

# **Future Waste Tyre Recovery and Recycling Options for Canterbury**

**Scoping Report for the  
Canterbury Waste Subcommittee**

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**Prepared by:  
Sarah Gordon  
Recovered Materials Foundation**

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# Future Waste Tyre Recovery and Recycling Options for Canterbury

## 1. Introduction

The Canterbury Waste Sub-committee has requested the Recovered Materials Foundation (RMF) to investigate and report on practical issues and options for recovery and recycling of waste tyres in Canterbury.

The RMF proposed this to be undertaken in three stages:

1. To undertake a scoping report to identify key issues and options and recommendations for further investigation / implementation.
2. Subject to the outcomes from the scoping report, undertake further research where there is insufficient information, and further analysis into most viable options, including a SWOT analysis of business and market opportunities.
3. Development of business and marketing plans to establish operations to facilitate the recovery and end uses for waste tyres.

This initial scoping report aims to summarise past and current issues with waste tyres, identify and interview key players, and recommend the most viable options and plans for further investigation. These are considered in local, regional and national contexts.

This scoping report is intended to provide an overview of all past and current issues with waste tyres. This is certainly not a new issue for Christchurch city, although it may be for the other Canterbury Territorial Local Authorities (TLAs). A considerable amount of work was undertaken in 1998 by the RMF in researching options for waste tyres, and by the Christchurch City Council (CCC) in implementing restrictions on the acceptance and disposal of tyres at its Burwood Landfill.

While this is historic and relates only to Christchurch, it is very relevant to summarise this for the benefit of the other Councils and also to note any major differences between then and now. Therefore the initial background information is focused on Christchurch information and statistics. However, it is expected that this information can be applied to other TLAs on a per capita basis.

## 2. Background

### 2.1 History

Waste tyres were accepted from the general public at no charge at the three CCC refuse transfer stations' recycling centres until 1998. Up until then they were collected mainly by silage contractors or members of the public wanting them for various low volume uses such as crib walls, planter boxes etc.

Commercial quantities were generally not accepted and most of the tyre retailers had direct arrangements with silage contractors, or with a major collector who had stockpiled up to 300,000 tyres with the view to developing a shredding operation to produce a range of marketable products.

This changed in 1997 as tyre volumes continued to grow at the transfer stations, eventually requiring them to be taken to landfill where they were stockpiled awaiting a suitable disposal option. Landfilling whole tyres was not an option given their ability to trap landfill gas and "float" up to the surface.

Three main factors were believed to be responsible for the increased volumes of waste tyres. Firstly there was a downturn in silage production due to farmers moving more to baleage, a major drought at the time, and the fact that farms already had sufficient tyres for any silage that was still being made. Secondly there was an increase in imported used tyres lasting only 30-50% as long as a new tyre. Thirdly the cheaper imported used tyres competed with local retreaded car tyres (perceived to be of similar quality and value) so less casings were being reused locally. In addition to this, the collector stockpiling tyres was running out of storage space and had reduced his collection services. This meant that more commercial tyre companies were trying to utilise free disposal services through the refuse transfer stations.

In February 1998 the CCC banned acceptance of tyres at the transfer stations and landfill until an appropriate disposal charge for tyres could be established to cover the cost of processing them for disposal or recycling. In March a report to the Council suggested introducing a charge of \$2 / tyre or \$380 / tonne (compared to the charge of \$48.43 for general landfill material) for bulk loads from commercial sources.

Response from tyre retailers, manufacturers, used tyre importers, and scrap metal processors (generating waste tyres through car crushing operations) was swift. The Industry Waste Tyre Committee (IWTC) was formed comprising representatives from all aspects of waste tyre generation, collection, disposal and recycling and coordinated through the RMF.

Prior to the tyres becoming an issue, the RMF had commissioned a student completing a Masters of Engineering Management at Canterbury University, to

undertake research on the current volumes and potential uses for waste tyres. The timely report “Scrap Tyre Strategy” was completed in February 1998 and also provided useful information and direction for the IWTC.

The committee identified and worked through a range of short and long term options for waste tyres. In May it endorsed the \$2.00 charge per tyre which was to be passed on to consumers at point of purchase and met six months later. After this the committee disbanded.

Since then there have been no apparent issues with tyres in Christchurch, largely due to major dairy conversions on the Canterbury Plains requiring tyres for silage pits (some requiring up to 10,000 tyres / per farm). The use of tyres by silage contractors is discussed later in this report.

## **2.2 Research and Investigation**

There exists an incredible amount of information on tyre recycling on an international scale. Many of these studies and reports are summarised in the 1998 Scrap Tyre Strategy Report.

Subsequent to this report, the known following reports and studies have been completed in Canterbury:

### **Overview of the Waste to Fuel Industry in Christchurch**

Masters of Environmental Management Thesis (University of Canterbury) by Tim Cosgrove. Completed March 1998. Sponsored by the Recovered Materials Foundation. Project included research and discussion on tyre derived fuel.

### **The possible use of waste tyres as an alternate fuel in the manufacture of cement – study for Miburn New Zealand Ltd**

Scoping study by John Daymond,(deceased) towards a thesis for a Masters Applied Science a Lincoln University. Completed March 1999. Sponsored by RMF and Milburn New Zealand Ltd. Full thesis not completed.

### **Tyre Pyrolysis**

Consultancy report prepared by LincLab for the Recovered Materials Foundation. Completed in June 2000.

### **Tyre Recycling Project**

Masters of Environmental Management Thesis (University of Canterbury) by Matthew Wright and Milo Kral. Completed April 2002. Sponsored by the Recovered Materials Foundation and Realize Technology. Project examined viability of utilising tyre tread/polymer composite in the manufacture of vineyard line posts.

### **Recycled Crumb Rubber use on Sports Turf in North America**

Report by Brain Way of the New Zealand Sports Turf Institute, partially sponsored by the Recovered Materials Foundation. October 2001.

At a national level, the Ministry for the Environment commissioned a report by Andrew Sweet from "Firecone" on *Management of End-of-Life Tyres*, completed in January 2004.

This is a very comprehensive report on current issues with tyre volumes and disposal options. It summarises the current central and local government regulations concerning the management of end-of-tyres, and recommends a range of options for central government to gain better information of waste tyre end uses, improve storage and disposal systems and encourage greater levels of recycling.

Key points of particular relevance for Canterbury include:

- That it is extremely difficult to monitor the production, collection and end storage / disposal of used tyres. The report recommends encouraging industry to develop procedures for used tyre collection, processing and storage. This subsequently led to the development of "Tyre Track," which is discussed in further detail later.
- That there are currently few controls and regulations specifically governing the storage of used tyres on private land. The report recommends the need to develop recommended standards for tyre piles on private land and encourage council to include them in their District Plans
- That the South Island has not yet experienced the same level of illegal tyre dumping on public and private land as that experienced in top half of the North Island with reports of 10,000 to 80,000 tyres being illegally dumped with the ultimate responsibility falling on the land owner to remove them. The report recommends that the government review the Litter Act to address illegal dumping of tyres, and also to discuss with councils how to fund the removal of tyres where it is not practicable to pursue the landowner for this.
- The report also recommended encouraging councils not to accept whole tyres for landfilling, but this is not as relevant for Canterbury with the opening of Kate Valley Landfill, the introduction of the cleanfill by-law banning tyres in clean fill pits, and the fact that both Kaikoura and Timaru landfills do not accept whole tyres for disposal.
- The above recommendations were considered to be of high priority to be implemented as soon as possible. Other long term recommendations for the Government included investigating recycling options, especially in the context of researching supply issues for potential recycling initiatives and considering options to subsidise these if warranted.

### 3. Current Estimated Volumes of Waste Tyres in Canterbury

Of all past and present research into tyre volumes in Canterbury and New Zealand, the one common conclusion reached is that it is extremely difficult to gain any accurate figures on the “used tyre supply chain”.

Nationally and internationally it is estimated that one waste tyre is generated per person each year. This is commonly quoted and used in studies, but it has been impossible to locate the source of this information. This estimate suggests that up to 450,000 waste tyres are produced in the Canterbury region, 1 million throughout the South Island, and 4 million nationally.

