Western Australian Circular Fashion Consortium

# THE STATE OF FASHION & TEXTILE CIRCULARITY IN WA

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We acknowledge the Whadjuk Nyungar people as the traditional custodians of the land on which we work and pay respect to elders' past, present and future.









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ACKNOWLEDGEMENTS

"a circular model uses better design and better systems to keep our materials cycling, use after use, to reduce our environmental footprint"

### The Hon. Tanya Plibersek MP

[State of Circularity in Australia, 2022]

'The State of Fashion & Textile Circularity in WA' is a response to the immediate need to reduce the high volume of clothing-based textile waste currently going to landfill.

This Report identifies the need for immediate and systemic action required to support adoption and capacity building for circular practice within the local fashion industry. The insights and recommendations build upon preliminary research conducted by the WA Circular Fashion Consortium (WACFC) and notes that further research and data collection would be a key next step. The document also provides a local response to the Australian Fashion Council Seamless Clothing Stewardship Scheme, Federal Ministers Waste Priorities List 2022-23 and the WA Waste Authority Resource Recovery Strategy (WARR) 2030.

Drawing on current research, the Report presents a narrative outlining the unique characteristics of the Western Australian clothing and textile sector. It highlights the fragmented nature of the local supply chain and manufacturing sector, the significance of a high proportion of micro businesses and SMEs, and the impact of large geographical distances and isolation. These are key factors affecting the implementation of circular economy strategies that could secure a reduction in clothing textiles waste. Also featured in the document is a profile of uniform waste with particular focus on the mining industry and the potential that this represents for waste reduction through prevention and recovery strategies. It highlights the significant role played by charitable organisations in the processing of clothing textile waste in WA, and the lack of infrastructure currently in place to support circular practices.

Throughout the Report, WACFC advocates for WA state and local government, and industry adoption of shared responsibility in implementing strategies that will align local infrastructure and logistics, investment, education, procurement and cross-sector collaboration.

An overview of the current state of circularity in WA is presented, and recommendations provided to support West Australian industry and government partnership in closing the loop on clothing textile waste . A series of 'opportunities' are presented which align with the key principles of the WA WARR Strategy 2030 and the national AFC Seamless Clothing Stewardship Scheme. Recommendations encourage a systems-level approach to change which support innovation, growth, and shared responsibility through partnership. The purpose of The State of Fashion & Textile Circularity in WA is to present an overview and recommendations designed to address clothing textile waste in WA; achieved through industry and government partnership, recommendations are circular and complimentary to existing national and state initiatives.

The Report has been prepared by the WA Circular Fashion Consortium (WACFC), convened in 2022, to conduct research that would contextualise Western Australia within the national product stewardship agenda, and advance Circular Economy (CE) based action within the local clothing industry. The document presents initiatives designed to inform the WA Waste Avoidance and Resource Strategy 2030 targets that include textiles as a focus material and has also been used as a basis for a response to the Government of WA Waste Authority "Directions Paper" call for submissions.

This Report draws on analysis of local data secured via a pilot survey initiated in 2022 by WACFC. It is informed by extensive review of the literature and national studies on circularity in the Australian clothing and textiles industry. The focus is on presenting an understanding of the Western Australian textiles and clothing industry size and profile, that will support the development and promotion of circularity and product stewardship in the sector.

The findings and recommendations are framed by Circular Economy principles and their application to the reduction of textile waste resulting from clothing industry product life cycles.



Figure 1. Circular Economy Model. [Source: Waste Avoidance and Resource Recovery Strategy 2030. 2012]

# **CURRENT STATE OF AUSTRALIAN FASHION: A Snapshot**

#### CONTRIBUTION TO THE ECONOMY

Increasingly, national studies and projects are emerging that provide a clearer understanding of the Australian textiles and clothing industry size and profile. Australia's fashion industry contributed more than \$27 billion to the 2020–2021 national economy, representing about 1.5%. It employs nearly 500,000 Australians, a higher rate than the mining sector (Australian Fashion Council 2021a, b), with 88% of the local apparel manufacturing sector comprised of small to medium enterprises (SMEs) (Miller 2019).

Shifting to a CE has the potential to generate new income streams, retain asset value, build supply chain resilience, reduce waste-related costs, and enhance brand value and loyalty (Planet Ark and Australian Circular Economy Hub 2022). Projections from CSIRO indicate the CE may contribute \$23 billion to the Australian GDP and create over 17,000 jobs by 2025 and 2048, respectively (KPMG Economics 2020).

> Australia's fashion industry contributed more than \$27 billion to the 2020-2021 national economy

#### ENVIRONMENTAL IMPACT

The National Clothing Product Stewardship Scheme (NCPSS) Data & Material Flows Report indicates that each year, Australians purchase 15kg of new clothing, and discard a similar amount (AFC 2022a). Australians consume twice the global average of textiles and are the second largest consumer of textiles per capita worldwide (Carmichael 2015; Smith and Black 2021). It is estimated 227,000 tonnes of clothing goes into landfill annually (AFC 2022a) and landfill is Australia's main waste management strategy for textiles (Department of Climate Change, Energy, the Environment and Water 2022).



Figure 2. Trend in Australian exports of waste-derived products by core material category, 2006/07 to 2021/22. [Source: Waste Avoidance and Resource Recovery Strategy 2030. 2012]

Eight million units of unwanted clothing go to Australian charitable organisations each year (AFC 2022a), who struggle with the challenges and costs of disposing of poor-quality clothing unfit for resale (Payne and Ferrero-Regis 2019). Only 27% of donated clothing is resold in Australia; the remainder is downcycled as rags, exported offshore or sent to landfill (Department of Climate Change, Energy, the Environment and Water 2022). While other focus materials in the WARR Strategy 2030 are trending downwards, textiles are climbing upwards significantly in export trends of waste products (Figure 2).

