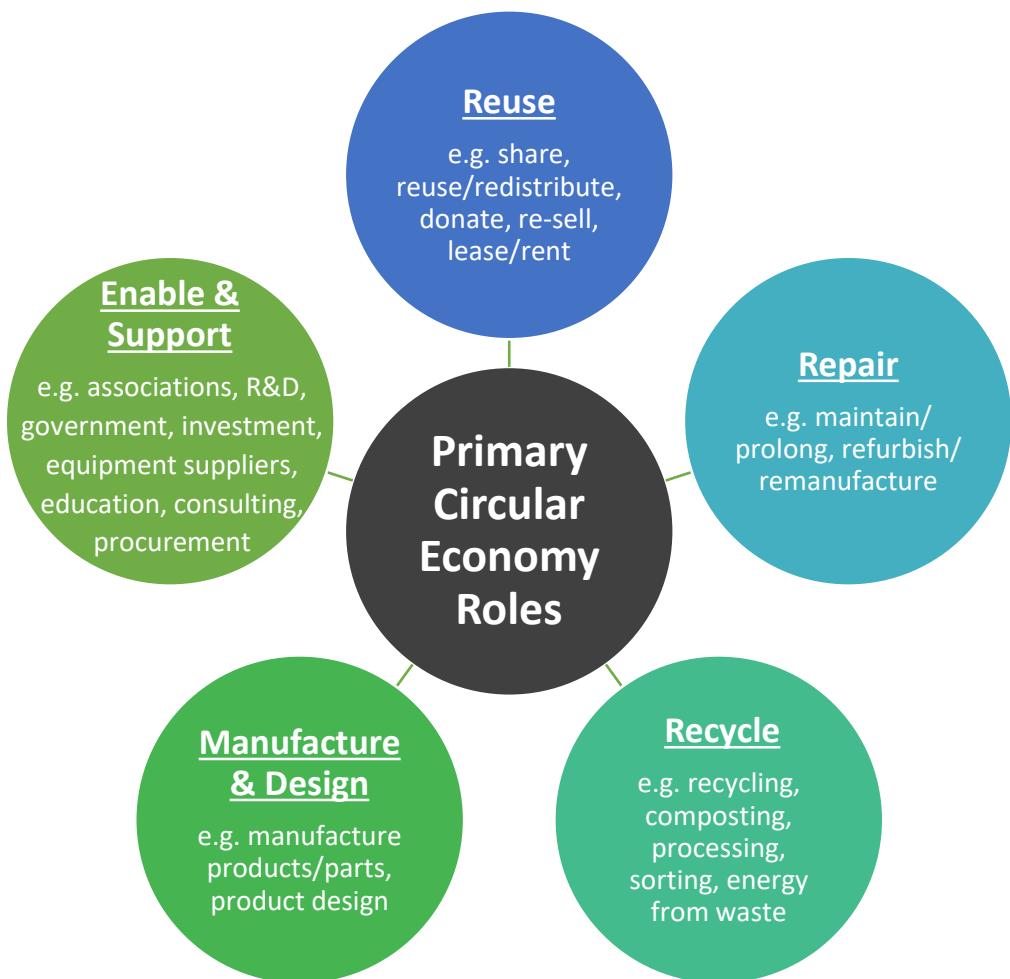


Figure 4. Primary Circular Economy Roles

The opportunities, examples and initiatives in **Table 3**, **Table 4**, **Table 5** and **Table 6** below are sorted from most preferable to least preferable waste management strategy, as per the NSW EPA Waste Management Hierarchy (**Figure 5**). This provides a simplistic method for prioritising opportunities in the region.

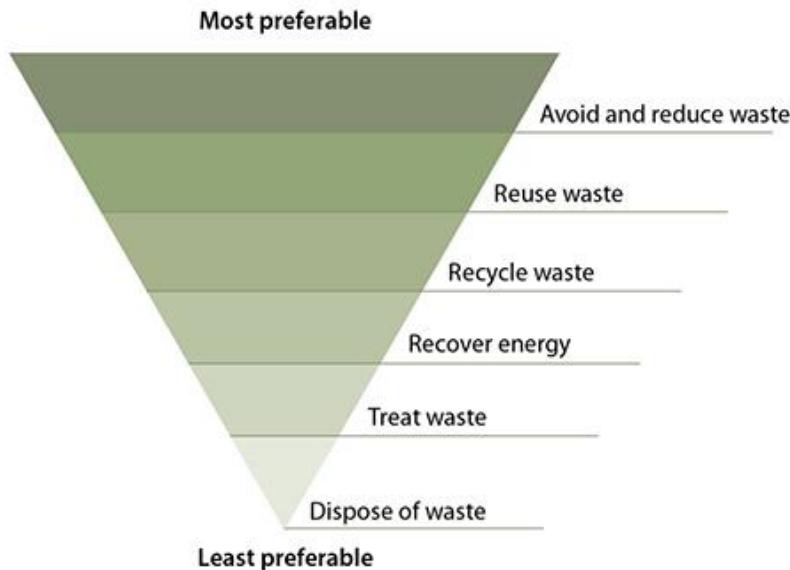


Figure 5. The Waste Hierarchy (NSW EPA)

4.2.1 Glass

Several circular economy initiatives and opportunities, both emerging and existing, were identified for glass. The HCC already has facilities within the region with capacity to process kerbside collected glass. Increased opportunities and demand from end users to use recovered glass will progress local micro circular economy solutions. Examples for reprocessing, recycling and manufacturing products from recycled glass are summarised below.

Table 3. Opportunities for glass

Glass	Example photo (indicative only)
Within Hunter Central Coast Region	
Immediate Opportunities	
<p>Reconophalt Asphalt which uses recycled glass (and other recycled materials) in asphalt and base layers.</p> <ul style="list-style-type: none"> • Organisation/s: Downer Teralba • Status: Immediate opportunity • Opportunity: Sustainable procurement, redirection of locally sourced glass that is processed to meet required specifications • Primary Circular Economy Role: Manufacture & Design • Appendix 6 - Case Study 4 (Central Coast Council) 	

Greencrete uses crushed glass fines to replace sand in concrete. For every 1m³ of concrete of nominal 20mm 20MPa concrete, approximately 20% or 400kg of coarse sand can be replaced with the equivalent crushed glass. Port Stephens Council trialled Greencrete in traffic islands at Tanilba Bay. Lake Macquarie City Council constructed a footpath using Greencrete and 100% recycled polypropylene strips at Redhead.

- **Organisation/s:** Redicrete Pty Ltd
- **Status:** Immediate opportunity
- **Opportunity:** Sustainable procurement, redirection of MRF and CDS glass for use in local construction projects
- **Primary Circular Economy Role:** Recycle, Manufacture & Design
- **Appendix 6 – Case Study 2 (Redicrete)**



Asphalt which uses recycled glass (and other recycled materials) in asphalt and base layers.

- **Organisation/s:** Fulton Hogan (Central Coast)
- **Status:** Current practice, immediate opportunity
- **Opportunity:** Sustainable procurement, source glass from IQRenew
- **Primary Circular Economy Role:** Manufacture & Design



Emerging Opportunities (Start-ups)

Using recycled glass to make bricks for use in the construction of environmentally sustainable houses with low embodied carbon. The glass bricks can be used to build sheds and single-story houses.

- **Organisation/s:** MJM Environmental (developing a start-up)
- **Status:** Emerging opportunity (start-up)
- **Opportunity:** Redirection of MRF glass, NDIS partnership
- **Primary Circular Economy Role:** Recycle



Recycled glass fines are washed and crushed by IQ Renew for use in low load (non-structural) concrete applications such as bike paths, kerbs, gutters, medium strips and footpath construction. It can also be used as a drainage medium, floor tiles, bench tiles, storm water management systems and fertilisers. IQ Renew and UNSW are currently researching opportunities to turn recycled glass fines into a silicone base.

- **Organisation/s:** IQ Renew
- **Status:** Emerging opportunity (Wyong plant ETC 2020/2021)
- **Opportunity:** Sustainable procurement, redirect glass from MRFs
- **Primary Circular Economy Role:** Recycle



Outside the Hunter Central Coast Region

Emerging Opportunities (Start-ups)

Using recycled glass fines as aggregates and precursors to produce lightweight concrete foam. A [research project](#) was conducted by University of Melbourne to discover the opportunities and benefits of using glass fines in light weight concrete. The results from this research project show that the use of recycled glass fines is feasible in both traditional and lightweight concrete foam.

- **Location:** Victoria
- **Organisation/s:** Partnership between PrefabAUS and the University of Melbourne
- **Status:** Emerging opportunity
- **Opportunity:** Sustainable procurement, local manufacturing
- **Primary Circular Economy Role:** Recycle



A [research project](#) was undertaken to analyse the opportunities to use recycled glass fines in cement treated pavement. Glass fines can successfully be added to crushed rock for use in cement by up to 15% for pavement subbase applications. Glass fines can reduce the rigidity of crushed concrete with the addition of up to 20% glass fines in blends with crushed concrete and crushed rock, for pavement base and subbase applications.

- **Location:** Victoria
- **Organisation/s:** Partnership between Swinburne University of Technology, Alex Fraser Group and VicRoads
- **Status:** Emerging opportunity
- **Opportunity:** Sustainable procurement, local manufacturing
- **Primary Circular Economy Role:** Recycle



4.2.2 Paper/Cardboard

The local eco-system has several examples of micro-circular economy models in action, primarily in the reuse of cardboard. The HCC has several active participants aggregating paper and cardboard, collected through kerbside and from businesses, for baling and redirection for processing outside of the region to the likes of Visy and Orora. A small-scale processing opportunity for processing paper was identified but it is only in the early prototype stage. Several initiatives, demonstrating existing local applications which can increase local reuse opportunities for cardboard were identified. Opportunities for aggregating, reusing and recycling this material stream are summarised below.