Information provided in the 1998 report “Scrap Tyre Strategy” quoted two sources estimating the production of waste tyres in Christchurch / Canterbury:

- Firestone’s projected passenger and light truck sales in Canterbury for 1997 to be 300,000 (0.64 tyres per capita based on a population of 468,040 for Canterbury).
- Independent Tyre Services estimated that 1997 national sales of 2.4 million tyres were made up of 480,000 retreads (20%), 600,000 used tyre imports (25%), and the remaining 55% were NZ manufactured. On a per capita basis this equated to 0.66 tyres per capita / year, or 204,977 tyres for Christchurch based on a population of 309,028.

As discussed later in this report, it is essential that we can reliably quantify the number of waste tyres that could realistically be recovered in Canterbury (and from throughout the South Island) to assess the viability of identified end-of-life recycling and tyre derived fuel options.

The following summarises all known information of waste tyre volumes and end of life options in Canterbury from a wide range of sources. Waste tyres are generated through five key sources: those manufactured locally for the domestic market, new tyre imports, used tyre imports, new car imports and used car imports. Methods to capture end of life options include those tyres recovered at transfer stations, those collected for uses such as silage pit weights and also tracking through “Tyre Track”.

### 3.1 Canterbury Territorial Local Authorities

The ten TLAs in Canterbury were interviewed as to their current management practices for waste tyres and volumes being recovered.

#### Kaikoura District Council

- Tyres are accepted at the Kaikoura transfer station at a charge of \$2 / tyre.
- Tyres are stored and collected as required by local users at no charge.
- For at least the past three years, there has never been an issue with surplus supply of used tyres.
- Because of this it has not been considered as high a priority as other materials (such as recyclables) needing to be transferred out of the district. Consequently there is no accurate data on the actual amount of tyres received each year at the transfer station.

#### Hurunui District Council

- Tyres accepted at no charge at Hurunui Transfer Station.
- Very few turn up and those that are dropped off are uplifted by members of the public
- There has never been an issue with having to find alternate outlets for tyres dropped off at the transfer station.

#### Waimakariri District Council

- Does not accept tyres for disposal at its two refuse transfer stations.
- Local tyre retailers deal with most of the used tyres and find outlets for them.
- Has recently had a couple of incidents with fly tipping of small amounts (5-10) tyres at the local high school farm, but this also included other car wrecking parts as well, so was not just specific to tyres.

#### Christchurch City Council

- Receives tyres at \$2 / tyre at the three refuse transfer stations.
- There is some issue with current charging system. As tyres are dropped off separately after initial weigh in customers are being both charged by weight for refuse, and charged per tyre - they are in effect being charged twice.
- CCC had not experienced any major issues in finding markets for these tyres, until last year,.
- In the last 12 months approximately 10,000 tyres have been received at the three stations. Car tyres make up the majority of tyres collected; approximately 40% are 4WD tyres and 5% larger truck tyres.
- 3,000 were uplifted by various collectors at no charge and for the first time since 1998, the additional 7,000 tyres were processed for landfilling. Cost to cut tyres: \$1.50 for car tyres, \$2.50 for 4WD tyres, \$6.00 for truck tyres,



plus \$1.50 to remove tyre rims if required (24% of tyres were on rims). This cost did not include transport and disposal at the Burwood landfill.

- Charge to receive tyres currently being reviewed following increased disposal costs at Kate Valley Landfill.

#### Banks Peninsula District Council

- Tyres are accepted at Barry's Bay Transfer Station at \$2 / tyre.
- Again, very small volumes are received and no records have been kept on the numbers of tyres received.
- Some tyres are uplifted for local uses, and the remainder are transferred through to CCC's Parkhouse Road Transfer Station for processing with the other tyres there.
- They have had a few problems with small refuse skips in more remote areas that are not supervised, and occasionally whole tyres have been placed in these. Not only are the tyres very bulky in small skips, but unless noticed and removed, they can invariably end up being emptied into the refuse pit at Parkhouse Road Transfer Station.

#### Selwyn District Council

- Have two temporary supervised transfer stations at old tip sites with hooklift bins and loading ramps.
- Sites are supervised by Selwyn District Council staff. Waste Management Ltd collect the hooklift bins and transport them to their transfer station in Christchurch.
- To date Waste Management are not aware of any problems with used tyres in the hooklift bins.

#### Ashburton District Council

- To date used tyres at the Ashburton Transfer Station have not been an issue.
- They receive very few tyres at no charge to drop them off, and they are uplifted free of charge by anyone who wants them.
- Staff believe the majority of tyres are dealt with by the tyre retailers who have direct contacts with silage contractors to collect them.
- As this is not an issue, there are no records on number of tyres received at the transfer station.

#### Timaru District Council

- Waste tyres have never been an issue.
- They are dropped off at a charge of \$5/tyre or \$125/tonnes for bulk loads
- Receive very few car tyres from the general public, and believe the majority are dealt with by tyre retailers who have arrangements with silage contractors to collect,
- Mainly receive truck tyres not suitable for use on silage pits.

- Are currently stockpiling these until there is sufficient quantity to justify shredding these for landfill cover. (Currently have around 20 truck tyres).
- Local Lions club collects, stockpiles and delivers waste car tyres to silage contractors and farms as a form of fundraising.

#### Waimate District Council

- Used tyres are accepted at no charge at the Waimate Transfer Station.
- The council has never had an issue with used tyres as they go back out to local farms.
- The local Rotary Club collects and delivers the tyres to farms, charging the farmers a nominal cost for this service as a means of fundraising.
- No easily accessible figures on tyres are available.

#### Mackenzie District Council

- Very few are dropped off (at no charge) at the three refuse transfer stations.
- Those that are dropped off are usually uplifted and taken away for a variety of uses, the main one being for silage pits on local farms.
- Not an issue so therefore have not focused on volumes being dropped off.

### **3.2 Tyre Track**

Tyre Track is a voluntary collection system for used tyres jointly developed by the Ministry for the Environment (MfE) and the Motor Trade Association (MTA). Essentially it is a “quality-mark” programme designed to encourage all suppliers, transporters and end users of waste tyres to operate through Tyre Track. Tyre Track members use the on-line database to connect available tyres, transporters and end users. Tyre Track provides assurance to all producers and collectors of waste tyres that they are disposed of responsibly through registered disposal points. There is also a marketing benefit for waste tyre producers in clearly stating to the public that they are taking responsibility for waste tyre disposal though being a member of Tyre Track.

The programme began operating on 1 July 2004. This is just its first year of operation, and response from South Island tyre dealers, collectors and processors has been slow. It seems that most tyre dealers have on-going arrangements with existing collectors and do not yet see the need or benefit of operating through Tyre Track.

Results for Canterbury from 1 July 2004 to 30 May 2005 show:

- In Canterbury 45 suppliers are now registered through Tyre Track.
- 36 tenders (ie: requests from suppliers for quotes to collect tyres from their premises) have been put into the database system.
- 27 of the 36 suppliers received quotes to collect and transport their tyres, of which 14 were accepted. The other quotes were rejected for various reasons.
- These 14 accepted quotes accounted for 40,000 tyres which could be tracked from point of collection through to end of life options.

### 3.3 Local Manufacture

It has been very difficult to obtain accurate data on the amount of tyres manufactured and sold in New Zealand within the time and resource constraints of this scoping report. As there are only two major plants in New Zealand (Bridgestone in Canterbury and South Pacific Tyres in Upper Hutt) understandably this data is very commercially sensitive.

However, one company did suggest that around one million tyres are manufactured locally each year.

As specific raw materials are imported to produce these tyres, it may be possible to work back from this to get an indication of local production if deemed necessary in the second stage of this project.

### 3.4 Imported and Exported Tyres

Very comprehensive information is available from the Department of Statistics on both imports and exports of new and used tyres. This information has been summarised by country of origin and New Zealand destination over the past three years and is included in the appendices.