# **CURRENT STATE OF AUSTRALIAN FASHION: A Snapshot**

#### KNOWN BARRIERS TO CIRCULARITY

The current predominance of a linear model in the Australian fashion sector creates three well recognised barriers to the adoption of CE design and business practice:

- **DESIGN** Most clothing is not designed for longevity or reuse, is of low quality and comprises multiple fibre blends, making the repurposing of clothing and fibres difficult (AFC 2022b).
- O2 **DISTRIBUTION** Geographical distances, sparse populations, and complexities and fragmentation in manufacturing and sourcing create barriers for innovative design and product development processes and the reverse logistics required to tackle issues of textile waste (Piller 2022; Payne and Ferrero-Regis 2019).
- **CONSUMPTION CULTURE** A competitive and accelerated fashion environment with a consumer highly engaged in fast fashion creates unrealistic price expectations; while a culture of 'greenwashing' saturates the market with misinformation and undermines the product story of those working in an authentic space (Piller 2022).

#### WASTE STRATEGIES IN WESTERN AUSTRALIA

Western Australia's Waste Avoidance and Resource Recovery Strategy 2030 outlines a pathway for the state to achieve the vision of becoming a Circular Economy by 2030 (Waste Authority 2022). It includes key principles aligned with legislation to drive WA's waste strategy (Figure 3). The strategy identifies textile waste is a focus material in "becoming a sustainable, low-waste, circular economy" (Waste Authority Western Australia 2019, 2), however, lists no strategies, actions, or targets for textiles. An abridged version of this report has been used as a Fashion Industry Response by WACFC to the Government of WA Waste Authority "Directions Paper".



Figure 3. Five key principles underpinning a circular economy approach to WA's waste management strategy. [Source: Government of WA Waste Authority "Directions Paper" 2023. 2023]

# **SCOPE OF INVESTIGATION**

### BACKGROUND TO THE RESEARCH

Recent national studies and projects are shedding light on the size and profile of the Australian clothing and textiles industry. These initiatives are supporting the profile and development of circularity and product stewardship for the sector. The Australian Fashion Council (AFC) has lead a consortium of Australian brands, manufacturers, retailers, reuse charities, fibre producers, academics, and waste management companies in an effort to establish a National Clothing Product Stewardship Scheme (NCPSS) for clothing and textiles. To inform the scheme, the AFC examined the flow of clothing in the sector from fibre resource through to disposal (AFC 2022a). However, a lack of accurate WA-specific textile consumption and waste data hinder the implementation of a CE in the local clothing and textile industries. Local data collection on material flows is necessary to address the textile waste issue and develop state-level policies.

Furthermore, collaboration and "co-ordination from all participants in the chain, from garment and textile producers, to consumers, resellers and recyclers" (AFC 2022, 15) is critical for a successful CE. However, movements towards CE are often activated in isolation, highlighting the need for ecosystem mapping to identify connections and opportunities for collaboration in Australia's CE (ACE Hub 2022). ACE Hub suggests ecosystem mapping can also establish a baseline of activity and identify case studies of product stewardship to use as case studies.

#### THE RESEARCH

WACFC undertook a mixedmethods approach of secondary research, surveys and interviews; and the data collection and analysis took place over a 10-month period in 2022 and 2023. There were four stages to the research:

### STAGE 01

**LITERATURE REVIEW** Prior to data collection, a comprehensive review of existing literature related to CE principles in the Australian and global fashion and textiles industry was conducted.



Figure 4. Key industry sub-sectors of WACFC Pilot Survey responses. 2023.

#### STAGE 02

**PILOT SURVEY AND SECONDARY DATA COLLECTION** Funded by Curtin University School of Design & the Built Environment, the research grant supported secondary data collection and a Pilot Survey was used to secure primary data. The initial secondary data collection identified 11 key industry sub-sectors with potential to influence CE and product stewardship in the WA clothing and textile sector. The Survey focused on the Greater-Perth region, spanning from Butler in the north to Mundaring in the east and Falcon in the south. Among 243 data points, seven operators were located outside this region, in the South-West, Geraldton and Kununurra.

Out of the 243 Pilot Surveys distributed, the response rate was 27%, with responses distributed across the 11 sub-sectors as shown in Figure 4 above.

# **SCOPE OF INVESTIGATION**

### STAGE 03

**ECOSYSTEM MAPPING** Building on research by Dr Tiziana Ferrero-Regis and Dr Marissa Lindquist on textile circularity mapping in South-East Queensland, WACFC used Stage 2 data and Google Maps to visually represent geolocated datasets. The live ecosystem map colour codes Stage 2 data to examine geographical relationships and identify opportunities for connections and collaborations. The map includes baseline information about each operator from Stage 2, including the size of the business, their circular activities, and primary sourcing supply and clientele information (see Figure 5).

#### STAGE 04

**IDENTIFICATION OF CASE STUDIES** Examples of best circular practice in the areas of production and design practice, consumption and use, and recirculation were identified in Stage 2 and form the Industry Profiles highlighted in the following sections.



textile and apparel supply chain. [Location: https://bit.ly/3YjXXcQ]

### THE FINDINGS

WACFC research supported two key outcomes which are expanded in the following sections:

# **Circular Hubs** Identification of potential ecosystems of activity

**The WA Story** A preliminary baseline of Apparel and Textiles activities in the Greater-Perth region

# **CIRCULAR HUBS:** Identification of potential ecosystems

WACFC research revealed two opportunities for collaborative ecosystems in the form of Circular Hubs:

### CROSS-SECTOR COLLABORATION

Achieving circularity in the clothing and textile supply chain requires collaboration across all sub-sectors, including designers, retailers, manufacturers, charitable recycling organisations, government, education, research institutions and waste management (Boulton and McCallion 2020).