Table 4. Opportunities for paper/cardboard

Paper/Cardboard	Example photo (indicative only)
Within Hunter Central Coast Region	
<i>Immediate Opportunities</i>	
<p>Avoid or reduce by going paperless and switching to digital filing and storage of information. For example, City of Newcastle implemented the Paperlite program to transition Council's Administration Building to digital filing systems to reduce use of paper onsite.</p> <ul style="list-style-type: none"> • Organisation/s: Any • Status: Immediate opportunity • Opportunity: Paper reduction and cost savings • Primary Circular Economy Role: Avoid/reduce 	
<p>Reuse waste cardboard as a packaging material. Waste cardboard can be perforated into a padding/packaging material using a HSM ProfiPack 425 machine to replace bubble wrap and polystyrene. Reusing cardboard as a packaging material will extend the life of cardboard and replace virgin or plastic materials (bubble wrap).</p> <ul style="list-style-type: none"> • Organisation/s: Mastershred Australia (supplier) • Status: Immediate opportunity • Opportunity: Increase demand for cardboard, keeping material in productive economy for longer, reducing transport of material to Sydney, reduce virgin plastic use and plastic waste within organisations. Share case studies and promote option to replace virgin packing materials with perforated cardboard. This will drive demand for cardboard reuse while reducing the amount of bubble wrap currently ending up in landfill. • Primary Circular Economy Role: Reuse of cardboard and designing out waste (bubble wrap) through alternative material substitution • Appendix 6 – Case Study 1 (Quarry Mining) 	
<p>Local SME's currently purchasing bubble wrap packaging with ability source perforated cardboard waste materials.</p> <ul style="list-style-type: none"> • Organisation/s: Various. Example, Designer in a box • Status: Immediate opportunity • Opportunity: Attract new participants to participate in the circular economy and increase the demand for cardboard within region. Recommend a discrete project to progress this 	

<p>opportunity and identify organisations currently using plastic bubble wrap or other materials (ie polystyrene) for fill/packaging. Review aggregation and funding opportunities and measure impact of any implemented initiative in terms of social, environmental and economic savings.</p> <ul style="list-style-type: none"> • Primary Circular Economy Role: Reuse, Enable & Support • Appendix 6 – Case Study 3 (Sirron Holdings) 	
<p>Processing of paper/cardboard. Orora / Visy -high quality recycled liner and recycled medium in the 100-200gsm weight range.</p> <ul style="list-style-type: none"> • Organisation/s: Visy/Orora • Status: Immediate opportunity • Opportunity: To promote procurement of recycled content that will allow more materials to be retained in the circular economy. Review opportunities to minimise contamination of cardboard (ie from embedded glass) • Primary Circular Economy Role: Recycle, Enable & Support 	
<p><i>Emerging Opportunities (Start-ups)</i></p>	
<p>T3 Energy Pty Ltd have developed a prototype for a brick and insulation product made from recycled paper. The brick is fireproof and preliminary testing has shown improved insulation properties than traditional brick, insulation and plywood walls in houses.</p> <ul style="list-style-type: none"> • Organisation/s: T3 Energy Pty Ltd • Status: Emerging opportunity (Start-up) • Opportunity: Prototype development, reuse opportunity for coloured paper e.g. magazines and catalogues • Primary Circular Economy Role: Manufacture & Design, Reuse 	

4.2.3 Plastics

Several examples of local circular economy initiatives, both emerging and existing, were identified for different types of plastics. There are emerging and existing mid-scale local processing opportunities to redirect plastic materials, both soft and rigid, outside the region for processing back into products. Opportunities for further reduction, separation, aggregation, reprocessing, recycling, manufacturing and procurement of products made from recycled plastics are summarised below.

Table 5. Opportunities for plastics

Plastics	Example photo (indicative only)
Within Hunter Central Coast Region	
Immediate Opportunities	
<p>Supplier take back and reuse, repair, recycling or remanufacture of products and packaging materials. For example, after delivering resins, Compass Pool's supplier collects empty IBCs for washing and reuse. Prior to this initiative the cages were used once to collect waste then sent to landfill. Another example is the supply of TonerPlas™ asphalt additive in bulka bags. As part of participating in the Plastic Police® program, Downer will be able to tap into the logistics which will allow the return of the bags to supplier Close the Loop for reuse. Port Waratah Coal Services and their supplier designed a reusable metal crate for packaging, storing and transporting conveyor rollers safely and efficiently. The crates are reused, repaired, and then are recycled at end of life via existing scrap metal recycling onsite.</p> <ul style="list-style-type: none"> Organisation/s: Any supplier or purchaser of goods can review options to implement bulk purchased and take back options to improve packaging design to reduce or design out waste. Status: Immediate opportunity Opportunity: Process and packaging improvement. Development of case studies and collaboration with APCO to share learnings. Primary Circular Economy Role: Manufacture & Design, Reuse, Repair 	
<p>Reuse or upcycle 20kg produce bags (Polypropylene), jute bags and other bags for local clean-up activities/events rather than source new bags made from virgin plastics.</p> <ul style="list-style-type: none"> Organisation/s: Various – Generators of 20kg produce bags or bulk delivery bags (e.g. coffee roasters, cafes, produce stores), Users of bags (e.g. Clean Up Australia, council and community events). Status: Immediate opportunity Opportunity: Match generators with users through a marketplace databased. Review other opportunities to advertise “sponsors” instead of printing logos on virgin plastic bags made especially for clean-up events. Aggregate bags for redirection and reuse. Primary Circular Economy Role: Reuse 	

<p>Organisations in the region are using significant resin volumes in their manufacturing processes. Aggregation and processing of suitable end of life polymers (HDPE, LDPE, PP and other polymers) sourced from the region to come back as recycled resins.</p> <ul style="list-style-type: none"> • Organisation/s: Various • Status: Immediate opportunity • Opportunity: Explore opportunities to identify manufacturers, quantify volumes and specification of resins being used. Review opportunities to aggregate local feedstocks and redirect to processors, e.g. PACT Group (Astron Plastics Ingleburn). Facilitate opportunities for local manufacturers to work with UON, CSIRO, product designers and other industry groups to explore opportunities to increase the proportion of recycled content in products, without impacting on production or product performance. • Primary Circular Economy Role: Manufacturing & Design, Recycle 	
<p>Downer's flexible pavements manufacturing hub in Teralba produces Reconophalt, a sustainable asphalt pavement product made using recycled soft plastics and toner (TonerPlas™ sourced from Close the Loop), recycled glass and reclaimed asphalt pavement.</p> <ul style="list-style-type: none"> • Organisation/s: Downer Teralba Plant • Status: Immediate opportunity • Opportunity: Sustainable procurement, participation in the Plastic Police® program to collect soft plastics for recycling into Reconophalt, aggregation of soft plastics at council waste management facilities, provide a drop off location for soft plastics for residents and organisations • Primary Circular Economy Role: Manufacturing & Design, Reuse • Appendix 6 - Case Study 4 (Central Coast Council) 	
<p>Plastic Police® is a recycling and engagement program that partners with organisations and councils better manage soft plastics. The program provides the framework to engage, collect and redirect soft plastics to approved processors for recycling into a range of products. Participating organisations procure products to close the loop. Products include Reconophalt asphalt, wheel stops, outdoor furniture and custom products designed for participants.</p> <ul style="list-style-type: none"> • Organisation/s: Plastic Police® • Status: Immediate opportunity • Opportunity: Councils can establish local aggregation points for soft plastics collected by residents and organisations. Plastic Police® manages logistics and recycling. Councils procure recycled plastic products from program processors to offset what is collected by their community. Deliver a capacity building workshop to increase collaboration and opportunity for councils and other program participants to work together to ensure the program is delivered in a way that meets the needs of the council and wider community. • Primary Circular Economy Role: Recycle, Enable & Support • Appendix 6 - Case Study 4 (Central Coast Council) 	

<p>Review applications/organisations using polystyrene and work with organisations to review designing-out waste or using substitute materials (e.g. perforated cardboard for packing material where suitable). Where polystyrene is collected at council-operated community recycling centres, review opportunities to reprocess/reuse recycled polystyrene in local applications. Recycled polystyrene could be used to pack and protect products during transport or in waffle pod construction.</p> <ul style="list-style-type: none"> • Organisation/s: Various • Status: Immediate opportunity • Opportunity: Aggregation of material and identification of generators/end users • Primary Circular Economy Role: Reuse, Recycle • Additional information: APCO EPS Working Group Report 	
<p>A range of plastic polymers are washed and flaked locally, and flakes are sold for export or recycling into a range of products.</p> <ul style="list-style-type: none"> • Organisation/s: Clean Waste Solutions (based in Maitland LGA) • Status: Immediate opportunity that several waste collection organisations are currently using within the region • Opportunity: Increase capacity, support to scale this operation • Primary Circular Economy Role: Recycle 	
<p>Council aggregation of specific plastic streams for redirection to recyclers:</p> <ul style="list-style-type: none"> • Mixed soft plastic films: Plastic Police® • Clear soft plastic films: Plastic Police® and other recyclers (directly or indirectly) to be turned into resin • Single polymer rigid plastics such as polypropylene pot plants (not accepted in kerbside recycling bin): Garden City Plastics • Medium density dripper tube and irrigation pipe: into bollards and barriers. These products are manufactured in Victoria by Woodshield and distributed in the region. Opportunity to redirect materials and develop case studies • PVC offcuts for recycling into new pipe: Vinidex • Clean stream HDPE (such as drums and milk containers) to be turned into fence posts, flakes: Pelletek, Clean Waste Solutions • Organisation/s: Council (as aggregator) and various (including examples provided above of recyclers refer to the online database) • Status: Existing and emerging opportunities • Opportunity: Local aggregation of source separate materials for redirection for recycling. Reverse logistics and product stewardship take back programs. Sustainable procurement and identification of end market users • Primary Circular Economy Role: Manufacture & Design, Enable & Support 	

Emerging Opportunities (Start-ups)

Waste plastics can be transformed into synthetic crude oil that can be used in multiple applications e.g. low temperature application for bitumen or high temperature rocket fuel.