#### 3.4.1 Imported New and Used Tyres

Summarised below are key findings at they relate to Canterbury and the South Island.

	Year ending April 2003	Year ending April 2004	Year ending April 2005
Total used tyre imports into New Zealand	510,777	613,224	489,942
Total used tyre imports into Christchurch	167,101	208,465	182,205
Total used tyre imports into Timaru	26,407	28,879	18,809
Total used tyre imports into Dunedin	19,915	47,363	2,001
Total used tyre imports into South Island	213,423	284,707	203,015
% total used imports into the South Island	41.8%	46.4%	41.4%

	Year ending April 2003	Year ending April 2004	Year ending April 2005
Total new tyre imports into New Zealand	1,074,200	1,384,086	1,473,293
Total new tyre imports into Christchurch	163,445	258,380	217,471
Total new tyre imports into Timaru	39,617	52,177	54,130
Total new tyre imports into Dunedin	5,704	10,259	18,551
Total new tyre imports into Invercargill		2,364	794
Total used tyre imports into South Island	208,766	323,180	290,946
% total new imports into the South Island	19.4%	23.4%	19.75%

It is interesting to note that disproportionately more used tyres are entering the South Island than new tyres. It is not clear why this is, although one explanation could be that the local manufacturing plant based in Christchurch services the needs for new tyres in the South Island sufficiently already. Also, a major importer of used tyres is based in Christchurch and they dispatch tyres from Christchurch throughout New Zealand, although this has been impossible to quantify.

However if the large quantity of used tyres entering the South Island is due to there being a greater demand for used tyres here, then the South Island could technically be producing more waste tyres per capita than the North Island.

### **3.4.2 Exported Used Tyres**

Surprisingly New Zealand also exports used tyres, mainly to South Pacific countries. Anecdotally two used tyre suppliers have advised that significant volumes of tyres have been exported to South America in the past six months for retreading. In Christchurch it is claimed that 15,000 tyres were exported to Chile and in Auckland 8-10,000 tyres a month were containerised for export to Brazil. However, this cannot be verified though Statistics New Zealand's overseas trade data and further investigation is required.

#### **Exported Used Tyres by Country of Designation**

<b>Number Exported Used Tyres Year Ending April 2005</b>	
Australia	4,036
Cook Islands	777
Fiji	3,537
French Polynesia	4
Ghana	20
Japan	6
Niue	295
Norfolk Island	249
Samoa, American	18
Samoa, Western	732
Solomon Islands	743
Sweden	382
Tonga	2,383
United Kingdom	48
<b>Total</b>	<b>13,230</b>

These used tyres were exported from the following centres:

Auckland	11,326
Tauranga	1,516
Christchurch	382
Wellington	6
<hr/> Total	<hr/> 13,230

The used tyres from Christchurch were all exported to Sweden. As a relatively low volume, this could be a one-off niche market for a specific brand of tyre only.

### 3.5 Retreading

The number of retreaded tyres on the market has reduced significantly over the past 20 years. Quantities from the Firecone report put this as a reduction of 350,000pa in the 1980s to 80,000 in 2003.

Locally this has been put down to the increased importation of used tyres competing on the same market as retreaded tyres. However, this is mainly applicable to passenger (car) tyres only, and retreading truck tyres still remains a viable industry. Truck tyres can be retreaded up to three times due to the inherent strength in the casings. There are four small to large scale retreading plants still operating in Christchurch. One of the retreading businesses estimates that between 2,500-3,000 truck tyre casings are recycled each month for the local market.

### 3.6 Tyre Retailers

The tyre retailing industry is constantly changing. It has not been possible to gain an accurate number of the retail outlets operating throughout Canterbury, but there is good comparative data between 1997 and 2005 on the number of different tyre retail businesses operating in Christchurch.

The *Scrap Tyre Strategy (1998)* report listed 75 different retail outlets in Christchurch City operating in 1997. Sixty two of these outlets were individual companies, and 13 were branches of these companies. In 2005 only 27 of the noted businesses were still operating under the same name, four of which had increased their branches by 14 (in total) and there were 22 new companies. This gives a total of 63 tyre retail outlets operating in Christchurch at present.

It is a very competitive industry and each outlet makes its own arrangements to dispose of their waste tyres. Understandably they are reluctant to share their outlets for waste tyres with their competitors. Again, much of the information is anecdotal and difficult to substantiate, but there is one collector uplifting tyres at a charge of \$0.50 /tyre, principally to supply the silage contractors.

Some companies clearly on-charge a disposal cost of \$2 / tyre which is itemised on the invoice, whereas others absorb that cost into their operation. Of the five outlets visited, none advertised whether they were members of Tyre Track, and customers seem blissfully unaware of disposal issues and costs. This suggests there is an opportunity for further promotion and information to the general public on this, which would also make it easier for retailers to explain the extra tyre disposal charge.

Retail outlets do not seem to have a major problem with car tyres, but are beginning to experience problems with larger tyres, and one suggested that disposal charges could be increased for these accordingly to \$6 for a light truck tyre, and \$10 for a truck tyre.

### **3.7 Summary**

As shown, with so many different sources of information and a very large network of tyre outlets, we do not have an accurate estimate of the number of waste tyres being generated throughout the Canterbury region.

The popular 1 tyre / capita per year estimates that around 450,000 waste tyres could be generated each year in Canterbury.

This correlates with 472,615 (201,014 used and 271,601 new) tyres being imported into Christchurch and Timaru in the twelve months ending April 2005. This however does not include tyres bought in on second hand and new cars. Nor does it include locally manufactured and retreaded tyres.

This also assumes that every tyre produced automatically represents one being discarded at the same time, and does not attempt to calculate how many tyres (new or used) are currently in storage. This is certainly the case with second hand imported cars stored in used car lots and warehouses throughout Christchurch.

The big question is – where are these 400,000-odd waste tyres produced each year going to? So far Tyre Track can account for 40,000 and Christchurch City Refuse Transfer Stations can account for another 10,000. Are the estimates of waste tyres accurate enough to suggest that 350,000 waste tyres still being used as silage pit covers, crib walling, marinas etc., or are they being disposed of through other means?

The next section examines some of the known current markets and end-uses for waste tyres.

## **4. Current End of Life Options for Tyres**

### **4.1 Canterbury Landfills**

#### ***4.1.1 Burwood Landfill***

Burwood Landfill will cease operating in June 2005. While whole tyres were banned from the Burwood Landfill in 1998, some would invariably end up buried in loads from the transfer stations. Christchurch transfer station staff have noted that, just as some customers do not separate green waste and reusable / recyclable materials in their loads, they have also thrown tyres into the pit as part of their refuse loads which end up buried under other refuse.

#### ***4.1.2 Kate Valley Landfill***

The new landfill at Kate Valley is more stringent on monitoring and rejecting non-complying loads of refuse. In its first week of operation, Christchurch transfer station staff were advised that 14 whole tyres had been delivered to Kate Valley in mixed refuse loads and this was not acceptable. All contracted suppliers to Kate Valley Landfill will therefore need to be more vigilant in ensuring no whole tyres end up in their refuse loads.

Kate Valley will accept tyres at normal disposal charges provided that they have been cut into quarters to minimise the risk of them trapping gas and floating to the surface. It is possible that solid tyres (considerably more difficult to cut into quarters) could be accepted whole but this is still awaiting final confirmation.

#### **4.1.3 Redruth Landfill**

Only large truck tyres that are not suitable as silage pits weights are processed for landfill cover. Once sufficient volumes are accumulated they are shredded. This cost is expected to be covered through the initial disposal cost of \$5/ tyre when they are dropped off at the refuse transfer station, but as yet there are insufficient volumes to justify processing them.

#### **4.1.4 Cleanfill Pits**

Tyres have been accepted at the twelve cleanfill pits around Christchurch in the past. However the new Christchurch City Council Cleanfill By-law, adopted in March 2004 now prohibits waste tyre disposal – whole or otherwise - at the ten pits currently operating within the Christchurch City boundaries. It is not known how many tyres ended up here prior to this time, nor the status of other cleanfill pits and acceptance criteria in other part of Canterbury.