The WACFC Ecosystem Map identified districts of dense clothing and textile activity such as Greater-Fremantle, Perth, Subiaco, Claremont and Osborne Park, presenting opportunities for Regional Hubs to facilitate cross connections and collaborations. Osborne Park is particularly noteworthy due to its concentration of 5 industry sub-sectors in its district: Apparel & Fashion; Apparel Manufacturing; Apparel Redistribution; Textile & Apparel Finishing; and Fashion Agencies. Several other districts have representation from four industry sub-sectors.

### CHARITABLE CLOTHING REDISTRIBUTION SECTOR

WACFC research identified over 220 used clothing stores in the Greater-Perth area, providing a unique opportunity for Collaborative Hubs focused on circularity in clothing textile waste management. The WACFC Ecosystem Map identifies clusters of used clothing redistribution stores in Fremantle and Subiaco, creating opportunities for collaborative hubs to address textile waste solutions together.

Investment in ecosystem research will empower businesses and organisations to establish regional and collaborative Hubs designed to support circular solutions for clothing textile waste.

- [ ] INDUSTRY SIZE AND CHARACTERISTICS
- 02 fibre and materials
- 03 design and manufacturing
- 04 UNIFORMS AND WORKWEAR
- $05\,$  clothing redistribution
- 06 TEXTILE RECYCLING

WACFC research establishes a preliminary baseline of clothing and textile activities in the Greater-Perth and WA region. It also aids in identifying case studies of product stewardship activities in WA, serving as best practice examples for advancing circularity in the sector.

This is outlined in this section, with six themes.

### O INDUSTRY SIZE AND CHARACTERISTICS

### CURRENT STATE

The WA fashion and textile sector employs 41,000 workers and contributes \$2.3 billion to the national economy, with the biggest sectors being retail and services (AFC 2021). This makes up over 8% of the national fashion and textile labour market and economy.

The WA fashion & textile industry is primarily made up of sole traders, micro businesses, and SMEs. National data on the dominance of SMEs in the local apparel manufacturing sector (Miller 2019) is supported by the WACFC survey data results where micro businesses of 1-3 staff dominated the sector, followed by small enterprise of 4-20 staff (see Figure 6).

Limited representation exists for the WA clothing and textile industry through member associations that advocate for the sector. These include:

- Food, Fibre, Textile Industry (FFTI) Training Council. Provides strategic information on industry workforce development and training needs to the WA Government.
- Textile Clothing Footwear Resource Centre WA (TCFWA). Located at the Belmont Business Enterprise Centre.
- WA Fibre and Textile Association (WAFTA). Represents the textile and fibre art community.



Figure 6. Dominance of SMEs in the WA clothing and textile sector. 2023.

In the past five years several prominent festivals and events that showcased the WA fashion industry and fostered community connections have been discontinued. Notable examples include the Perth Fashion Festival, Urban Couture Joondalup, and Wearable Art Mandurah. Additionally, fashion representation for government funding and advocacy has diminished since the Department of Culture and the Arts merged into the Department of Local Government, Sport & Cultural Industries in 2017.

#### **OPPORTUNITY**

Support for local industry leadership to facilitate collaborative partnerships between key representatives across the WA clothing and textile sector will drive pathways to circularity.

# 02 FIBRE AND MATERIALS

A natural fibre story dominates the WA textile and clothing sector from the thriving merino wool industry to the resurgence of the cotton growing industry in the Ord Valley growing region, and opportunities for hemp fibre production. WACFC survey participants heavily favour natural fibre-based textiles, with the top three textile fibres being natural plant-based materials, recycled materials and natural animal-based materials (see Figure 7). Survey participants showed low usage of synthetic fibres such as polyester, which is a positive contribution to reducing the microplastic pollution associated with such materials.



Figure 7. Fibre and textile composition use by WACFC Pilot Survey participants. 2023.

# WOOL

#### CURRENT STATE

Wool growing, in particular fine and superfine merino, has played a significant role in the cultural and economic development of Australia and Western Australia. According to the Australian Government DAFF report, the value of the Australian wool clip is projected to increase by 11% to \$3.5 billion in 2023–24 (Van-Lane 2023).

The Western Australian wool clip accounts for one-fifth of the total value of the Australian wool clip (Pritchett, 2023); and is a significant contributor to the state's economy. In 2017-18, woolgrowing held the highest proportional gross value in the Primary Industry Sector at 32% (DPIRD 2020). Furthermore, the Western



Figure 8. Average fibre diameter of wool in WA compared to national flock 1998/99-2021/22, Australian Wool Testing Authority (AWTA) Key Test Data. [Source: Prichett. 2023]

#### OPPORTUNITY

Merino wool has renewable, biodegradable, and flame-resistant properties (Black & Farren 2010), making it well-suited to support circular initiatives. Further research to investigate local wool processin opportunities is recommended.

Australian wool clip has consistently maintained a one micron fineness advantage over the Australian wool clip for the past five years (Figure 8) with fine micron wool characteristically securing high prices (Wood 2022). Western Australia houses one of only two Australian Wool Testing Authority (AWATA) Laboratory facilities in the country.

### COTTON

#### CURRENT STATE

The Ord Valley region is experiencing a resurgence in cotton growing with over 1000 hectares of cotton harvested in 2020. A proposed Kununurra Cotton Gin aims to process cotton grown in WA within the state, eliminating the need for transportation over 3,500 kilometres to Queensland. The WA state government is providing land for the facility and \$4 million towards preliminary work, while the Commonwealth's Northern Australia Infrastructure Facility (NAIF) board approved a \$32 million loan to the Kimberley Cotton Company for Stage One construction of the gin. Completion is expected in 2023, with operations commencing in the second half of 2025 (Government of Western Australia 2021).