- **Organisation/s:** IQ Renew
- **Status:** Emerging opportunity
- **Opportunity:** Redirection for low value/residual plastics
- **Primary Circular Economy Role:** Recycle



Outside the Hunter Central Coast Region

Immediate Opportunities

Close the Loop are using recycled soft plastics (mixed polymers but primarily LDPE) and waste toner from ink cartridges to make an asphalt additive (binder) product called TonerPlas™.

- **Location:** Victoria (Aggregation undertaken by Plastic Police® locally. Processing of plastics undertaken in Victoria)
- **Organisation/s:** Close the Loop
- **Status:** Immediate opportunity for procurement and redirection of collected soft plastics
- **Opportunity:** Review possible investment within region to establish local processing capacity. Local collection of soft plastics through the Plastic Police® program for redirection to Close the Loop. Council sustainable procurement of asphalt from local asphalt manufacturer Downer (Teralba) using TonerPlas™
- **Primary Circular Economy Role:** Recycle



Manufacturing of products, with products procured by Councils and organisations, made from recycled hard and soft plastics, such as wheel stops, bollards, decking, outdoor furniture, asphalt additive (purchased by Downer) etc.

- **Location:** Victoria, New South Wales
- **Organisation/s:** Replas (Vic), Plastic Forests (NSW), Close the Loop (Vic), Moodie Outdoor Products (NSW), Newtecpoly (NSW), Integrated Recycling (Vic), Environex (Tas)
- **Status:** Immediate opportunity to redirect to a number of these processors through existing programs.
- **Opportunity:** Attract local manufacturing and investment to region. For example, the data that will be collected by Plastic Police® on material feedstock leaving the region and demand for products within the region could form part of the due diligence for further investment by manufacturers in the region (and reduce carbon footprint and costs associated with interstate transport).
- **Primary Circular Economy Role:** Recycle, Manufacture & Design



Plastic Forests recycle soft plastic films from consumers, industry and agriculture into recycled plastic products such as mini wheel stops, dunnage, garden edging and edging pegs, path edging, root barrier, electrical cable cover and resin. Plastic Forests commercialised a unique dry-cleaning process to recycle contaminated plastic films, without using water. Plastic Forests can recycle LDPE, HDPE, LLDPE and PP.

- **Location:** Albury NSW



<ul style="list-style-type: none"> Organisation/s: Plastic Forests Status: Immediate opportunity Opportunity: Establish opportunity in local region. Some initial aggregation currently occurring as part of Plastic Police® Primary Circular Economy Role: Recycle 	
<i>Emerging Opportunities (Start-ups)</i>	
<p>Using recycled plastics and glass fines in concrete footpath construction.</p> <ul style="list-style-type: none"> Location: Victoria Organisation/s: Swinburne University of Technology Status: Emerging Opportunity Opportunity: Redirection, sustainable procurement, local manufacturing and investment Primary Circular Economy Role: Recycle 	
<p>The Milk Bottle Collective is a program collecting HDPE milk bottles from cafes to be recycled back into milk bottles and resins, closing the loop on this waste stream. The program provides a collection service and baler rental service.</p> <ul style="list-style-type: none"> Location: Sydney NSW Organisation/s: The Milk Bottle Collective Status: Emerging Opportunity Opportunity: Establish the initiative in the local region (collection, aggregation and processing) Primary Circular Economy Role: Recycle 	

4.2.4 Other resource material streams

Beyond the three priority waste streams, additional opportunities for other resource/material streams were identified. A selection has been summarised below.

Table 6. Opportunities for other material streams

Resource and Opportunity	Example photo (indicative only)
Within Hunter Central Coast Region	
<i>Immediate Opportunities</i>	
<p>Using its innovative MatrixMaterials technology, StabilCo NSW blend selected materials from waste aggregates and other solid wastes from the construction, municipal, chemical, utility and mining industries to produce superior pavement construction materials – for roads, rail, airport aprons, cycleways, landfill liners and other hardstand areas.</p> <ul style="list-style-type: none"> • Organisation/s: StabilCo NSW • Status: Immediate opportunity • Opportunity: Redirection, sustainable procurement • Primary Circular Economy Role: Reuse, Manufacture & Design 	
<p>C&D Waste Streams (e.g. concrete and aggregates) Sorting, crushing, screening and processing aggregates and other C&D materials for reuse and recycling. Concrete and masonry are crushed to create aggregate for use on roads, driveways.</p> <ul style="list-style-type: none"> • Organisation/s: Central Waste Station • Status: Immediate opportunity • Opportunity: Redirection, sustainable procurement, expand capacity • Primary Circular Economy Role: Reuse 	
<p>Metals Scrap steel can be recycled into mining equipment and consumables</p> <ul style="list-style-type: none"> • Organisation/s: MolyCop • Status: Immediate opportunity • Opportunity: Council aggregation and redirection • Primary Circular Economy Role: Recycle 	
<p>Timber Pallets Timber pallets can be aggregated at local aggregation points for sharing and reuse by local organisations.</p> <ul style="list-style-type: none"> • Organisation/s: Various • Status: Immediate opportunity • Opportunity: Council aggregation, pooling model, reuse • Primary Circular Economy Role: Reuse 	

<p>Timber Pallets</p> <p>Processing timber pallets into particle board.</p> <ul style="list-style-type: none"> • Organisation/s: Borg Manufacturing • Status: Immediate opportunity • Opportunity: Reuse, reprocessing into particleboard, increase capacity, sustainable procurement • Primary Circular Economy Role: Recycle 	
<p>Coffee grounds</p> <p>Used coffee grounds are collected and reused to grow oyster mushrooms by local business Bean Cycled. Participating cafes/restaurants can purchase the mushrooms.</p> <ul style="list-style-type: none"> • Organisation/s: Bean Cycled • Status: Immediate opportunity • Opportunity: Increase capacity, logistics solution to scale • Primary Circular Economy Role: Reuse 	
<p><i>Emerging Opportunities (Start-ups)</i></p>	
<p>Rubber Tyres</p> <p>Using waste car tyres in the manufacture of sustainable housing.</p> <ul style="list-style-type: none"> • Organisation/s: MJM Environmental (developing a new start up) • Status: Emerging opportunity (start-up) • Opportunity: Alternative material review, local processing and job creation. • Primary Circular Economy Role: Recycle 	
<p>Outside the Hunter Central Coast Region</p>	
<p><i>Immediate Opportunities</i></p>	
<p>Rubber Tyres</p> <p>Using recycled tyre crumb in asphalt. Tyrecycle processes the crumb which is added to the asphalt mix locally by Downer in Teralba.</p> <ul style="list-style-type: none"> • Organisation/s: Downer and Tyrecycle • Status: Immediate opportunity • Opportunity: Sustainable procurement, council aggregation and redirection to Tyrecycle for processing, councils procure asphalt, local processing/investment • Primary Circular Economy Role: Recycle, Manufacture & Design 	
<p>Plasterboard can be recycled into agricultural products. There is some current recovery occurring in the region, but a significant volume is believed to be still be ending up in mixed waste streams in landfill.</p> <ul style="list-style-type: none"> • Organisation/s: Regyp (Sydney based) and generators • Status: Immediate opportunity to redirect, Emerging opportunity to process locally. • Opportunity: Revisit aggregation opportunities to quantify volume and reverse logistics costs. Raise awareness of local aggregation options and develop a case study to demonstrate economic and environmental value. Provide support to businesses wishing to review local processing opportunities and compliance with current resource recovery orders and 	

<p>exemptions. Council aggregation and reduced gate fee for source separated plasterboard could be reviewed</p> <ul style="list-style-type: none"> • Primary Circular Economy Role: Manufacture & Design, Enable & Support, Recycle 	
<i>Emerging Opportunities (Start-ups)</i>	
<p>Rubber Tyres</p> <p>Extracting carbon from used car tyres and polymers for use as a substitute to coking coal in steel manufacturing.</p> <ul style="list-style-type: none"> • Location: Aggregation of tyres within region, processing of tyres undertaken outside of region • Organisation/s: MolyCop and UNSW • Status: Emerging opportunity • Opportunity: Resource recovery • Primary Circular Economy Role: Manufacture & Design, Recycle 	
<p>Textiles</p> <p>Recycling of end of life/used synthetic clothing (e.g. polyester and nylon) into carpet underlay, carpet tiles, wall panels for buildings, acoustic panelling.</p> <ul style="list-style-type: none"> • Location: Processing undertaken outside of region • Organisation/s: Circular Fashion Centre • Status: Emerging opportunity • Opportunity: Review opportunity to attract local investment. Review aggregation opportunities and end market demand • Primary Circular Economy Role: Recycle 	
<p>Textiles</p> <p>All clothing textiles, including denim, cotton, wool and synthetics, can be recycled into a range of products. Natural textiles can be composted or used as weed matting. Products include building materials, insulation, carpet underlay, tiles, automotive carpet, wall panels, filters for exhaust systems, recycling back into fashion/clothing, insulation, acoustic panels, wool lining and filling.</p> <ul style="list-style-type: none"> • Location: Processing undertaken outside of region • Organisation/s: Circular Fashion Centre • Status: Emerging opportunity • Opportunity: Review opportunity to attract local investment. Review aggregation opportunities and end market demand • Primary Circular Economy Role: Recycle 	

4.2.5 Circular Economy Enablers and Opportunities Identified

Organisations that play that support and enabling role in progress local circular economy opportunities are key participants in the circular economy eco-system. Examples of organisations that fulfil this function are provided in **Table 7** below. This is a sample selection of examples identified, and additional enablers such as manufacturers, product designers, end market users and consultants should be included in the online database.