## **4.2 Shredding and Chipping**

Screening Crushing Systems Ltd (SCS) in Christchurch has a mobile plant (“The Ripper”) capable of shredding waste tyres. It is designed to shred a range of different materials including wood waste, greenwaste and carpet, to name a few.

Tyres are ground through this process into 8-9 pieces ranging from 100 – 300 mm in length. The steel bands inside the sidewalls are occasionally stripped of rubber and can protrude up to 200mm from the tyre pieces.

The main benefit of this process is that it can reduce the volume of tyres by 500%. Feedback from a potential user of waste tyres advises that in this form, the metal can often knit together when in a pile, making it difficult to uplift and spread the end product eg if using it for incineration. However, the binding properties of this product make it suitable for use as “geomatting” – to build up metal roads on soft areas where it is used as a base course over which to spread shingle.

SCS have undertaken trials shredding tyres, but are not in the market to contract this work out as they are principally manufacturers of crushing and screening plants. Current costs to process tyres through this process are estimated to be around \$4/tyre, although no large scale trials have yet been undertaken.

Waste Tyre Solutions Ltd, a North Island based company with a mobile plant specifically designed to process tyres, dealt with Christchurch City Council’s 7000 tyres in 2004. The tyres were guillotined into quarters suitable for landfilling at cost of \$1.50 for car tyres, \$2.50 for 4WD tyres and \$6.00 for truck tyres. There was an additional cost of \$1.50 to remove rims from any tyres. This additional cost would, however, be covered through the recovery of the metal rims which are grade one ferrous scrap metal. The quartered tyres have some application in a landfill for drains and gas extraction.

The company processes tyres in the North Island, but as they are currently processing around 30,000 tyres in total a month the manager does not believe that the South Island currently has enough volumes of waste tyres to justify a separate operation there. .

## **4.3 Silage Contracting**

The most common use by far for waste tyres in Canterbury is to weigh down silage pit covers. If estimates of 450,000 waste tyres being generated in Canterbury are correct, it seems incredible that even 300,000 waste tyres are used every year; farms would eventually have sufficient volume to reuse them year after year.



However, discussions with a couple of large silage contractors seem to confirm that there still is an on-going demand for tyres. Summarised below are some key points from these discussions. It must be noted that these are only informal interviews but worth recording as this is a start in quantifying the use of tyres on silage pits in Canterbury.

It is recommended that formal research and surveys with all 25 silage contractors operating in the Canterbury / North Otago districts be undertaken as soon as possible as once this demand ceases, waste tyres will become a major issue for Canterbury.

One contractor estimates he uses between 30-40,000 tyres per year. His largest client last season brought in 3-4,000 additional tyres. Most tyres are delivered to farms in truck and trailer loads of around 500 tyres per load, some using 3-4 truck and trailer loads at a time. The large dairy farm conversions (2000+ cows) can use up to 10,000 tyres on their silage pits. He believes that around 70% of his clients now have sufficient tyres for their current operations.

A main issue with tyres for silage is the ability to supply large volumes as required. When silage is being made, tyres need to be immediately on hand, and this can be difficult if relatively small amounts are scattered around at retail outlets and transfer stations. One contractor collects and stockpiles tyres to overcome this problem. There is also another collector who stockpiles tyres and transports them as requested as a service to both silage contractors and farmers. He currently has around 40,000 tyres stockpiled. The Lions Club in Timaru also collect and stockpile tyres to supply local farmers as a means of fundraising. Many contractors have established relationships with retail outlets and suppliers to guarantee supply of tyres. Stockpiling of tyres on private land may become an issue with the latest MfE guidelines on tyre storage and enforcement options.

Tyres should be spread over silage pit covers so that each tyre touches each other. Few silage pits around Canterbury are covered like this and it was suggested that this could be due to the net cost to the farmer to receive tyres. They may therefore spread their tyres out over the cover to limit the quantity they need to purchase (it's also a lot of hard work transferring tyres by hand onto the pits). There is a net cost to farms of around \$1 to \$1.50 per tyre for them to be collected and delivered to farms. One suggestion was that farms would take more tyres if they were delivered them at no cost.

The future of silage as stockfeed conservation looks stable. At one stage there was a move away from silage to baleage but there now seems to be a move back to silage, especially on larger farms (over 500 acres). Silage is the cheapest form of winter stockfeed to make, but requires specialist equipment to feedout effectively. Silage will also keep indefinitely if made and covered correctly, unlike baleage that will keep a maximum of two years. Consequently if there is a good season, extra silage will be made, and if there is a mild winter and feed is left over, then it can be stored and more tyres will be required for the next season's silage. This suggests that they may always be an additional demand for waste tyres for silage – depending on the weather.

#### **4.4 Tyre Shredding, Chipping and Crumbing**

There are no plants operating in Canterbury which shred tyres, take them to the next stage of crumbing to recover the steel, and then chip the rubber for various applications. In 1998 King and Co. Ltd had stockpiled over 300,000 tyres on the outskirts of Christchurch with the aim of purchasing a shredder and chipper. They were paid \$1 to receive tyres at their site, mainly from tyre retail outlets in Christchurch. However, purchase of the tyre shredder and chipper never eventuated, they left the site, and the tyres were cleared away by a major silage contractor over the next couple of years.

The only granulated rubber product produced in Christchurch are buffings from the tyre retreading plants. There is a good demand for this product which is usually made into rubber matting for playgrounds etc. Currently most of this material is exported to the North Island for further processing.

J&J Laughton Shredding Services Ltd, is based in Auckland and has been successfully shredding and chipping waste tyres for nine years. They charge \$2 / tyre which helps cover the cost of recycling them. Over time they have established good markets for the chipped rubber product – some of which is sent to the South Island. They believe that a similar plant could be viable in Canterbury provided tyre supply could be assured, as they process up to 10,000 tyres a week. They are working to full capacity with their chipping plant to supply current markets. They are unable to process all of Auckland's waste tyres at their chipping plant, so tyres are also shredded for landfill. They estimate that a tyre shredding and chipping plant would cost in the vicinity of \$2 million.

#### **4.5 Other Low Volume Uses for Tyres**

There are a multitude of uses for low volumes of tyres at household and cottage industry scales. Separately they would not make a significant dent in the assumed 400,000 tyres available in Canterbury each year, but collectively they could if each household used even one or two tyres for a myriad of uses.

While this is not an on-going solution to a potential waste tyre problem in the future, promoting these uses sends a clear message that waste tyres are a resource rather than a difficult waste requiring additional processing for landfilling. The CWSC may consider the viability of collectively producing a booklet for Canterbury residents on all the creative and resourceful uses for tyres as part of its education and promotion for waste minimisation.

## **5. Current Collection and Processing Infrastructure in Canterbury**

Due to high demand for tyres for silage in Canterbury, most of the current infrastructure comprises stockpiles to amass sufficient quantities and transport services.

There are three known stockpiles of tyres around Christchurch. Two specifically for silage production, and one at Owaka Road where tyres are accepted and stored for various uses according to local demand. This site has the capacity to receive more tyres which, if sufficient volumes are accumulated, could be viable to establish processing operations there. One of the issues with tyres is to amass sufficient quantities in one location to make processing options viable.

As mentioned before, there is a tyre shredder/grinder manufactured by Screening Crushing Systems that can process tyres.

Southern Xpress, based in Oamaru own a mobile baler capable of baling tyres. The benefit of this is that it can significantly reduce volumes and make the tyres easier to handle and load. The baled tyres measure 1.1x1.1x2.4 metres (2.5m<sup>3</sup>), reportedly as weigh up to 1.8 tonnes, meaning that the bales could contain up to 180 tyres (based on an average weight of 10 kg / tyre). Because of the extra energy required to compress these tyres, it is estimated that it would cost around \$100 / bale to produce (\$0.55/tyre).

Shredded tyres are believed to weigh 330kg / m<sup>3</sup>, whereas baled tyres are reputed to achieve greater density of 700kg / m<sup>3</sup>. This would make transporting and handling more efficient – being able to load 180 tyres at a time with a forklift so tyres can then be delivered to end processing plants. However, as yet none of the trial bales produced have been opened again, so the logistics of cutting the straps and the state of the tyres once “released” is not known.