### OPPORTUNITY

With a good climate and a reliable water supply, the Ord Valley is poised to contribute significantly to national cotton exports, valued at \$2.7 billion (CSIRO), boasting the world's highest yield. The Kununurra Cotton Gin could create over 1000 local jobs in its first 10 years, generating \$1.19 billion in cotton export revenue. Furthermore, it offers additional benefits such as livestock feed as a by-product (Government of Western Australia 2021). With 100 per cent renewable hydroelectricity and low carbon emissions, the gin positions WA cotton advantageously in the global marketplace, which is experiencing increased demand for sustainable fibre products. This opportunity in upstream processing may foster connections across sectors and contribute to localised circular supply chains, and warrants further research.



### **INDUSTRY PROFILE 1: NULLABOR FIBRE BY NANOLLOSE**

Based in Techpark Bentley, WA, Nanollose has developed the Nullabor fibre derived from converting waste products into microbial cellulose.

Nullarbor fibres are compatible with existing industry processing and manufacturing equipment, and Nanollose have collaborated with Australian designer Lee Mathews to produce the world-first tree-free lyocell fibre clothing item.

Image source: Nanollose.

### **HEMP**

#### CURRENT STATE

The Department of Primary Industries and Regional Development (DPIRD) is trialling Industrial Hemp (IH) as fibre in Kununurra and Manjimup in a 3-year project as part of the AgriFutures National Industrial Hemp Variety Trials. The trial includes IH processing to develop fibre-based hemp building products such as hempcrete, insulation and fibreboard. There is no current initiative or plan to process IH for textiles (DPIRD 2022). Other hempgrowing activities in the south-west are mostly producing grain crops that are being used for oil, food and body products.



Image source: Getty Images

#### **OPPORTUNITY**

Hemp is naturally pest resistant and uses far smaller amounts of water for crop irrigation. As a textile fibre it is hardwearing and durable. Investigation into opportunities for processing IH for textiles is recommended.

# 03 design and manufacturing

WACFC Research revealed three key themes relevant to pathways of circularity in design and manufacturing in WA.

- Designing out waste through sourcing and supply
- Manufacturing and value-adding in the WA clothing sector
- Customer expectations and price

These themes are expanded in this section, which includes a case study of a sustainable hemp-fibre PPE and workwear producer.

### DESIGNING OUT WASTE THROUGH SOURCING AND SUPPLY

#### CURRENT STATE

Designing for circularity in Australian apparel requires sourcing strategies and material decisions rooted in a product stewardship mindset, that 'design out' waste at the design phase (Piller 2022). The WACFC Stage 2 research found that SME designers and producers within the WA fashion sector exhibit sustainable practices, with a focus on natural and recycled fibres and demand-led business models, rather than strong concepts of product stewardship and CE (see Figure 9).



Figure 9. Reported nature of circular activity indicated by WACFC Pilot Survey participants. 2023.



Of the designers and producers surveyed by WACFC, natural fibres (cotton, linen, hemp) were the most commonly used fibre at 39% (see Figure 7), and more likely to be sourced offshore (see Figure 10). This contrasts with the NCPSS Data & Material Flows Report which synthetic fibres accounts for around 62% of national market share.

Figure 10. Reported source location of materials indicated by WACFC Pilot Survey participants. 2023.

Organic and recycled materials with ethical supply chains and highly specialised circular and compostable components such as elastic, thread and labels are expensive, and unlikely to be sourced in Australia (Piller 2022). This was supported by one WACFC survey respondent:

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Natural, environmentally friendly, circular products are more difficult to obtain, are mostly needing to be sourced off-shore and cost a premium, as does local production, or ethically sound offshore production. This comes at a cost to profit margins."

Many WA fashion SME designers and producers that participated in the WACFC Stage 2 research displayed a keen awareness of ethical supply chains and transparency. A survey respondent highlighted their approach:

Participants also acknowledged a growing demand for ethical sourcing and sustainability, emphasising the necessity for education in this space: I try to source my fabrics from the UK, Europe, Japan, US - countries with stronger pay and labour laws.

New clients coming through are increasingly asking about sustainability and ethical sourcing options, but they don't have much knowledge about the processes/options.



#### **OPPORTUNITY**

The industry requires education and support to embrace product stewardship, circularity and designing out waste concepts. Additionally, further research into circular sourcing strategies, as well as technologies and infrastructure for fibre and textile processing would unlock potential for local sourcing and supply opportunities.

### MANUFACTURING AND VALUE ADDING IN THE WA CLOTHING SECTOR

#### CURRENT STATE

WA clothing brands are challenged by a lack of technologies for processing and finishing textiles (Piller 2022). The hollowed-out nature of the WA textile and processing industry in comparison to eastern states is significant (see Figure 11), with no presence of fibre processing, mills, fabric finishers or dyehouses (IBSA Manufacturing 2019). Geographical isolation creates challenges for the supply chain (Piller 2022), and manufacturing is largely focused on the production of uniforms and clothing finishers such as embroiderers and t-shirt printers and is lacking in specialised garment categories.



Figure 11. Distribution of TCF workforce by state, selected industries vs the overall labour force, 2016. [Source: IBSA Manufacturing. 2019]



Figure 12. Reported location of manufacturing indicated by WACFC Pilot Survey participants. 2023.

However, supply chain disruptions and a shift in consumer sentiment as a result of COVID-19 have accelerated a trend towards local manufacture (Piller 2022), and WACFC survey respondents primarily manufacture locally (see Figure 12). Two commercial digital textile print houses have been established in Perth within the last 12 months, and clothing manufacturers are very busy, with good local employment outcomes for skilled workers as machinists, patternmakers, production assistants, specification writers, and those with production technology skills (Western Australia 2022).

#### OPPORTUNITY

Investment in manufacturing will further local production and opportunities for transparency and minimising waste, supply chain disruptions and the sustainable footprint of the sector.



### INDUSTRY PROFILE 2: WORTKOOL WORKWEAR

Wortkool Workwear is an ethical and sustainable supplier of Hemp and Hemp-blended PPE and is founded and run in WA, with a focus on employment for Aboriginal Australians. Currently designed locally and procured offshore, their vision is to grow and manufacture the Hemp Workwear in WA. They are currently collaborating with DPIRD and HempGro WA as part of the AgriFutures National Industrial Hemp Variety Trials.