Table 7. Circular economy enablers

Enabler	Example photo (indicative only)
Equipment suppliers Several organisations exist who supply equipment that aid circular economy initiatives. Waste Initiatives and Miltek supply balers and other reduction equipment for efficient transport and storage of materials such as cardboard and soft plastics. Such equipment can facilitate greater source separation of material streams and reduced contamination. <ul style="list-style-type: none"> • Organisation/s: Miltek, Waste Initiatives, TW Woods, Source Separation, Mastershread • Status: Immediate opportunity • Opportunity: Baling, source separation, reduced contamination, cardboard perforation to reduce use of bubble wrap packaging • Primary Circular Economy Role: Enable & Support 	
Local resource recovery and recyclers Local recyclers exist for source separated materials both within and outside the region. They provide a clean, consistent quality feedstock and are the first step in initial processing stage. A full list of local NSW EPA licenced facilities in region (from desktop research) and those collecting material streams will be available on the online database. <ul style="list-style-type: none"> • Organisation/s: Various • Status: Immediate opportunity • Opportunity: Collection, aggregation, transport • Primary Circular Economy Role: Enable & Support 	
Council and government organisations and departments Necessary to progress and expand circular economy outcomes in the region. A full list of organisations will be available on online database. <ul style="list-style-type: none"> • Organisation/s: Various • Status: Immediate opportunity • Opportunity: Opportunity to deliver capacity building workshops to staff across the various Council functions necessary to progress the transition to the circular economy. • Primary Circular Economy Role: Enabler 	

<p>Research and development organisations</p> <p>These organisations support the research, design and development of innovations and new circular economy initiatives.</p> <ul style="list-style-type: none"> • Organisation/s: Various including Design Anthology, CSIRO and various UON departments (e.g. Newcastle Innovation, NIER) • Status: Immediate opportunity • Opportunity: Engage with organisations to progress initiatives that may require further assistance and research around specifications, prototypes, testing. • Primary Circular Economy Role: Enable & Support 	
<p>Industry Associations</p> <p>Working with these organisations will increase collaboration between organisations, facilitate the ability to host events that can communicate and showcase local initiatives.</p> <ul style="list-style-type: none"> • Organisation/s: Various (outlined in Table 2) • Status: Immediate opportunity • Opportunity: Research and development, collaboration, networking, investment/funding • Primary Circular Economy Role: Enable & Support 	

4.3 Immediate opportunities for Councils and Hunter JO

Recycled materials in road base applications

Identification and engagement with **end market users** will form an important part of developing the local circular economy eco-system. Increased demand will provide the pull-through effect for recovered materials. Within the region Hunter Water, councils and Infrastructure organisations have the capacity to create increased demand for recovered glass. Several specifications and resource recovery orders and exemptions exist. For example, RMS specifications R82 and R83 also allow for recycled crushed glass in concrete base and subbase.

The Institute for Public Works Engineering Australia (IPWEA) sets out the industry wide performance standards for the supply of quality recycled materials across a range of public works. The Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage, also commonly known as Greenspec, aims to bolster confidence in the marketplace by encouraging the use of recycled materials.

Southern Sydney Regional Organisation of Councils has also partnered with NATSPEC to develop a range of specifications suitable for a range of local roads. LGNSW are also in the scoping stage of another similar area of work (Source Hunter Water).

There is immediate opportunity for councils to procure Reconophalt asphalt (Downer) or pavement construction using MatrixMaterials technology (Stabilco NSW).

Procurement policies

Hunter JO and its member councils should also ensure that their procurement policies not only allow recycled materials to be used in their projects but should consider making it a weighted criterion in the evaluation process, or even make it mandatory. As recycled products are sometimes not cost competitive with existing mainstream products, councils need to take responsibility and create

demand, which will eventually have a positive impact on the cost structure of recycled materials and provide the stimulus for more recycled manufacturing.

Further, Hunter JO and its member councils need to maintain pressure on state and federal government to provide funding and industry stimuli for recycled product manufacturing. At the same time, regional and local planning processes may need to be reviewed to encourage local recycling facilities to be established.

Lastly, councils may need to provide training to their operational and strategic staff to ensure staff members fully understand the challenges and opportunities of recycled materials and are open to try new products. This may include field trips to the facilities or to other regions that already use the materials.

Reducing resource use within councils

In addition to procurement, councils can ‘walk the talk’ by embodying circular economy principles – starting with the reduction and avoidance of waste. Immediate opportunities to reduce waste include:

- Review use and generation of paper and cardboard waste onsite.
- Request that products be delivered in recyclable packaging. Ask providers to deliver on reusable pallets/alternative methods that reduce packaging waste.
- Reduce paper within the organisation by transitioning to paperless record keeping and notetaking.

Council aggregation of additional material streams

Councils can expand the recycling streams available to be dropped off by residents at Resource Recovery Centres/Waste Management Centres. This could include materials not currently accepted in kerbside recycling, for example PVC pipe, pool toys, pallets and clean timber etc, for redirection to recyclers or as part of product stewardship programs, both existing and emerging.

Councils have an immediate opportunity to implement a circular economy solution to soft plastic waste with the Plastic Police® program. Councils provide drop-off locations for residents and local organisations to drop off their soft plastics for recycling. Councils bale the material onsite for collection and recycling through the Plastic Police® program. Councils procure the equivalent weight in product, such as Reconophalt sustainable asphalt pavement, bench seats, bollards, wheel stops and other products containing recycled soft plastics, to ‘close the loop’ on what is collected by the community. The program also provides another opportunity to engage with, and educate, the community on how to reduce single-use plastics, the need to recycle right to reduce contamination and recover valued resources, and opportunities for businesses and individuals to act and close the loop. This creates clean streams for recycling, beyond soft plastics, along with additional demand for material collected by Council facilitating a greater pull-through-effect.

Attract investment and processing to the region

Grants, tax breaks or other incentives could be utilised to attract interstate stakeholders to the HCC region. This could include sorting, processing or recycling businesses or manufacturing companies. For example, Close The Loop Australia supplies its TonerPlas™ product (asphalt additive made from processed soft plastics and toner) to Downer in Teralba to manufacture asphalt. Attracting Close The Loop to the region would provide a local processing solution for soft plastics, reduce emissions, and provided a circular economy solution whereby councils procure Downer’s asphalt product to ‘close

the loop'. Assisting local organisations to expand their capacity would also assist in increasing local processing of materials, e.g. Clean Waste Solutions.

The [Centre for Sustainable Materials Research and Technology \(SMaRT\)](#) at the University of New South Wales could be duplicated or expanded to the HCC region. The core aims of the SMaRT Centre are to develop novel research for sustainable materials and manufacturing processes, build industry partnerships to activate research for real world impact, and to disseminate green materials and manufacturing technologies that benefit industries, local communities, and enhance sustainable economic growth internationally. A similar program could operate out of the University of Newcastle or CSIRO.

Residents and businesses

In addition to the opportunities for councils in their own operations, there are opportunities that councils can promote and encourage in the residential and commercial collection space. This includes:

- Promoting the Return and Earn scheme to divert clean sorted materials from kerbside recycling bins and reducing the occurrence of mixed crushed glass.
- Promote soft plastic recycling programs such as Plastic Police® and REDcycle to divert this material stream from kerbside recycling and reduce contamination.
- Consider separate glass or paper bins to reduce contamination in co-mingled recycling bins. Some councils in Victoria are transitioning to six recycling bins for households.
- Additional community and business workshops and environmental education around waste avoidance, reduction and reuse is needed, rather than purely focusing on better recycling (e.g. sustainable living/business workshops).
- Increase Council collaboration with local industry associations as a conduit to engaging with businesses to further develop the local eco-system. Recent examples included Central Coast Council and City of Newcastle hosting the Supply Chain and Logistics Forums during September and Hunter JO presenting at the AI Group Forum in October.
- Encourage local businesses to design out soft plastic and expanded polystyrene packaging materials by promoting perforated cardboard machines. This could involve raising awareness of the equipment and solution or offering grants to encourage uptake.
- Promoting and enabling the recycling of fabrics. There is potential for councils to use existing CRCs to widen the offer.
- Give businesses a garbage AND recycling bin as standard practice.
- Ensure new developments in the area, regardless whether residential or commercial, include recycling bins in their developments (MUDs and commercials often still have just garbage bins).
- Implement a Food Organics and Garden Organics (FOGO) program and promote local composting organisations and solutions.
- Develop and share video case studies on organisations participating in the local circular economy to raise awareness, inspire and encourage others to improve their practices. For example, the [video case study on Sirron Holding's](#) resource efficiencies.

4.4 Challenges to progressing and participating in the local circular economy

During the telephone interviews, respondents were asked to discuss what are/have been the biggest barriers to participating in the local circular economy. Responses varied across organisation types, circular economy role and industry, however, six key themes were identified from the interview responses, which have been summarised below.

AWARENESS

Some participants state a low awareness of the circular economy and collaboration opportunities as a current challenge to progressing the local circular economy. More initiatives such as case studies, events and information on the circular economy are considered useful to raising awareness and inspiring collaboration. Further, a platform to bring organisations together to progress the local circular economy, network and identify collaboration opportunities was identified as crucial by several respondents.

"An increased public understanding of and discussion around the circular economy is needed." (Research organisation)

"We need a local marketplace to connect people who have waste with people who need waste." (Education institute)

GOVERNMENT FUNDING

Obtaining the necessary funding to commercialise or scale up was a common barrier to investment in local processing facilities, including mid-scale operators. While government funding opportunities exist, they are often perceived as too complex, detailed and/or time consuming for smaller organisations and start-ups. Awareness of the different funding opportunities available that organisations may be eligible for is low. Overall, obtaining investment and navigating funding opportunities is seen as a key barrier for some organisations.