## **6. Potential End of Life Options for Tyres**

Options discussed previously include:

- Grinding tyres for fill and geomatting
- Shredding and chipping tyres
- Various low volume uses

As well as this, there are three other very significant projects currently being researched independently of this project.

### **6.1 Tyre Pyrolysis**

The RMF has received an application through the Sustainable Initiatives Fund (a business development project funded through a \$2 / tonne levy on waste to landfill from Christchurch) to investigate the viability of setting up a tyre pyrolysis plant in Canterbury. The model used for the feasibility study is based on a minimum guaranteed supply of 400,000 tyres per annum, (preferably 600,000) recovered throughout the Canterbury region. A key focus at this stage is on ascertaining the continued guarantee of supply.

### **6.2 Tyre Encapsulation**

Following initial research in 2002, the project is at the next stage for further technical research and developing a business plan with assistance through the RMF Sustainable Initiatives Fund. Essentially the proposal involves recovering the outer treads of tyres as a long strip and binding them together with a polymer based compound. The resultant product is a high strength lumber-like strip with inherent flexibility. This makes it suitable for applications such as bollards, raised beds, etc.

### **6.3 Tyre Derived Fuel**

Holcim (New Zealand) Ltd. operate one of two cement works for New Zealand. Their plant is the only one in the South Island and is based near Westport.

Currently the plant operates on 80% coal and 20% used oil but the company's long term objective is to responsibly utilise as much waste material as practicable. The used oil is recovered throughout New Zealand, being back loaded on ships delivering cement throughout the country. The high operating temperatures of the kiln (1450-1500 degrees Celsius material temperature) means that a range of materials can be cleanly co-processed through this plant.

There have been on-going discussions in the past about the viability of the (then) Milburn Cement Plant incinerating waste tyres in these kilns, (RMF jointly sponsored a project in 1999 on this), but it was considered unfeasible due to the

need to modify the plant to accept waste tyres and uncertain supply of waste tyres.

Holcim are now seriously considering this option and, to this effect, have engaged four fourth-year Canterbury University Mechanical Engineering students to undertake a year-long research project into the logistics of recovering waste tyres throughout the South Island. The technology is not new, with around 60 similar Holcim plants internationally operating solely on tyre derived fuel. At this stage the company is particularly interested in sourcing used tyres only from the South Island as the plant is based there and it considers this to be a good solution for the local community.

The initial concept for recovery would involve Holcim establishing the infrastructure throughout the South Island to collect and transport the tyres to their plant. Logistics are based on a standardised fee per tyre dropped off at collection points to assist in collection and transportation costs. However the company acknowledges that this needs to be set at market rates and cannot be too excessive otherwise they would not receive the required volumes.

Modifying the plant to accept tyres would cost around three million dollars. The potential volume of tyres recovered is based on the “one tyre / person per annum” estimate, or 1 million tyres per year from the South Island. Management are concerned that the volume of tyres required is not currently there, and have expressed a strong interest to work with the RMF and CWSC to further investigate current and potential volumes before they proceed much further.

## 7. Conclusion

Waste tyres, although not currently an issue for Canterbury, could well become one in the next one-two years when adequate volumes have been recovered for use in silage production.

In 1998 Christchurch City witnessed the potential impact of this during the drought of 1997, resulting in reactionary measures by the Christchurch City Council to ban acceptance of waste tyres at both the transfer stations and landfill until a charge per tyre could be introduced to cover the cost of processing tyres for either recycling or disposal.

Fortunately the following expansion of dairy conversions in Canterbury seems to have used most of the available waste tyres for development of more silage pits, but this is not anticipated to last much longer. At most there is a one-two year window of opportunity to work on this before tyres could become an issue for Canterbury.

Canterbury currently does not have an accurate idea of exactly how many waste tyres are being produced in the region and where they are ending up. The Tyre Track programme was developed to address this issue, but support and use of it by suppliers, collectors and end users of waste tyres in Canterbury has been particularly low.

There is a clear need to further investigate the volumes of waste tyres currently being recovered for silage production if, for nothing else, to gain a better appreciation for the potential volumes of tyres that could become available once this market is saturated (if this ever happens).

There are a range of viable alternative recycling and disposal options identified for waste tyres, but it will take time to establish the infrastructure and investment to implement these.

Private commercial operators considering investing in tyre recovery / recycling need better information on guaranteed volumes and consistency of supply and known agreed costs per tyre to meet any shortfall in processing for recycling / energy recovery or disposal options. This should be uniform throughout the Canterbury region.

Canterbury is in a reasonable position to address these concerns now before it becomes an issue. Waste tyres are not a problem now, but there is no room for complacency. While Christchurch City generates the greatest volume of waste tyres, a regional approach to this is essential as the tyres are flowing out to surrounding rural districts. The CWSC is the logical conduit to continue this process.

## 8. Recommendations

### High priority

Further research to confirm current waste tyre generation and end use:

- Research and survey silage contractors operating in the Canterbury / North Otago districts
- TLAs to investigate and report back on number and use of cleanfill pits operating in their areas and acceptance criteria – ie: whether waste tyres are acceptable “cleanfill”
- TLAs to monitor and record number of waste tyres accepted at refuse transfer stations and note (where possible) end uses by collectors
- TLAs to influence tyre suppliers through procurement contracts to become members of Tyre Track programme to ensure that waste tyres are responsibly disposed of
- Maintain and continue to research / refine information on local tyre production and importation.

### Medium Priority

- Further research on reuse / recycling / disposal options for waste tyres
- RMF to continue discussions with all potential end users of waste tyres (although this is subject to being able to confirm quantity and consistency of supply of waste tyres)

### Low Priority

- Develop and implement communication strategies to advise Canterbury residents of the issues and options surrounding waste tyre disposal in the future
- Work with MfE on education and promotion of Tyre Track so customers are aware of the relevance of supporting retailers that have signed up to this programme
- CWSC consider producing a booklet on resourceful and innovative uses for waste tyres as part of an overall education strategy.

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Ecoflex Australia. Promotional booklet on specifications and products (including drainage systems and retaining walls) manufactured from waste tyres.

LinLab Limited. *Tyre Pyrolysis*. Consultancy report prepared by for the Recovered Materials Foundation, Christchurch. June 2000.

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Wright, Matthew and Kral, Milo. *Tyre Recycling Project Phase 2*. Masters of Environmental Management Thesis. University of Canterbury, Christchurch. Completed April 2002.

Way, Brian. *Recycled Crumb Rubber Use on Sports Turf in North American Use of Ground Rubber in Sports Turf Applications*. Report prepared for the New Zealand Sports Turf Institute, Palmerston North. October 2001.

## Relevant Websites:

Ministry for the Environment –

[www.mfe.govt.nz / issues/waste/special/tyres](http://www.mfe.govt.nz/issues/waste/special/tyres)

“Tools for local and regional councils: tyre storage and enforcement options”

Tyre Track.