Image source: Wortkoorl Workwear

### **CUSTOMER EXPECTATIONS AND PRICE**

#### CURRENT STATE

The designers and producers surveyed in the WACFC research primarily service a local clientele (Figure 13).

WA Fashion SMEs face challenges from consumer price expectations in an Australian market highly engaged in cheap imports. Further challenges arise from 'greenwashing' marketing strategies that dilute the brand message of authentically circular and sustainable labels (Piller 2022).



#### OPPORTUNITY

Recommendations to tackle these challenges and combat 'greenwashing' involve consumer and community education, along with the integration of circular and product stewardship concepts into education curriculum.

Figure 13. Reported primary location of business clientele indicated by WACFC Pilot Survey participants. 2023.

### 04 UNIFORMS AND WORKWEAR

### CURRENT STATE

Various industry sectors, such as mining, construction, trade, hospitality, medical and education, rely on uniforms and workwear. Corporate branding, fabrication and trims, along with industry related soiling present challenges to recycling, upcycling and re-use. End-of-life uniforms generate an estimated 11,000 tonnes of textile waste annually, with less than 1% being recycled (Australian Government 2023).

Applying CE principles, including changes to procurement policy, design, production and distribution can significantly reduce uniform and workwear waste. Progress has already begun, as the Sustainable Procurement Guidelines direct government departments to consider product life cycles during procurement (Australian Government 2021). Several workwear rental services in WA facilitate rental and laundering of uniforms for organisations, which maximises product longevity and reduces consumption and waste.

This section focuses particularly on uniforms within the mining sector and includes two case studies of enterprises working at recovery in this sector.



#### **INDUSTRY PROFILE 3: LOOP UPCYCLING**

Loop is a WA social enterprise and Australia's first corporate upcycling company. Established in 2017, Loop is committed to innovative solutions to waste from company uniforms and textiles. By transforming corporate textile waste into practical products like tote bags, bucket hats, backpacks, and teddy bears, they breathe new life into discarded materials. The Loop social enterprise model extends

opportunities to various segments of the WA community, including new migrants; transforming lives, inspiring positive change, and fostering a collective commitment to environmental responsibility.

Image source: Loop Upcycling.

### MINING

The mining industry in WA plays a significant role in the Australian mining sector, accounting for half of all mining activity and providing employment to over 157,000 people (Department of Mines, Industry Regulation and Safety 2022). Due to the projected increase in employment figures by 8.3% by 2025 (Fawthorp 2020), managing uniform waste in this sector becomes crucial (Zaman, Marinova and Farren 2023). However, the remote locations of most mining operations pose a significant challenge in establishing efficient uniform collection systems. Moreover, the absence of viable facilities for reusing or recycling unwanted uniforms further exacerbates the problem. The limited investment by companies in addressing this issue results in the majority of mining uniform waste being disposed of in landfill.



Image source: Pixabay.

### **OPPORTUNITY**

The corporate and mining sectors offer unique procurement opportunities centred on textile waste reduction. Education promoting sustainable procurement processes and investment in initiatives to prolong the lifespan of workwear are recommended.

### INDUSTRY PROFILE 4: FIBRE ECONOMY

Fibre Economy is a social enterprise founded in 2020, that isolates high-vis uniforms as a waste stream through the establishment of collection points throughout companies. Collected workwear is sorted and redistributed to different avenues based on



its condition, with a priority being placed on wearable workwear being redistributed in its current form. Through their partnership with Good Sammy, they provide people with disabilities employment opportunities in different roles throughout their supply chain including sorting, grading, dismantling and logistics.

### 05 GARMENT REDISTRIBUTION

#### CURRENT STATE

The Australian Fashion Council's Seamless Clothing Stewardship Scheme (2023) recommends implementing and following Jacqueline Cramer's ten circular economy principles, known as the R-strategies. These principles "rank actions such as 'reducing' and 'reusing' above 'recycling' because they use less resources and keep materials in circulation at their highest use for longer" (AFC 2023, 8). As such, the WA garment redistribution sector plays a critical role in the clothing and textile circular economy.



Figure 14. Breakdown of clothing redistribution (second-hand) stores in Greater-Perth. [Source: WACFC secondary data collection. 2023]



Good Sammy Warehouse , clothing processing. Image source: Good Sammy

According to ThredUp (2023), the global second-hand resale market is projected to nearly double by 2027, reaching \$350 billion. In Australia, the interest in second-hand fashion is evident, with 73% of respondents in a recent Reluv survey stating they purchase second hand fashion. Over the last three years, 20% of Australians have adopted second-hand shopping behaviours, motivated largely by environmental concerns, closely followed by economic considerations (Reluv 2022).

Garment redistribution in WA is comprised of three key operators; charitable organisations, second-hand garment retailers and private recycling organisations. WACFC research identified over 220 second-hand garment retailers in WA, with close to 200 of these outlets run by charitable organisations (Figure 14). This section focuses on the Charitable and Private Recycling Organisations and includes a case study for each.

### **CHARITABLE ORGANISATIONS**

The role of charitable organisations in reuse and recycling is an important component of a circular economy, making up 87% of the clothing redistribution (second-hand) stores in Greater Perth (see Figure 14). Donations of clothing to the charity sector is the main pathway of the redirection and recirculation of textile waste from landfill in Australia, providing established infrastructure and systems for redistribution. Their role in the redistribution of clothing is demonstrated in Figure 15 (AFC 2022a).