LOGISTICS

The collection, aggregation and transport of materials can constrain progress in establishing circular economy solutions. In particular, the cost and the desire to reduce carbon emissions during transport are identified as key barriers.

"The current system of collecting recyclate to getting it to our organisation for manufacturing is not efficient. There are too many steps, too many stakeholders, and too many organisations/people clipping the ticket along the way. Cost of transport is also an issue. The supply chain needs to be reinvented." (Manufacturer)

"Getting materials to recyclers and then chemistry and design to maximise the recycling of constituent materials is a key challenge in Australia." (Research institution)

REGULATION

A common barrier to participating in the circular economy is regulatory and legislative hurdles. Obtaining NSW EPA approvals is considered a slow and onerous process. Further, the EPA's legislation regarding the definition and categorisation of material as 'waste' is perceived as a challenge. One respondent noted that once a material is classified as a 'waste' product, it makes it very difficult to use and handle the material.

“Navigating the regulatory program and legislation has been a real challenge. It has taken two years to get an EPA licence for our processing solution. Its new, different and disruptive technology, so the EPA doesn't know how to deal with this.” (Recycler/Processor)

On the other hand, one respondent noted that more government regulation and support is needed to incentivise organisations to take up circular economy initiatives (e.g. recycling services), reduce the appeal and ease of landfilling resources, encourage sustainable procurement and promote product stewardship.

“A key challenge in Australia is the source separation of materials, product design of components so products can be taken apart for recycling, and the need to reduce number of different plastics used in product design. Better product design is also needed. Manufacturers and designers need to consider value of the product/packaging after initial use.” (Research institution)

CONSUMER BEHAVIOUR AND COMPANY CULTURE

Encouraging organisations to procure sustainable and recycled products is a challenge. There may be a perception that recycled is not as durable or quality as virgin material. Further, the upfront cost of a recycled product may be more expensive than a virgin product. Similarly, the cost of recycling or finding a reuse solution may be more expensive or time consuming than simply landfilling it. These are some barriers that manufacturers and retailers in particular are currently facing.

“There is an assumption that using recycled materials for manufacturing our products would result in poorer quality outputs and this goes against the brand's commitment to quality.” (Manufacturer)

“It is currently cheaper to landfill textiles than to participate in this circular economy service.” (Recycler)

“Consumers need to recognise brand value, and the value in having a product that is highly durable. Often the most durable product on the market is the ugliest and dearest which can be off-putting.” (Manufacturer)

Encouraging consumers/organisations to sort material into source separated waste streams is also a challenge, as is contamination. There is a need for ongoing consumer education to change consumer behaviours and address these issues.

“Company culture is a major issue within our organisation. Getting staff on board, minimising contamination, increasing source separation on site are key challenges. Within our organisation we need more education onsite regarding recycling initiatives.” (Manufacturer)

TIME AND RESOURCES

The perceived time it will take to find an alternative solution to landfill is a perceived barrier to reducing waste to landfill. Knowledge of resource recovery and recycling initiatives in the local region is also lacking, and for some organisations there is no dedicated role/position tasked with this responsibility, meaning organisations are not proactive in minimising waste and maximising resource recovery.

“The time and resources required to find a circular economy solution is a challenge. You have to do it yourself.” (Manufacturer)

6. Mapping the Hunter Central Coast Circular Economy Eco-System

The participants identified in the HCC circular economy eco-system in this project were mapped (**Figure 6**). Each participant is categorised by its Primary Circular Economy Role (**Figure 4**). The map provides a geographic representation of the local circular economy, proximity to one another and the different roles being performed in the region. This is for demonstration purposes and it is envisaged the database tool being developed by Hunter iF will provide the ability to interact, zoom and extract relevant details on the participants.

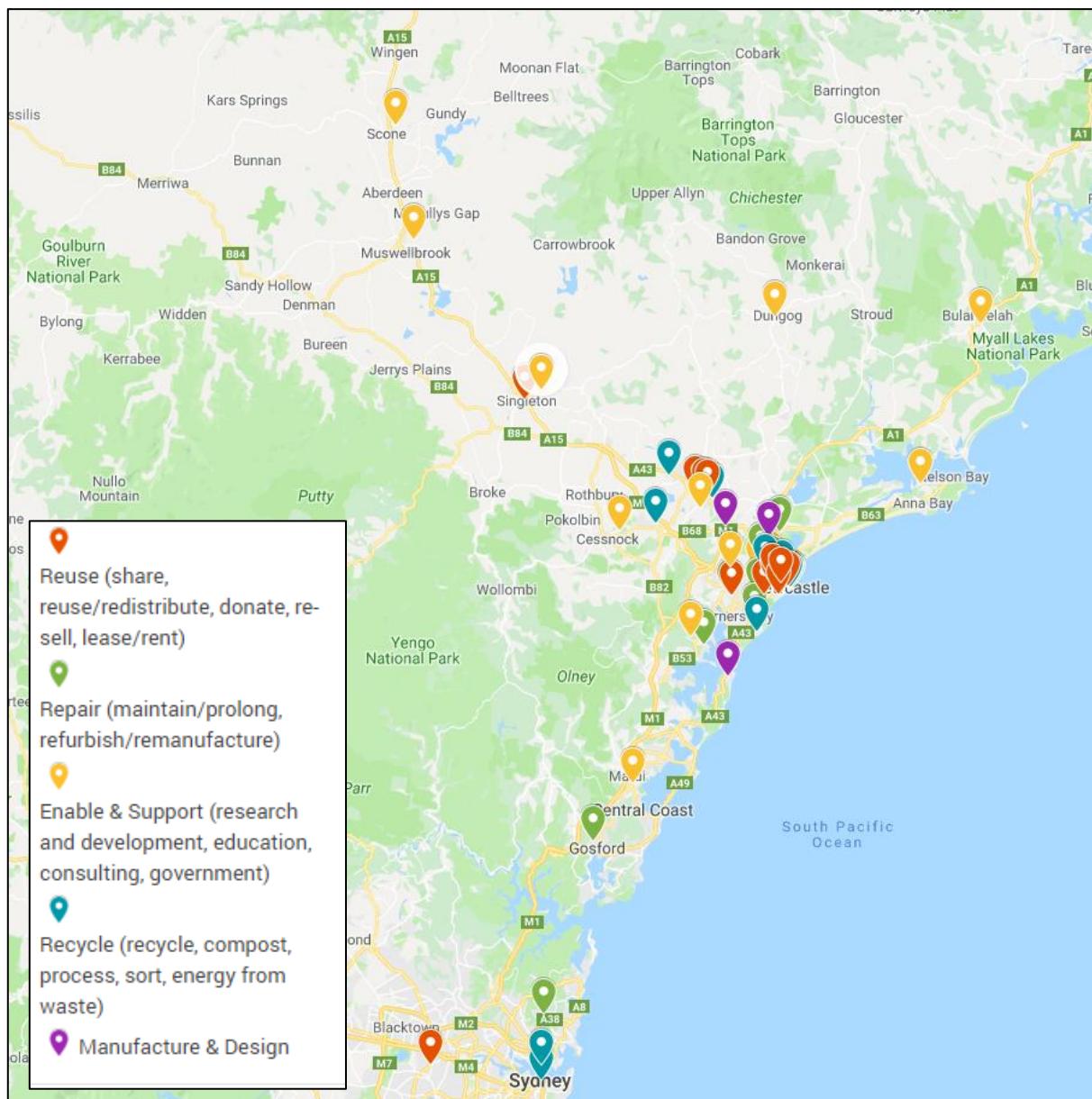


Figure 6. Geographical mapping of circular economy eco-system participants identified during telephone interviews and desktop research. Colour coded by Primary Circular Economy Role.

7. Recommendations

Several recommendations have been presented below. These recommendations should be considered in conjunction with the initiatives and opportunities identified in the preceding tables which form the key findings from the project.

Capacity building, engagement and behaviour change

- Developing education resources targeted at local businesses, industry groups (members) and councils in the region who generate these materials and whom have capacity to reuse or incorporate recycled content into their products manufactured or procured.
- Continue to build and add new participants to the local database and review opportunity to link to State and National platforms.
- Through the National Circular Economy Hub and NSW Circular, the HCC region will have the opportunity to share local initiatives throughout the State and Nationally. This collaboration will also provide the HCC with knowledge of initiatives outside of the region and opportunities to transfer learnings and consider further investment in initiatives that specifically meet the needs of the HCC region. The National Circular Economy Hub will have strong links to international platforms which will provide Hunter JO with the ability to access and tap into global, world leading tools and information.
- Develop and promote relevant case studies to stimulate awareness and engage new circular economy participants in the region.

Identifying upcoming local projects, opportunities to incorporate recycled content and designing out waste

- Engage with relevant government bodies to identify current and upcoming projects that could use sustainable asphalt or pavements and recycled plastic products.
For example, the New Maitland Hospital.
- Review upcoming projects to see opportunities to incorporate recycled content into the design specification stage and flag any hurdles that need to be addressed
For example, <https://www.newcastleherald.com.au/story/6404407/maritime-infrastructure-works-set-to-begin-across-lake-macquarie/?cs=12>.
- Product development workshops and engagement with manufacturers, industry and research organisation to capture additional information on resins being used in the region and progress opportunities to incorporate recycled content (both soft and rigid plastics).

Progress priority stream reduction and reuse opportunities - immediate opportunities to ‘position the transition’ to a circular economy.

- Understand the full supply chain and logistics issues and opportunities for all the immediate opportunities identified in this section. This may include investigating how

aggregation of waste ‘resources’ may assist in ensuring new circular economy opportunities are viable.