[www.tyretrack.co.nz](http://www.tyretrack.co.nz)

Database for registered suppliers, transporters and end users / disposal option for waste tyres



**Appendix: Summary of Used Tyre Imports by country of Origin,  
Port Destination and Tyre Size**

<b>Used Tyre Imports by Port</b>			
<b>year ending April 30</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Auckland	200,707	225,203	196,735
Christchurch	167,101	208,465	182,205
Dunedin	19,915	47,363	2,001
Invercargill	1,436	8	
Napier	2,335	312	447
Nelson	15	1,866	2,319
New Plymouth		25	4,076
Tauranga	89,668	97,282	82,253
Timaru	26,407	28,879	18,809
Wellington	3,193	3,821	1,097
<b>Total</b>	<b>510,777</b>	<b>613,224</b>	<b>489,942</b>

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<b>Used Tyre Imports by Tyre Type</b>				
<b>HS10 Code</b>	<b>Description</b>	<b>YE April 2003</b>	<b>YE April 2004</b>	<b>YE April 2005</b>
4012.20.01.01	Rubber; used pneumatic tyres of a kind used on motor cars (including station wagons and racing cars), internal rim diameter less than 508mm	409,287	552,285	436,529
4012.20.01.09	Rubber; used pneumatic tyres of a kind used on light commercial vehicles, internal rim diameter less than 508mm	66,534	34,275	29,397
4012.20.09.00	Rubber; used pneumatic tyres of a kind used on motor cars (including station wagons and racing cars) or light commercial vehicles, internal rim diameter 508mm or more	45	904	2657
4012.20.19.00	Rubber; used pneumatic tyres of a kind used on vehicles (other than motor cars or light commercial vehicles)	34,911	25,760	21,359
	<b>Total</b>	<b>510,777</b>	<b>613,224</b>	<b>489,942</b>

Source Statistic New Zealand Import Data, May 2005

# **Future Options for Recovery and Recycling of Woodwaste in Canterbury**

**Scoping Report for the  
Canterbury Waste Subcommittee**

**June 2005**



**Prepared by:  
Sarah Gordon  
Recovered Materials Foundation**

# **Future Options for Recovery and Recycling of Woodwaste in Canterbury**

## **1. Introduction**

The Canterbury Waste Sub-committee requested the Recovered Materials Foundation (RMF) to investigate and report back on practical issues and options for recovery and recycling of woodwaste in Canterbury.

The RMF proposed this to be undertaken in three stages:

1. A scoping report to summarise current situation and identify key issues / options for further investigation.
2. Undertake further research as recommended in the scoping report
3. Develop a strategy to achieve the desired outcomes

This scoping report will:

1. Research the current extent of the problem from woodwaste facing Canterbury Territorial Local Authorities (TLA's)
2. Summarise current and potential options for recovering / recycling woodwaste in Canterbury
3. Recommend options for further investigation / development

Woodwaste can be broadly classified as treated or untreated timber.

The timber can be in the form of timber lengths / off-cuts, sawdust / wood shavings, and manufactured products such as chipboard, particle board and melamine etc.

Woodwaste comes from industrial sources such as sawmills, building, carpentry, joinery, construction and demolition businesses, through to relatively smaller quantities from households in the form of household renovation wastes, hobbies and crafts, through to old furniture.

## **2. Current Woodwaste Management in Canterbury**

The following key stakeholders were interviewed to summarise the current situation and identify potential opportunities for further woodwaste recovery , recycling and/or energy recovery in Canterbury.

### **2. 1 Canterbury Territorial Local Authorities**

Territorial local authorities (TLA's) are responsible for the recovery and safe disposal of waste materials. They operate or contract out the management of refuse transfer / recycling stations within their boundaries. All Canterbury TLA's have identified woodwaste to be a problem in terms of volume, handling issues (transport, compaction etc), the potential waste of a resource and in particular, the management and disposal of treated timber as a special waste.

#### **Kaikoura District Council**

- All wood waste is placed in a separate pile at their refuse / recycling station.
- Public can pick through it for firewood / woodworking etc.
- There is always a pile of woodwaste at site. Three years ago it got "out of hand" and was disposed of, but now the public are encouraged to bring it in sorted to make it easier for people to source the types of wood they are seeking.
- The pile has remained relatively static since then.
- A local sawmill produces untreated wood shavings that are stockpiled and then sent to an industrial boiler in Blenheim for incineration.
- Are considering options to convert untreated shavings into locally produced fuel pellets / bricks.
- Main concern with disposal options for tanalised timber.

#### **Hurunui District Council**

- Consider woodwaste to be a problem, especially treated timber.
- Local transfer station recovers materials suitable for firewood or reuse.
- Receive treated and untreated sawdust blended together, making it difficult to find alternate markets for the untreated sawdust.

#### **Waimakariri District Council**

- Woodwaste is a concern both in volume and handling.
- Local sawmill brings in one-two truck loads of off-cuts per month for disposal at transfer station.
- Currently working through waste exchange to find a suitable outlet for this.

#### **Christchurch City Council**

- There is currently limited recovery of woodwaste at the refuse transfer stations, with the exception of reusable furniture.

- Undertook trials in 2002 to recover all woodwaste in order to assess its quantity, quality and marketability. (Details appended).
- Approximately 1000 tonnes pa of treated sawdust/shavings used to be delivered directly to Burwood Landfill as for disposal Special Waste.
- Has good information on woodwaste types, quantities and sources dropped off at transfer stations.

#### Banks Peninsula District Council

- Some local recovery of woodwaste suitable for firewood or reuse at Barrys Bay Transfer Station.
- Chipper shreds other untreated woodwaste for blending with compost.
- Remainder sent through to Parkhouse Road Transfer Station in Christchurch for disposal.

#### Selwyn District Council

- No recovery of woodwaste through present refuse collection, but will be sorting materials when new Resource Recovery Park is operation in September / October 2005.
- Untreated woodwaste will be recovered for firewood or shredding for composting operation.
- Reusable treated timber to be recovered for local supply.
- Local sawmills producing large quantities of sawdust etc, usually make their own arrangements with end users for their waste.

#### Ashburton District Council

- Receive both treated and untreated timber and sawdust / shavings at local transfer station.
- Untreated sawdust is used in compost production.
- Untreated timber is shredded where practicable for compost production.
- Major issue is with treated woodwaste which is currently stockpiled. Public can pick through this for building / woodworking materials.
- Currently have a stockpile of 60-70m<sup>3</sup> of treated wood products.

#### Timaru District Council

- Some woodwaste goes to private cleanfill sites around Timaru. At present these are outside the council's jurisdiction, so information on volumes, sources and tyres are incomplete.
- Council has good information on the source and type of wood waste picked up though kerbside collection, or dropped off at the transfer stations by both householders and businesses.
- Treated and untreated woodwaste is accepted at Redruth Landfill.
- Some recovery of reusable furniture and timber undertaken at Timaru transfer station for retail at the "Crows Nest".

#### Waimate District Council

- Treated and untreated woodwaste is dropped off at local transfer station.
- Untreated woodwaste can be collected for firewood etc.
- Key issue is with treated timber off cuts and woodshavings from local furniture manufactures.
- Currently these are diluted through blending with other waste for transfer and disposal at Redruth Landfill in Timaru.

#### Mackenzie District Council

- Consider woodwaste to be one of their major problems.
- Try to separate at the three transfer / recycling stations and encourage collection of untreated wood for firewood.
- Untreated sawdust is composted.
- Currently have large stockpiles of other woodwaste (total 1000m<sup>3</sup>) at Fairly, Twizel and Tekapo transfer stations.

## 2.2 Landfill Disposal Options

Woodwaste (both treated and untreated) used to be accepted in mixed refuse loads at the Burwood Landfill until it closed at the end of May 2005. Mixed woodwaste is still accepted in refuse loads at the Redruth Landfill in Timaru.

The new Kate Valley landfill, however, has far more stringent resource consent conditions. Commercial volumes of treated woodwaste are not acceptable without verification of pretreatment to meet acceptance criteria developed by Transwaste.

Only licensed transporters and generators may deliver materials for disposal at Kate Valley. Treated woodwaste is a "Special Waste" that will require a permit for disposal at Kate Valley. This will involve a Toxic Characteristic Leachate Potential (TCLP) Test. Under laboratory conditions a sample of the waste is tested to assess the type of leachate that would be produced in a landfill situation. There are set acceptable limits for almost 200 different chemicals and compounds. If any of these limits are exceeded, the waste will not be accepted.

Solid treated timber (eg: a CCA treated post) is not as significant an issue as treated sawdust and shavings, as there is less likelihood of leaching. Treatment options to bring the treated woodwaste within acceptable criteria include dilution or adding compounds to reduce leaching potential. In the case of treated sawdust, this could involve mixing it with untreated sawdust, which may impact on the supply of sawdust for current viable recycling programmes already in operation (discussed in further detail later in the report).