Figure 15. Australian Fashion Council National Clothing Product Stewardship Scheme Clothing Data Report: Flow of Clothing in Australia by weight: note the role of donation in redirecting clothing waste from landfill. [Source: Australian Fashion Council NCPSS. 2022b]

There are approximately 2,700 charitable and social enterprise retailers in Australia, of which 8% are in WA (See Figure 16). The Australian charitable recycling sector processes 310,316 tonnes of clothing annually, which equates to an average of 12.1kg of clothing textiles donated per person in Australia (MRA Consulting Group 2021). Of the clothing processed by the charitable reuse and recycling sector, 16.5% is sold at a charity shop, 36% is recycled domestically, and 14% is sent to landfill (MRA Consulting Group 2021).

A Charitable Impact Study (Charitable Recycling Australia 2020) estimates the Western Australian charity sector saves 72,341 tonnes of CO2 emissions, 153,715 MWH of energy and 7,204 ML of water annually through the redirection of clothing from landfill and provides over 430 jobs for Western Australians.



Figure 16. Number of charity shops by state. [Source: Charitable Recycling Australia. 2021].

Good Sammy, a WA social enterprise, has been in operation for over 60 years, with more than 50% of its workforce made up of people with disability. Good Sammy ranks third in clothing redistribution (second-hand) shops in Greater Perth, following national charity enterprises Salvos and Vinnies (see Figure 15). Good Sammy received 3,832 tonnes of clothing and textile donations in 2021/22. Of this figure, 40% was sold in their 25 second-hand shops or through their online store, 29% was sent offshore and 27% was sent to landfill (see Figure 17).



Figure 17. Good Sammy Material Flow Data 2021/2022. [Source: Good Sammy. 2023]

Good Sammy accepts a high proportion of low-grade stock as part of their Sustainability Program. As part of a data audit into the low-grade stock for other markets, they found only four brands consistently represented at over 2% of the material stream (see Figure 18). These brands were all mass produced, imported, discount fashion brands. Alongside lowgrade stock, Good Sammy also process a large number of dirty, stained, damaged or wet items, partially attributed to their large number of community donation bins. This results in a high proportion of donations being ineligible for sale in stores. They are working with a range of stakeholders to explore material diversion options including local repair, ragging, upcycling and recycling.



BRAND OWNER	Count Proportion	Weight Proportion
Brand 1	11.6%	11.0%
Brand 2	8.6%	8.0%
Brand 3	2.6%	1.0%
Brand 4	2.0%	2.0%
Other	75.1%	77.1%
TOTAL	100%	100%

Figure 18. Good Sammy Low-Grade Stock Brand Analysis. [Source: Good Sammy.2023]

### **PRIVATE RECYCLING ORGANISATIONS**

Limited activity is observed in the clothing textiles Private Recycling sector in WA. Three for-profit businesses, Perth Community Clothing Recycler (PCCRW), Loop Upcycling and Fibre Economy are highlighted in WACFC research for their efforts in collecting, sorting, redistributing, and repurposing textile waste. Loop Upcycling and Fibre Economy are featured as case studies in the previous section for their work on managing textile waste from corporate uniforms and high-vis. Below is a case study featuring PCCRW.

#### **OPPORTUNITY**

Investigation and investment in best practice industry initiatives, and considering opportunities to scale and extend these models, represents a pathway towards enhancing onshore capabilities in clothing sorting, remanufacturing and extending product life.



PCCRW have been recycling clothing, shoes and accessories since 2007 to help people in need and protect the environment. They provide free home collections to the community, and items are then sorted and redistributed via multiple avenues. Wearable clothing with a grade of AA - A is sent to Africa and Asia. Unwearable clothing may be ragged for selling locally, or sent to Asia to be made into furniture. Wool products are sent to India to be recycled into rugs.

age source: PCCRW

### 06 TEXTILE RECYCLING IN WA

#### CURRENT STATE

WACFC research highlights an absence of sufficient mechanical or chemical recycling infrastructure in WA. At present, all WA clothing and textiles destined for recycling are transported to the eastern states of Australia or overseas, resulting in increased CO2 emissions and a missed opportunity to foster a local textile recycling industry.

Textile ragging and shredding is a common starting point in a recycling process, and currently, there are limited textile shredding services in the state. The scale of ragging and shredding in WA is insufficient to handle the current volume of textile waste, necessitating significant expansion to support local demand.



Image source: Gary Cass.

### **INDUSTRY PROFILE 6: CASS MATERIALS X FIBRE ECONOMY**

Innovative research and development initiatives, such as the partnership between Cass Materials and Fibre Economy, facilitated by Curtin University School of Design and Built Environment Small Grant Funding, offer promising solutions to textile waste recycling challenges. The ongoing project aims to produce insulation from unwearable highvis workwear sourced from the mining and construction industries. These insulation prototypes could be repurposed back into the mining industry for use in dongas, machinery vehicles and lithium battery storage, offering economic, environmental and social benefits.

#### OPPORTUNITY

Investment in and support for textile collection, sorting, and recycling infrastructure in WA, along with innovative solutions to textile waste, present avenues to nurture a local textile recycling industry and create job opportunities.

- A high proportion of **SMEs** within the WA Clothing Textiles Industry.
- D2 High levels of industry interest in future opportunities to support **circularity**.
- The potential for establishment of **industry collaboration** and **partnership** in the form of regional Industry Hubs focussed on
  - Case studies of **innovation** and **best practice** in the
- 04 **AVOIDANCE** areas of design practice, production and consumption and **RECOVERY** through recirculation
  - \_ The significant role played by Charitable Organisations in the
- 05 **RECOVERY** of garments and the potential for their Op Shops to function as district Recovery Hubs.

Although Western Australia faces many barriers to the implementation of Circular Economy principles within the WA clothing and textile industry, this report has identified several key areas of opportunity for circular intervention.

# LEADERSHIP

There is currently limited representation of clothing textiles industries by WA based governing bodies. WACFC has identified a need for local industry leadership to facilitate collaboration between key representatives across the WA clothing supply chain to progress Circular Economy thinking, processes and products.