- Review opportunities to review current purchasers of bubble wrap in the region who could substitute with a perforated cardboard material, thus dealing with two priority waste streams.
- Encourage source separation of priority waste streams from SME’s and the ability to drop off cardboard, glass and plastics (soft plastics and approved rigid plastics) for recycling and diversion from landfill at approved recyclers and/or council aggregation points
- Council representatives (sustainability, procurement, works/operations) to participate in a capacity building workshop hosted by Hunter JO to discuss how different programs could be progressed in the region to provide a sustainable and consistent solution across all member councils.
- Councils to explore additional material streams for aggregation at council facilities to assist with consolidating smaller volumes and aiding in ability to cost effectively transport for processing outside of region or review local processing opportunities.

For example, soft plastics drop off via the Plastic Police® program, monthly plastic plant pot drop off or PVC pipe drop off.

General

- The HCC has a strong manufacturing base which provides a strong foundation to progress circular economy initiatives in the region. Volume and feedstock specification important. Review the findings of this report in conjunction with the Material Flow Analysis project to identify further areas of interest.
- Provide case studies to industry group and National Circular Economy Hub to showcase initiatives in the region and encourage industry participation in the local circular economy eco-system. Create demand and awareness around sustainable products and which products (manufactured locally or interstate) are facilitating circular economy outcomes for HCC.
- Review recommendations provided to refine the database fields (**Appendix 5**) and review the opportunity and ability to link the local database to national and state platforms being developed (or reviewed).
- To assist with reducing barriers and constraints and attract more investment to enable local mid-scale processing facilities, there may be value in looking at opportunities for Hunter JO to lobby for more government funding and facilitation of the planning process.
- The issue of the definition of ‘waste’ has been raised by some respondents. Work with the NSW EPA and other government agencies to move toward models adopted in other states around the treatment of waste as a resource in new processes.
- Develop a ‘circular economy investment opportunities’ section in the online database tool. This will provide case studies, guidelines and potential funding opportunities to

improve outcomes and assist businesses in further developing the local circular economy.

Appendix 1 - Email Invitation

Hi [First Name],

You may be aware that we are conducting research on the circular economy eco-system in the HCC region to better understand the participants, capabilities and opportunities in the region.

Cross Connections Consulting has been engaged by the Hunter Joint Organisation (see attached letter of support) to obtain feedback from relevant stakeholders regarding their participation in the circular economy and to identify initiatives currently being undertaken or progressed in the region.

You have been identified as an important stakeholder and we wish to speak with you about your role in the local circular economy. [Interviewer Name] will be in touch over the coming days to conduct a short 15-20 minute interview or to arrange a more convenient time to speak if you are interested in participating in this important research.

The findings will be used to review the region's circular economy eco-system, build a database of the local circular economy and provide greater opportunity to improve collaboration between local organisations, business, government and research sectors.

Thank you for your support and we look forward to sharing the outcomes of this project. Please don't hesitate to contact me if you have any questions and thank you in advance for your participation in this project.

Regards,

[Name, Signature]

Appendix 2 - Letter of Support

Hunter Joint Organisation

16 August 2019

Dear Sir/Madam,

Re: Hunter Central Coast Circular Economy Eco-System project

The Hunter Joint Organisation (Hunter JO) has commissioned Cross Connections Consulting Pty Ltd (Cross Connections) to undertake research on the local circular economy in the Hunter Central Coast and identify local circular economy initiatives being undertaken or progressed in the region.

Circular economy is about changing the way we produce, assemble, sell and use products to minimise waste, and to reduce our environmental impact. The circular economy can also be great for business; by maximising the use of our valuable resources, and by contributing to innovation, growth and job creation.¹

The Hunter Central Coast would like to be a leader in the development of the circular economy. To achieve this vision, a greater understanding of the participants, capabilities and opportunities within the region is needed.

As part of this research project, Cross Connections will be conducting interviews with relevant stakeholders regarding current circular economy participation and initiatives within the local ecosystems. The Hunter JO encourages organisations to participate in the research to help progress the circular economy in the Hunter Central Coast.

Your participation will assist the Hunter JO Circular Economy Working Group (CEWG) to better understand and develop the local circular economy. This project is part of Hunter JO's strategy to improve waste and resource recovery outcomes in the region and ensure our environment is protected for future generations, improve opportunities to collaborate and develop the regional economy.

The project will build a database of the region's circular economy and provide an opportunity for participants to improve collaboration between businesses, and across government and research sectors in the region.

For additional information about this project, please email Samantha Cross, Director of Cross Connections Consulting, at samantha@crossconnections.com.au or phone 0423 943 100.

Sincerely,



Tim Askew
Regional Program Manager

¹ [NSW Circular Economy Policy](#)

Appendix 3 – Discussion Guide

Discussion Guide

Organisation:		Site Address:	
Entity Type:	Choose an item.	Primary Contact Name:	
Industry:	Choose an item.	Title:	
Primary CE Role:	Choose an item.	Phone:	
Primary Material:	Choose an item.	Email (direct):	
Size/turnover:	Choose an item.	Email (general):	
Logo Image		Secondary Contact Name:	
Website		Title:	
		Phone:	
Key business activities/description:			

INTERVIEWER NOTES

- Before conducting interview, complete the above table and review the organisation's website to gain an understanding of the business.
- Record the session.
- Instructions are written in CAPITALS.
- About the CE project:

INTRODUCTION

Hi, my name is [First Name] from Cross Connections Consulting. You recently received an email from us inviting you to participate in the Hunter Joint Organisation's Circular Economy Eco-System Project. We are speaking with organisations currently or potentially participating in the circular economy, in order to understand their capacity and capabilities, and to build a circular economy network for the Hunter and Central Coast region. The discussion will take approximately 15-20 minutes depending on your responses, is now a good time?

- IF NO: Not a problem, are you available [date/time] to schedule a 15-minute chat?

Before we begin, are you happy for me to record this session to reduce notetaking and to ensure nothing is missed? [Confirm if these will be used for note taking purposes only and supplied to Hunter JO].

The information you provide may be entered into a Circular Economy Network or Database managed by Hunter JO to link stakeholders and identify new collaboration opportunities so please advise if you don't want any particular information available to the public.

CIRCULAR ECONOMY

- What does the term Circular Economy mean to you? (*internal note - we will provide a definition in the letter and email*)
- What do you believe your organisation's role is in the circular economy?
- In what ways does the organisation participate in the circular economy?
- What barriers do you face to being more involved?
- What opportunities are you aware of for your business in the circular economy?

INDUSTRY ORGANISATIONS (WITH A MEMBERSHIP BASE)

- Can you provide a list of up to 10 of your members that you believe are actively participating in the circular economy in the Hunter Central Coast region (or have potential to)? PROBE FOR PLASTICS, PAPER/CARDBOARD/GLASS and other innovative organisations with potential to participate.

MANUFACTURING [ONLY ASK OF MANUFACTURING ORGANISATIONS] (SIPOC MODEL)

- What products do you manufacture?
 - Do your products contain recycled material? What %?
 - What volume/weight do you manufacture annually (approximate)?
- What input materials do you use? (e.g. polymer resin, packaging)
- Who are your suppliers?
- How do you process these inputs, i.e. what technology or process do you use? (e.g. injection or extrusion moulding)
 - Do you introduce processing waste back into the manufacturing process?
- Do you currently have the capacity to manufacture more?
 - What is your maximum capacity?
- What limits your manufacturing output/volume? E.g. end market demand or material constraints?
- What waste or output streams do you produce?
 - How do you dispose of your plastic, paper/cardboard and/or glass outputs?
 - Do you reintroduce manufacturing
- Who are your customers/who is buying the products?
- How could your organisation improve its participation in the circular economy? (e.g. use recycled resin, reduce waste outputs, take-back scheme, supply chain opportunities.)
- Which of the following best describes where you are at in the circular economy journey now?
 - Not participating
 - Idea generation
 - R&D/Testing/Prototyping/Minimum Viable Product
 - Active participating/Commercialised

OTHER

- What are you sending to landfill?
- What are the key streams that you are recycling? Do you know where this is going/how it is being processed/recycled?

- Do you use large volumes of bubble wrap in your packaging?
 - Yes
 - No
 - N/A
- Do you produce or use large volumes of soft plastic packaging? (e.g. shrink wrap, pallet wrap?)
- Do you currently have a cardboard collection service on-site?
- Have you considered or reviewed other sustainable packaging materials or bulk deliveries to reduce waste? If yes, please provide details.

ORGANISATION PROFILE

- Approximately how many paid employees does [ORGANISATION] have?
 - 0 – 20 people [SMALL BUSINESS]
 - between 20 and 199 [MEDIUM BUSINESS]
 - More than 200 people [LARGE BUSINESS]
 - No paid employees/volunteers only
- Which of the following best describes your organisations approximate annual turnover?
 - <\$1 million
 - \$1 million to <\$5million
 - \$5 million to <\$10 million
 - >\$10 million
 - Prefer not to say
- Do you know of any other organisations connected to you that may be participating in the circular economy? (e.g. your customers, suppliers etc.).
 - IF YES, RECORD ORGANISATION NAME, KEY CONTACT NAME AND PHONE NUMBER, HOW THEY ARE CONNECTED AND THEIR ROLE IN CE.
- We know that things change rapidly, and to ensure the Circular Economy Eco-System Database is kept up to date we would like to record some contact details. What would be a general phone number and email address that we can contact in 12 months to check-in and update the database? [NOTE: TRY TO OBTAIN GENERAL ORGANISATION DETAILS E.G. INFO@ORGANISATION.COM AND NOT THEIR PERSONAL CONTACT DETAILS AS EMPLOYEES MAY LEAVE THE BUSINESS].
- Is there any information you would like to see included on a public database designed to progress connections between organisations in the Hunter to progress a circular economy?
- Finally, are you happy if I pass on your contact details to Hunter Joint Organisation to notify you or any upcoming circular economy events and progress being made on the database tool?
 - Yes
 - No
- Do you have anything else you would like to add?