## **2.3 Cleanfill Pits**

Woodwaste of any type is not accepted at any of the ten cleanfill pits operating within the Christchurch City Council boundaries under its Cleanfill By-law. Cleanfill pits outside of Christchurch are not governed by the By-law, but they do have resource consents to accept a maximum of 5% vegetative matter. This could include woodwaste, but definitely not treated timber.

## **3. Reuse, Recycling and Energy Recovery Options for Woodwaste**

### **3.1 National Construction and Demolition (C&D) Waste Reduction Programme**

The Ministry for the Environment's Sustainable Management Fund has funded a two year project on national waste reduction C&D waste issues and options.

The consultancy firm, Sinclair Knight MERZ, has just completed a very comprehensive review and assessment of market opportunities for C&D waste for the project sponsors, namely: the Ministry for the Environment, Auckland, Christchurch, Hamilton, Manukau, North Shore and Waitakere City Councils, Rodney District Council, Environment Waikato, BRANZ, RONZ and Winstone Wallboards Limited.

Deliverable outputs from this two year project are accessible on the REBRI (Resource Efficiency in the Building and Related Industries) website ([www.rebri.org.nz](http://www.rebri.org.nz)). This includes a wealth of information for all C&D waste types and processes, and covers minimisation options, recovery, collection, transportation and market development.

There are at least six resources specifically dealing with woodwaste including guidelines for the collection, transportation, processing, sorting, storage and market development.

It is not necessary to duplicate those resources in this report, which focuses specifically on issues which could be addressed at a regional level through the Canterbury Waste Working Group. However, it is highly recommended that this report be read in conjunction with the national resources available through the REBRI website.

## **3.2 Woodwaste Recovery**

Within Christchurch the majority of the sawmills, timber yards, joiners, carpentry workshops and construction and demolition companies deal directly with recyclers or processors to find outlets for their woodwaste. Very few large loads of pure woodwaste are delivered to the transfer stations unless it is mixed with other refuse and hence unacceptable by alternate outlets.

The key issue is concentrated treated timber which used to be acceptable at Burwood Landfill. About a dozen customers in Christchurch are directly affected by the closure of Burwood Landfill and the non-acceptance of treated timber at the Kate Valley Landfill.

In the rural communities there are less options available for woodwaste disposal and a higher proportion of commercial woodwaste ends up at the local transfer and recycling stations. Some of these stations sort woodwaste from the general refuse and over time have accumulated large volumes – which in some cases is further sorted into treated and untreated timber.

When the Selwyn Resource Recovery Park is operating by the end of this year, all Canterbury TLA's will have the ability to collect and store woodwaste separately at their stations for alternate markets. However, it is probably not worth collecting and stockpiling until long-term secure markets are established.

## **3.3 Current Markets for Woodwaste**

### ***3.3.1 Solid Energy Renewable Fuels***

Situated in Rolleston, just out of Christchurch, Solid Energy Renewable Fuel (SERF) accept all untreated sawdust and woodshavings to manufacture clean burning pellets in purpose designed burners. Currently there is a very strong demand for untreated sawdust for a range of uses including composting and gardening. SERF will pay for sawdust from major suppliers and will also accept untreated white woodwaste (ie: no bark) which they also process to manufacture the fuel pellets.

They are not overly concerned at the possibility of contamination by treated sawdust resulting from it not being accepted at Kate Valley unless pretreated, as they can easily recognise treated sawdust and woodshavings.



### **3.3.2 Construction and Demolition Woodwaste**

#### ***Crusaders Construction and Demolition (C&D) Yard***

Crusaders Owaka Road Site in South Christchurch accepts and sorts a range waste wood - principally from C&D operations at a cost of \$55per tonne. They have undertaken a couple of trials to crush and screen untreated timber to produce boiler fuel.

The company has identified a couple of major industries in Christchurch which could use all the hog fuel (ie: mulched waste wood as boiler feed) produced at this site in their boilers instead of coal. This would require some minor modifications to their boilers, but the benefits of using hog fuel are that it is clean burning, and will be more cost competitive as a result of a 40% higher carbon tax on coal than wood fuel. The energy outputs are not too dissimilar but at least twice the volume of wood is required to achieve the same total energy outputs.

However, full production of the crushing and screening operation for untreated timber is still subject to resource consent and it is unknown how long this will take. In the meantime they are stockpiling the untreated timber.

Treated timber lengths suitable for reuse are de-nailed and sold through "Musgroves" - a local demolition yard.

This site has a major issue with treated MDF chip board and currently have stockpiles of this material. This used to be processed for supply to the Carter Holt Harvey (CHH) Fibre Board Plant in Sefton, which has the plant and capability to incinerate it, but they stopped accepting chipped MDF from a range of different sources after receiving contaminated product.

#### ***Screening and Crushing Systems***

Screening and Crushing Systems (SCS) at the northern end of Christchurch also have the capability to crush and screen untreated woodwaste for hog fuel. They have just applied for a resource consent to install and operate a two megawatt boiler on their 27 acre site. The boiler would supply all heating requirements for the planned industrial park expansion on this site. They estimate that around 100,000 tonnes of untreated waste wood suitable for hog fuel could be recovered in and around Christchurch for incineration. They will also be able to incinerate kiln dried off-cuts from timber mills and grain husks.

SCS's main business is manufacturing crushing and screening equipment and produce plants to recycle materials ranging from asphalt, glass, tyres, waste carpet, greenwaste and woodwaste. These plants vary in size and are mobile, meaning that it is feasible for this type of plant to move throughout Canterbury

crushing untreated timber for approved local boilers. It is estimated that it would cost around \$30 per to process wood waste through these plants.

### **3.3.3 Treated Timber**

As mentioned previously, the CHH plant in Sefton, north of Christchurch, has the ability to incinerate treated timber, in particular MDF board. The company was at one stage accepting this material from external suppliers for incineration. However, consistency and quality of supply of materials is a fundamental component of any recycling operation and the company found that the supply of material was both irregular and had several contamination issues. Consequently they ceased accepting this material from external suppliers.

The RMF has been in discussion with the CHH management about addressing these past issues and has offered to take a coordinating role in meeting their supply requirements. As a recycling company well versed in contamination issues, the RMF is very supportive of the need to ensure that a processing company receives good quality material. Also, in a regional context, it may be viable to guarantee a consistent volume of material, making it considerably less problematic for the company in planning longterm supply.

Initial feedback from CHH about the proposal has been extremely positive, especially if they only need to deal with one organisation.

## **4. Conclusion**

Woodwaste has been identified by most of the Canterbury TLAs as one of their most pressing problems. Some councils have large stockpiles of both treated and untreated timber and want urgent solutions.

Those councils sending their waste to Kate Valley are no longer in a position to dispose of the high volumes of treated timber they have amassed without costly pre-treatment to meet the landfill acceptance criteria.

Concentrated volumes of treated sawdust and woodshavings are an issue for the building, joinery and carpentry industry operating in districts now disposing of their waste at Kate Valley. There is a possibility that this material may end up elsewhere if pre-treatment costs for disposal at Kate Valley are too prohibitive.

A range of existing and potential opportunities for woodwaste in the Canterbury Region have been identified. Only one of these, however, is currently able to receive as much material as possible. The other options are still subject to planning and resource consent outcomes.

The infrastructure to sort and receive woodwaste at the region's recycling / transfer stations is well established. There may also be a good opportunity for some synergy with the transport systems transferring material to Kate Valley to move woodwaste to a centralised processing site if required.

At a local level it could be worth investigating a mobile crusher to produce hog fuel for local industries.

Future options for woodwaste recovery and recycling / energy recovery look very positive, but could take anywhere from six months to two years to implement.

## **5. Recommendations**

1. Investigate potential volumes and types of woodwaste that could be recovered throughout Canterbury. Detail what can be addressed at a local level, and what requires regional coordination.
2. Liaise with local producers of treated sawdust and shavings on their plans and options for disposal.
3. RMF to continue discussions with CHH re: investigating setting up a formal system to recover, process and supply treated timber for incineration at their plant in Sefton.

## References

Canterbury Waste Services Ltd. Christchurch.