## EDUCATION AND TRAINING CONSUMER EDUCATION

Educating consumers in the MSW waste stream is key to achieve a 20% reduction in waste per capita by 2030. Everyone in the supply chain, including the consumer, has a role to play in shifting the fashion industry towards more sustainable practices. To reduce waste, consumers need to be informed about the environmental impact of improper textile waste disposal, the resources involved in textile production, the role of textile-producing nations, and the value of textile waste.

Currently, the WasteSorted Initiative lacks resources on textile waste as part of their free waste education materials for individuals and schools.

### INDUSTRY TRAINING

Major opportunities for intervention exist within the training of future industry professionals, particularly educating designers as part of their studies (Boulton, McCallion and Curtis 2020). There is an opportunity for institutions to work together to create a baseline for sustainability in education for students engaged in both TAFE and higher education fashion courses. WACFC Survey data identified limited WA training available for the implementation of circular economy models into current clothing and textile business practices.

### **BUILDING RESPONSIBLE SUPPLY CHAINS**

Building responsible supply chains is challenging for SME's due to the lack of availability of sustainable materials, high costs associated with procuring these materials, lack of education on Circular Economy principles and sustainable practices, reduced customer buying power and their inability to pass increased costs onto their customer base. Supported by the initial pilot survey, crosssector dialogue and working together across sections in the supply chain were identified as ways to facilitate the change.

Workwear and uniforms present an opportunity to begin to build more resilient supply chains. Workwear and uniforms offer a range of opportunities within a circular economy model to eliminate textile waste because of the stability and consistency in design and requirements related to materials and comfort (Zaman, Marinova and Farren 2023). Other factors contributing to this opportunity include the small number of key manufacturers, suppliers and high volumes of workwear distributed to many large companies.

### **GOVERNMENT INTERVENTION**

The WA Government WARR Strategy 2030 briefly identifies textile waste as a focus material, however there are no specific strategies listed to address this waste stream. This summary is designed to support the implementation of actions and measurements to help achieve the following targets listed within the WARR Strategy:

- Increasing material recovery to 70% by 2025.
- No more than 15% of waste generated in the Perth and Peel regions is landfilled by 2030.
- All waste is managed and/or disposed to better practice facilities.

Whilst it is recognised that the market for locally produced sustainable materials is currently limited in WA, government procurement can directly and immediately drive demand for sustainable or recycled products and services, providing confidence within other sectors (WA Waste Strategy Action Plan 2022). There is an opportunity for the WA Government to lead by example through the procurement of uniforms by actioning the following strategies:

- Phasing out the procurement of uniforms made from synthetic materials.
- Procuring uniforms made from sustainable/recycled materials from local manufacturers and retailers where possible.
- Engaging with local businesses to divert redundant.end-of-life uniforms from landfill.

We strongly urge the WA Government and the WA Waste Authority to include specific strategies and a 2030 target around textile waste avoidance and recovery during the review of the Waste Strategy this year.

# **INVESTMENT IN INNOVATION & INFRASTRUCTURE**

Government and industry must work together to invest in strategies and projects that will enable the transition to a Circular Economy. According to Beswick (2022) Global Fashion Agenda's 'Scaling Circularity' report, "the fashion industry could become 80% circular by 2030 if there is increased investment in existing recycling technologies and infrastructures." Three key areas for investment in the clothing supply chain have been identified including Manufacturing, Clothing Textiles Recovery and Textile Recycling.

#### MANUFACTURING

Circular practice in clothing design and manufacturing is critical to avoid textile waste in MSW and C&I waste streams. At this point, WA's manufacturing capabilities are limited. With survey participants heavily engaged in the use of natural fibres, further investigation and development of manufacturing capabilities and emerging technologies could enhance WA's potential to achieve circularity.

### **CLOTHING TEXTILE RECOVERY**

Considerable systems and infrastructure to collect, process and recover and textiles already exist within WA's charitable recycling industry. Further Government support and investment in this industry could improve WA's textile recovery capabilities. While WACFC research identified interest amongst survey participants in engaging in textile waste

avoidance and recovery, only three small for-profit businesses were identified that focus on collection, sorting, redistribution and repurposing textile waste. An increase in participation in the clothing textiles recovery industry is needed to meet demand and ensure that the amount of clothing textiles going to landfill is minimised.



WACFC data suggests approximately 87% of local apparel reuse and recycling stores are run by **Charitable Organisations** in the Greater-Perth -Fremantle area, providing infrastructure and systems for redistribution as well as a unique opportunity for collaboration. (WACFC Research Data 2023)

### **TEXTILE RECYCLING**

WA currently has no technology or infrastructure available to implement mechanical or chemical textile recycling at the scale required to meet demand. In order to achieve sustainable development, financial support is crucial for small and medium-sized businesses to explore the opportunity of utilising textile waste (Khan, Wang and Padhye 2023).

## **CROSS SECTOR COLLABORATION**

The textile, clothing and fashion sector cannot achieve circular business models alone. Everyone in the supply chain must be involved including retailers, SME's, corporates, manufacturers, charities, government, universities, research institutions, waste management (Boulton, McCallion and Curtis 2020). The mapping of circular activity enhances the state's potential for cross collaboration, and further uptake of circular practices.

The WACFC Pilot Survey and initial mapping of local circular activity in WA garment industries indicates value in the establish regional activity hubs, designed to enhance collaboration between industries in the improvement of circular activity.

### **RECOMMENDATIONS FOR CIRCULAR INTERVENTION IN WA**

### )] LEADERSHIP

Establish an industry body to provide advocacy and support for action required to implement structured and organised progress. The WA Government and Waste Authority could support this by convening a Clothing Textiles round table with key industry representatives.

### 02 RESEARCH

Provide funding for thorough data collection, including a state-wide materials flow analysis, capturing information on clothing textiles consumption and waste outputs, as well as mapping of WA infrastructure.