CONCLUSION

- THANK AND NEXT STEPS
- SAVE RECORDING ON DRIVE
- FINALISE NOTES AND SAVE COMPLETED VERSION ON DRIVE

Appendix 4 - Hunter iF Survey Tool

Sample screenshot:

The screenshot shows a web-based form titled "Create Circular Economy Eco-System Record". The top navigation bar includes links for "Dashboard", "Add content", "Hello ceadmin", and "Log out". The main content area is titled "Profile" and contains the following fields:

- Organisation ***: An input field with a placeholder.
- Entity Type**: A dropdown menu showing "- None -".
- Industry**: An input field with a placeholder.
- Primary CE Role**: An input field with a placeholder.
- Primary Material**: An input field with a placeholder.
- Size/turnover**: An input field with a placeholder.
- Number of Employees ***: A dropdown menu showing "- Select a value -".
- Annual Turnover ***: A dropdown menu showing "Prefer not to say".
- Logo Image**: A file upload section with a "Choose file" button, a message "No file chosen", and an "Upload" button. Below it, text specifies file size and type restrictions: "Files must be less than 128 MB. Allowed file types: png gif jpg jpeg."

Circular Economy Eco-System Database Form

Abbreviations:

OE Open Ended **SR** Single Response **MR** Multiple Response

Notes:

- All questions are mandatory (unless specified), and responses will be public.
- Text that is **BOLD AND IN CAPITALS** are instructions for programmers.
- For quality control, ongoing maintenance/updating and communication, it is recommended that each organisation registers in order to complete/edit their organisation's profile on the online database. Additional details such as name, position and direct contact details (and secondary contact details), as well as any private details, should be obtained in the registration process.

ASK ALL

Q1. Organisation Name (**OE**) _____

ASK ALL

Q2. Industry (**SR**)

1. A - Agriculture, Forestry and Fishing
2. B - Mining
3. C - Manufacturing
4. D - Electricity, Gas, Water and Waste Services
5. E - Construction
6. F - Wholesale Trade
7. G - Retail Trade
8. H - Accommodation and Food Services
9. I - Transport, Postal and Warehousing
10. J - Information Media and Telecommunications
11. K - Financial and Insurance Services
12. L - Rental, Hiring and Real Estate Services
13. M - Professional, Scientific and Technical Services
14. N - Administrative and Support Services
15. O - Public Administration and Safety
16. P - Education and Training
17. Q - Health Care and Social Assistance

18. R - Arts and Recreation Services
 19. S - Other – please specify _____ (**OE**)

ASK ALL

Q3. Organisation Type: (SR)

1. Business
2. Government
3. Research and Education (e.g. University)
4. Non-Profit
5. Community Group (e.g. volunteer group, social enterprise)
6. Facilitators (e.g. consultants, investors, associations)
7. Other – please specify (**OE**) _____

ASK IF Q3=1 (BUSINESS)

Q3a. Which of the following best describes your business? (SR)

1. Corporate (e.g. multinational and national corporations)
2. Small to Medium Enterprise (SME)
3. Start up
4. Other – please specify (**OE**) _____

ASK ALL

Q4. Describe what your organisation does, and how it participates in the circular economy. Please provide a succinct overview of your organisation's activities in the context of the circular economy. (OE 100-WORD LIMIT)

ASK ALL

Q5. What is your organisation's main role/s in the circular economy? Please select all that apply. (MR)

1. Repair	e.g. maintain/prolong, refurbish/remanufacture
2. Reuse	e.g. share, reuse/redistribute, donate, re-sell, lease/rent
3. Recycle	e.g. recycling, composting, processing, sorting, energy from waste
4. Manufacture & Design	e.g. manufacture products/parts, product design
5. Enable & Support	e.g. investment, research and development, education, consulting, associations, government, sustainable procurement
6. Other	Please specify _____ (OE)

ASK ALL

Q6. What waste streams does your organisation produce that you are seeking a solution for? (MR – DISPLAY CHECK BOXES)

- I do not require solutions for waste (**IF SELECTED, DO NOT ALLOW RESPONSES TO BE CHECKED BELOW**)

Resource (MR)	Please enter more details about your waste here, e.g. type, specification etc. (OPTIONAL) (OE)
• Aggregates	
• Chemicals	
• E-waste	
• Garden, Vegetation	
• Glass	
• Hazardous	
• Metals	
• Organics	
• Paper/Cardboard	
• Plastics	
• Soil, dirt, dust	
• Textiles	
• Timbers	
• Other - please specify _____	

ASK ALL (OPTIONAL)

Q7. What potential collaboration opportunities are you hoping to obtain from, or provide to, other organisations on the online database? For example, does your organisation require/offer funding support, inputs, end markets, processors, research, consulting services or something else?

(OE - NO WORD LIMIT)

ASK ALL

Q8. Finally, how can others get in touch with your organisation?

1. Website: **(SR)**
 - a. http://_____ (OE)
 - b. Do not have a website
2. Site address (**ADDRESS TO AUTO POPULATE ONCE USER STARTS TYPING**)
3. Phone number (for general enquiries) **(OE) (OPTIONAL – HOWEVER MUST ENTER EITHER EMAIL OR PHONE)**
4. Email address (for general enquiries) **(OE) (OPTIONAL – HOWEVER MUST ENTER EITHER EMAIL OR PHONE)**
5. Logo **(UPLOAD FUNCTIONALITY) (OPTIONAL)**

Other considerations (out of scope for database form):

- Feedback loop when organisations have connected/collaborated as a result of this database... how is this information captured?
- Registration portal and functionality for organisations
- Ongoing engagement – share newsletters, every 12 months, ask organisation to update their details, collect information on success stories in order to develop case studies and track success/outcomes of database, share case studies etc.
- This form will require an introduction. The introduction should mention:
 - Purpose of the database
 - How the information will be used
 - The information will be publicly available
 - You can update/edit at anytime
 - Benefits/outcomes (to encourage them to complete)

Appendix 6 – Case Studies

- **Case Study 1:** Quarry Mining, Plastic Police and RENZ – reducing soft plastics by reusing waste cardboard onsite
- **Case Study 2:** Redicrete – Greocrete
- **Case Study 3:** Sirron Holdings - Designing out waste, built to last
- **Case Study 4:** Central Coast Council, Plastic Police® and Downer – Recycling soft plastics into local roads

Case Study 1: Quarry Mining

Reducing soft plastic use: A success story

Quarry Mining extracts value from waste

Quarry Mining provides a wide range of quality products, service and support to the construction and extractive industries. Through its operations, Quarry Mining is committed to responsible environmental management and minimising waste to landfill. This includes participating in the [Plastic Police®](#) program to collect and recycle soft plastics at its Hunter branch. Central to the Plastic Police® program is identifying opportunities to reduce single-use soft plastic use where possible. Quarry Mining recently implemented a solution to significantly reduce its use of bubble wrap packaging with innovative equipment, provided by Renz Australia, creating a reuse solution by transforming waste cardboard into sustainable packaging. This is circular economy in action and highlights the opportunity to reuse and extend the life of valuable resources.

Reinventing Packaging

Quarry Mining's Hunter branch manufactures and distributes steel products which require protection during storage and transport. Historically, this protection has been provided by plastic bubble wrap. To reduce the need for bubble wrap, Quarry Mining purchased a Mastershred cardboard perforating machine (HSM ProfiPack 425). The machine turns waste cardboard into a flexible and high-quality packaging material.



The ProfiPack 425 perforates waste cardboard into padded packaging material (Image: [HSM](#))

This has allowed Quarry Mining to substitute a material made from virgin resources and with limited end market recycling opportunities, with perforated cardboard sheets made from cardboard that is readily available onsite.

Outcomes

The business has saved costs by reducing bubble wrap purchases and eliminating the need for a cardboard collection and recycling service onsite. This new practice also extends the life of the cardboard keeping it in the productive economy for longer. Unlike bubble wrap, the perforated cardboard packaging can be more easily recycled by Quarry Mining customers.

Previously, the branch would buy approximately 100 metres of bubble wrap per month. The new solution provides a commercial cost saving and avoids generating approximately 84kg of soft plastic waste from ending up in landfill. This is the equivalent weight of 21,000 plastic bags.

The Quarry Mining team has seen fantastic results through this transition away from bubble wrap, with a higher quality reuse product that is used for multiple purposes, including padding mats, padded packaging and filling empty spaces, at a lower cost to the business and environment.

Quarry Mining aim to eliminate the need to purchase bubble wrap across all operations once the transition to the new perforating equipment is complete.

Soft Plastic Reduction and Recycling

Through its participation in the Plastic Police® program, Quarry Mining has saved 869kg of soft plastic form landfill in the last 12 months. These soft plastics will be reformed into a 100% recycled plastic table setting to showcase the recycling efforts of staff and ‘close the loop’ on what they’ve collected. Watch a video on the Plastic Police® program [here](#).

Plastic Police® soft plastic bins are available in the workshops and offices, and staff are encouraged to bring their own soft plastic waste into work for recycling. Not only is this keeping more plastic out of landfill, the program educates and engages staff to reduce their use of single-use soft plastics, reuse where possible and recycle the rest through Plastic Police®.

Thanks to the shift to perforated cardboard packing, Quarry Mining is expecting their soft plastic consumption to drop significantly.



Plastic Police® founder and Director Samantha Cross.

Multifaceted Sustainability Focus

In addition to reducing and recycling soft plastics, Quarry Mining also recycles scrap metal, steel swarfs, paper and co-mingled recyclables. The workshops have alsynite ceiling panels which reduce the need for electric lighting in many areas, and LED globes have replaced heater lights where electric light is necessary. All Quarry Mining buildings in the Hunter have solar panels, reducing electricity costs and emissions.

Well done to Quarry Mining for their efforts in minimising waste to landfill through its recycling and waste reduction initiatives – another fantastic success story of a Plastic Police® participant.



Quarry Mining steel rods ready to be securely packed for transport using perforated cardboard.



Some of the Quarry Mining team in the workshop.