# 03 CROSS-SECTOR COLLABORATION

Create regular Government and industry collaboration forums to provide a platform for cross sector dialogue and engagement on initiatives.

### )4 CONSUMER EDUCATION

Include textile waste education in the Waste Sorted resources and establish other public education campaigns. Content should cover the environmental impact of clothing production and textile waste, and information about responsible garment disposal and greenwashing.

### 05 FINANCIAL INCENTIVISATION & FUNDING

Financially incentivise and provide accessible funding opportunities to charities and SMEs that participate in textile collection, processing and recycling innovation, as well as SMEs that retail recovered products.

# 06 INDUSTRY TRAINING

Provide advocacy and education for local industry to build capacity to design for circularity and product stewardship. Government investment should also be provided to address the skills shortage that exists among machinists and garment technicians.

### סק MANUFACTURING

Invest in innovation, technology and infrastructure associated with the local clothing supply chain to build manufacturing capabilities.

### **08 LEGISLATIVE REFORM**

The WA Government and Waste Authority must take action in addressing clothing textiles waste, through the formulation of legislation regarding sustainable procurement, textile waste management plans, and reporting requirements for industry and state government bodies. Awareness of clothing textile waste has been significantly heightened by the Australian Fashion Council National Product Stewardship Project that has resulted in the implementation of the Seamless Clothing Stewardship Scheme.

The WA Circular Fashion Consortium was convened to provide a voice for WA in the clothing textile waste forum. WACFC quickly identified the need for local research to ensure evidence-based support to this voice. The Consortium Pilot Survey revealed an appetite amongst local industry for engagement in circular activity. It is noted however that the lack of accurate and accessible WA specific textile consumption and waste output data is a major barrier to the implementation of a Circular Economy within the local industry. To better understand the textile waste issue and develop policies at a state level, more extensive data collection is required. This data can be used to construct models utilizing techniques, such as material flow analysis, to quantify the textiles that are used, reused, and disposed of (Khan, Wang & Padhye 2023).

The WA clothing industry is unique. It is predominantly made up of Sole Traders, Microenterprises and SME's, and is currently without any regional industry bodies to support networking or representation. It is challenged by geographical isolation and disrupted supply chains. A customised approach is needed to provide local industry access to resources that will support change.

The Report includes Recommendations that are focussed on supporting the implementation of initiatives that engage in cross-sector collaboration between Industry sectors and Government agencies, which is critical to the achievement of suggested targets of 80% circularity by 2030. It is recognised that this target will require significant investment in innovation, technologies and infrastructure to optimise local capability. Australian Fashion Council. 2021. *High fashion to high vis: The economic contribution of Australia's fashion and textile industry*. Ernst & Young. <u>https://ausfashioncouncil.com/wp-</u> content/uploads/2021/05/From-high-fashion-to-high-vis-EY-final-report-31-May-2021.pdf

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**Circular Economy:** An economic system that replaces the 'end-of-life' concept with circularity principles of reducing, alternatively reusing, recycling and recovering materials in the production/distribution and consumption processes, with the aim to accomplish sustainable development (Kirchherr et al. 2017).

**Downcycling:** Using a mechanical process, discarded textiles are turned into new products, usually with a lower value and industrial application. Textiles are cut into cleaning cloth, shredded to create insulation/fill and/or fibres are bonded in composite materials (AFC 2022b).

**Fashion:** In the context of this document the use of the term fashion describes all forms of garment, including luxury items, fast fashion, uniform and leisurewear.

**Fibre:** A base material extracted from natural animal or plant sources such as wool, silk cotton, linen, hemp or manmade materials such as rayon, nylon, polyester. Fibres are plied together to form long continuous threads or yarn that can be used to form a cloth via mechanisms such as weaving or knitting or fibres can be layered to form loose bats or bound together via a fusing mechanism to form structured material such as felt.

**Greenwashing:** Fabricating or exaggerating claims to deceive consumers into thinking their products are environmentally friendly. This can be done in numerous ways, from hiding key information to overstating claims in order to distract consumers from unsustainable practices (AFC 2022b).

**Product Stewardship:** Product Stewardship is based on the idea that actors throughout a supply chain retain a level of responsibility for offsetting the social and environmental impacts of the materials/product produced and consumed ("shared responsibility") (AFC 2022b).

**Recycling:** Recycling is the process of breaking down textiles into raw materials which are then used to make new products (AFC 2022).

**Recirculation:** All activities that work toward a circular economy – specifically those which put clothes in use for longer (AFC 2022).

**Redistribution:** Divert a product from its intended market to another customer so it is used at high value instead of becoming waste (Ellen MacArthur Foundation, n.d.).

**Responsible:** To have control and authority over something or someone and the duty of taking care of it (Cambridge University Press n.d.).

**Sustainable:** Causing, or made in a way that causes, little or no damage to the environment and therefore able to continue for a long time (Cambridge University Press n.d.)

**Sustainable Development:** Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission 1987).

**Sustainability Transitions:** Transformation processes through which established sociotechnical systems, industries and societies undergo major shifts to move systems towards more sustainable modes of production and consumption (Köhler et al. 2019).

**Systems Approach:** A particular way of tackling an issue whereby the problem is considered in reference to an interrelated whole (Carey et al. 2015).

**System Change:** A process and an outcome where a deliberative, collaborative, and iterative process of change leads to the emergence of a new structure (Barker et al. 2021).

**System Transformation:** The result of action that leads to significant alteration in attributes and/or function within a system (i.e., alteration to structures, rules, processes, practices, power dynamics, and mental models), potentially creating substantial impact (Clarke & Crane 2018).

**Textiles:** Any cloth or goods produced by weaving, knitting, or felting; a material, as a fibre or yarn. (Dictionary n.d.).

**Upcycling:** The process of transforming waste materials and discarded or unwanted products into something of a higher quality or value, often using crafts or artisanal knowledge as tools (Australian Fashion Council 2022).

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