The ProfiPack 425 in action at Quarry Mining, shredding cardboard to size.

Case Study 2: Redicrete paves the way with Greencrete

Greencrete

Greencrete is a more environmentally sustainable form of concrete manufactured by Redicrete. It looks and performs the same as normal concrete, however, it reuses recycled glass in place of quarried sand and gravel materials to reduce waste. The mix allows for a reduction in the amount of raw materials that are used, replacing them with a glass aggregate or fine glass sand that is obtained from the glass that Australian households recycle every day.

Depending on the application, up to 70% of the concreting mix can be replaced with recycled glass. The performance levels of a standard Greencrete mix are on par with 20-32MPa concrete. A high-speed crusher is used during the process to round out the glass increasing the safety of the aggregate by removing rough edges.

Greencrete is a versatile mix that can be used in a range of concreting applications including:

- Residential Slabs
- Driveways
- Block Fills
- Footings
- Beams
- Footpaths
- Kerbs & Gutters
- Median Strips
- Flooring



Greencrete pour at Redhead. Source: Lake Macquarie City Council.

Port Stephens Council Greencrete Trial 2018

Port Stephens Council trialled Greencrete on traffic islands at Taniilba Bay. The project involved replacing the sand content of normal concrete – which makes up about 25% – with recycled glass. Council's Capital Works Section Manager Philip Miles said, "Port Stephens will be the first Council in the Hunter to reuse recycled glass in this way, and we're keen to lead the way in developing sustainable practices for our projects now and into the future". Council elected to trial this new material in a prominent location so the community could view and provide their feedback on it.

Lake Macquarie City Council Greencrete Trial 2019

Crushed glass sand and recycled plastic strips have been used in a Hunter-first footpath construction project trialling environmentally sustainable materials. Lake Macquarie City Council crews poured Greencrete along a 30m stretch of footpath on Steel Street in Redhead, with plans to monitor its performance and condition over time. Fifty per cent of the fine aggregate used in the Greencrete was crushed glass sand, rather than natural sand. The mix also contained thin polypropylene strips made from 100 per cent recycled plastic, which help reinforce the concrete and replace steel mesh traditionally used in concrete. Council's Manager for Asset Management Helen Plummer said, "Council is committed to exploring new and innovative ways to create a more liveable, sustainable and environmentally friendly City".



Butler Equipment
Kitchen Smart



Case Study 3: Sirron Holdings

Revolutionising the commercial kitchen

Sirron Holdings Group, Caves Beach, encompasses hospitality companies Norris Industries, Zexa Chemical Solutions, Butler Equipment and Mahatmacane Finance. The group services the hospitality industry through the provision of commercial equipment, chemicals and support services. Sirron Holdings and its companies are committed to the business philosophy of "leaving the world better than we found it". This philosophy is evident in their product design and manufacturing, as well as their commitment to reduce, reuse, repurpose and repair where possible.

Norris Industries

Norris Industries manufacture and supply busy kitchens with commercial glass and dishwashers. They are recognised for the quality, efficiency and durability of the machines. Norris designed an award-winning commercial dishwasher that only uses 15amps in power and has the highest continuous wash performance of any 15amp dishwasher on the market. The machine uses 50% less energy than the previous model by harnessing wasted energy. This results in energy cost savings between \$2,000 and \$10,000 per annum for customers. Other brand's machines achieve this performance by having a dedicated hot water system and/or 3phase power. Norris' machines are cold water connected and water is heated using energy that would otherwise be wasted.

The working life of a typical commercial dishwasher is approximately 1-4 years. Norris's machines are built to last in excess of 10 years. The machines are regularly serviced, repaired as required and repurposed, extending the life of equipment, parts and resources. Regarding packaging, Norris eliminated expanded-polystyrene and soft plastic packaging, replacing it with recycled cardboard. Norris uses a Mastershred ProfiPack machine to turn waste cardboard into perforated cardboard padding. This resulted in cost savings for the business and eliminated the need for a cardboard collection service – reducing carbon emissions by reusing and repurposing it on site.

Zexa Chemical Solutions

Zexa design and supply cleaning chemicals to the hospitality industry. The chemicals are made from harvested rainwater. To reduce packaging, chemicals are sold in bulk containers. Chemical pumps for machines are used to release accurate amounts and reduce wastage. Zexa manufactures and supplies concentrates that reduce the storage space and shipping footprint commonly associated with chemicals used in hospitality, aged care, childcare and animal care.

Butler Equipment and Mahatmacane Finance

Butler Equipment provides a rental service for catering equipment. They also supply refurbished equipment. This prolongs the life of the equipment and promotes the reuse and sharing of resources where possible. Mahatmacane Finance provides a rent-to-own service for commercial kitchen equipment.

Through innovative design thinking and initiatives to reduce waste along the supply, Sirron Holdings Group and its companies are demonstrating that it is possible to balance ethical, environmental and economic outcomes within business. View the [video case study](#) on Sirron Holdings.



Case Study 4: Central Coast Council, Plastic Police® and Downer

Recycling soft plastics into local roads: Central Coast Council paves the way for a sustainable city

Background

Central Coast Council (Council) is the first council to implement the Plastic Police® program as part of the regional project supported by the NSW EPA. Over 2,500 Council employees are collecting soft plastics for recycling across 66 sites, including all administration buildings, libraries, childcare centres, depots and waste management centres on the Coast (Photo 1). Two Plastic Police® education and engagement sessions have been conducted with Council staff to educate them about plastic pollution and the collaboration between Council and Plastic Police® to tackle soft plastics (Photo 2). Staff are encouraged to collect soft plastics from home and bring them into work for recycling.

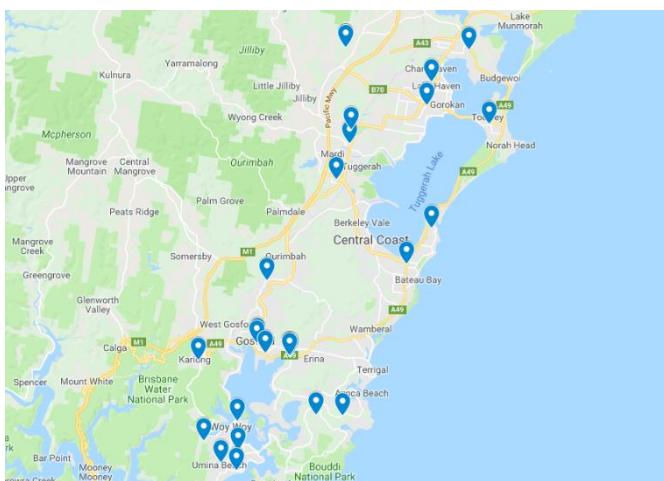


Photo 1. Soft plastic collection points at Council buildings across the Central Coast.



Photo 2. Council employees and Plastic Police® following a Plastic Police® engagement session at Wyong Council Office.

Phased Implementation Plan

Council is implementing the program in a two-phased approach. Phase one, which is currently underway, involves establishing the program within Council operations and engaging staff in the program. Phase two, scheduled for late 2019, involves establishing public drop-off locations that will enable the community, schools, businesses and community groups to recycle their soft plastics. Council are in the process of procuring a baler that can be used to compact larger volumes of soft plastics and efficiently transport it to Plastic Police® recyclers, which is necessary for Phase two.

Recycling Soft Plastics into Local Roads

Soft plastics collected by Council staff and the community will be recycled into Reconophalt, a sustainable asphalt pavement product made using recycled waste materials, including soft plastics, toner, glass and pavement. Three road projects have already been completed, at Long Jetty (Photo 3),

Woy Woy and Empire Bay. Additional road upgrade projects are scheduled for the remainder of 2019, including 6 projects in front of local schools. Feedback from the community on these projects is overwhelmingly positive, with the Facebook post on the Long Jetty project being the most liked, shared and commented post on the Council Facebook page (Photo 4).

To engage the students and wider school community in these road projects, Council is in discussions with Plastic Police® regarding implementation of the program at the schools. This will enable the school community to collect soft plastics at school for recycling into local roads, such as the road in front of their school! Students will be able to see the outcomes of their recycling efforts, learn about environmental issues and participate in the sustainable development of the Coast.



Photo 3. Downer, Plastic Police®, Central Coast Council and Madam Mayor Jane Smith attending the first road pour of Reconophalt on the Coast. Boomerang Road, Long Jetty May 2019.

Central Coast Council
May 21 ·

You might soon be driving on Central Coast roads made with recycled soft plastic, glass and toner cartridges! Our commitment to the war on waste now includes a road resurfacing product that is helping to save thousands of tonnes of waste from ending up in landfill. A 600 metre section of road can be made using 631,000 plastic bags, 117,000 glass bottles, toner from 14,400 used printer cartridges, and 160 tonnes of reclaimed road asphalt... See More

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Groups

201 Comments 169 Shares

Photo 4. Screenshot of Council Facebook post about recycling soft plastics into Reconophalt for Council roads.

Outcomes

Creating a vibrant, liveable and sustainable future for the Central Coast is a key priority for Council. The Plastic Police® program is being introduced to reduce environmental impacts such as pollution and littering, minimise waste to landfill and educate to strengthen positive environmental behaviours. The program aligns with *One - Central Coast*, Council's Community Strategic Plan for 2018-2028, as well as the United Nations **Sustainable Development Goals** - positioning the future of the Central Coast in a global context. Environmental, social and economic outcomes for Council include:

- Community education and engagement about environmental issues (**SDG 12, 14**)
- Resource recovery and landfill diversion, maximising landfill space (**SDG 12**)
- Behaviour change – increased recycling and reduced contamination in kerbside recycling bin (**SDG 12**)
- Reduced litter and pollution (**SDG 14,15**)
- Working in partnership to progress the circular economy (**SDG 9, 12, 17**)
- Sustainable procurement of Reconophalt roads (**SDG 9 and 12**)

View the NBN news coverage [here](#).