- *Guide for Special Waste Generators and Transporters.*
- *Kate Valley Landfill Waste Acceptance – TCLP Limits.*

Guidelines produced October 2004.

Clean Washington Centre, Seattle, Washington State. *Best Practices in Woodwaste Recycling.* March 1997.

Cosgrove, Tim. *Overview of the Waste to Fuel Industry in Christchurch.* Thesis, University of Canterbury, Christchurch. March 1998.

REBRI (Resource Efficiency in the Building and Related Industries) Website

[www.rebri.co.nz](http://www.rebri.co.nz)

Related resources include:

- *Easy Guide for Wood*
- *REBRI Resource Recovery Guidelines - ALL WASTE TYPES: collection and transport*
- *REBRI Resource Recovery Guidelines - ALL WASTE TYPES: storing and sorting*
- *REBRI Resource Recovery Guidelines - WOOD: collection and transporting*
- *REBRI Resource Recovery Guidelines - WOOD: processing*
- *REBRI Resource Recovery Guidelines - WOOD: sorting and storage*
- *Market Development Strategy Report for Christchurch (also reports for Auckland and Hamilton)*
- *Assessment of Markets for C & D Waste*

Sinclair Knight Merz. *Construction and Demolition Waste Reduction – SMF 4194. Assessment of Markets for C&D Waste.* Report prepared for the Ministry for the Environment through the Sustainable Management Fund. Completed May 2004. Downloaded from:

<http://www.mfe.govt.nz/issues/waste/construction-demo/con-demo-project.html>

**Appendix: Examples of sorted and unsorted woodwaste recovered over one week at Metro Place Refuse Transfer Station, Christchurch. June 2002.**



Sorted reusable timber (1)



Sorted reusable timber (2)





Sorted reusable timber (3)



Unsorted woodwaste.



Timber not suitable for reuse but with potential for use as hog fuel.

# **Barriers to Recycling and Composting**

**Scoping report prepared for the  
Canterbury Waste Sub-Committee,  
June 2005.**



**Prepared by:  
Julie McCloy  
Recovered Materials Foundation**



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# Barriers to Recycling and Composting for the Public

## 1. Background and Objectives

The New Zealand Waste Strategy (March 2002) sets targets relating to both recycling and composting. These include:

“Ninety-five percent of the population will have access to community recycling facilities by December 2005.”<sup>1</sup>

“By December 2005, 60 percent of garden wastes will be diverted from landfill and beneficially used, and by December 2010 the diversion of garden wastes from landfill to beneficial use will have exceeded 95 percent;

“By December 2007, a clear quantitative understanding of other organic waste streams (such as kitchen wastes) will have been achieved through the measurement programme established by December 2003.”<sup>2</sup>

Planning is required if these targets are to met by the desired deadlines, and this planning must consider potential barriers to success.

The Canterbury Waste Sub-Committee (CWSC) commissioned this scoping report from the Recovered Materials Foundation (RMF) in late April 2005. This project seeks to assimilate all current, relevant research regarding barriers to public uptake of recycling and composting behaviours in New Zealand. By drawing on the experience of others involved in waste minimisation both inside and outside Canterbury the CWSC can better explore and understand current barriers to composting and recycling, and direct resources towards finding strategies to overcome them. Collation of existing findings will also prevent repetition in future research.

## 2. Methodology

### 2.1 Scope and Parameters

No specific parameters were noted in the research proposal therefore those which seem most relevant to the overall general objective of the research have been chosen.

As new technologies in recycling and composting are developed, new markets open up, and new systems of collecting and processing materials are being constantly revised, some findings pre-2000 may no longer be relevant. This report therefore deals only with research from 2000 onwards.

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<sup>1</sup> NZ Waste Strategy, Section 3 – ‘Taking Action’, Targets for Waste Minimisation, pg 23

<sup>2</sup> NZ Waste Strategy, Section 3 – ‘Taking Action’, Targets for Organic Waste, pg 24

As this scoping report was asked to consider barriers to participation by 'the public,' findings have been summarised and generalised. Some of the research collected did relate to specific groups (eg those in serviced apartments, urban or rural areas, students populations) but any finding that was specific only to one group and was not supported in more general studies has not been included.

As no differentiation was made in the report proposal between kerbside recycling and that taken to recycling centres, or between composting at home and that at green waste centres, relevant findings applicable to either/both of these options has been included. Garden waste and kitchen waste are dealt with together as 'organics' unless there is a significant result applicable to one and not the other.

## **2.2 Rationale**

Although this report is concerned primarily with the Canterbury area it was noted that relevant research existed elsewhere. Every council in the South Island and 25 larger North Island councils were therefore contacted. Many have contributed their thoughts, opinions and what in general terms are 'known' to be factors, even if actual research has not been undertaken to objectively verify them (see Appendix I).

I have requested solid evidence in survey or research form rather than opinions or anecdotal evidence. Actual, objective research relating this topic has only been undertaken in seven regions out of those contacted.

Input from other relevant or interested organisations and associations has also been sought and relevant websites and articles have also been consulted in order to make this report as comprehensive as possible (see Appendix II).

## **2.3 Key Stakeholders**

- CWSC councils – particularly waste management and education staff
- Other councils in the South Island – Marlborough/Nelson; Otago and West Coast - particularly waste management and education staff
- North Island councils – waste management and education staff of 25 larger councils were consulted
- Waste, composting and recycling contractors
- Waste minimisation associations
- Composting associations and organisations
- Academic researchers.

## **2.4 Timeline**

This research was undertaken primarily during May 2005. Results were collated during the following month and presented to the CWSC by June 30 2005.

### **3. Summary of Key Results**

Barriers seem to be similar throughout the country, though their intensity may be influenced by regional factors such as population density, demographics and what systems for handling recycling and/or organic waste are currently in place.

Many of the barriers that are highlighted here are already known, or assumed as obvious. These come up time and again in all surveys and include such things as cost, distance, convenience and level of awareness. Others are less obvious but may be important factors to consider, and these include the anxiety people experience thinking that others might see what is in their recycling crate, or the relationship between the extent of rental housing in an area to composting activity.

As might be expected the common barriers to recycling and composting are lack of knowledge (of how, where, why), lack of ownership of the problem, inconvenience (eg limited time, distance, difficulty), cost, and misconceptions about recycling or composting as a process.

It would seem that barriers fall into various categories such as those relating to knowledge, to incentives, or to practical considerations for the public. These categories can themselves be divided into barriers which external agencies can directly influence (eg knowledge, cost) and those which require a more lateral approach (eg lack of space on a property for recycling/composting, lack of time to prepare recycling/green waste, or the ease of putting all 'waste' materials out in one container).

In general, most research indicates that people are willing to engage in recycling behaviour, and in composting (to a lesser degree). Of the research over the last five years, significant improvements in the willingness to compost have been noted and awareness of the need to take green waste out of landfill has been shown to increase where there are active education programmes explaining the reasons why this is desirable (as in Christchurch).

People are generally either committed to a recycling/composting behaviour, interested and make an effort, or ambivalent. In general most people believe they know how to recycle - particularly where they have kerbside recycling - and feel they are doing a good job. They feel less confident of their knowledge of and ability to compost.

### 3.1 Barriers

Barriers have been summarised within each category in descending order of commonality. Any theme which was prevalent across research surveys has been included. Where unique circumstances dictated a specific barrier (eg in serviced apartment buildings it was noted that there was lack of ownership for the problem between tenants, managers and the body corporate) this was not included. However, the real barrier (lack of ownership and lack of knowledge) is covered in these results.

#### 3.1.1 Recycling

##### Lack of Knowledge:

- A common theme is a lack of knowledge of what can be recycled, and how, where and why to recycle it. This is particularly true where there is no kerbside collection. People may be interested in and willing to recycle but it needs to be as easy as possible for them. They definitely require guidance. Kerbside recycling helps overcome the 'where' and 'how', but the 'what' and 'why' is still not obvious to everyone.
- Lack of knowledge over why certain items are not acceptable. If an item that is thought OK to be recycled (eg a glass cup, or a plastic yogurt container) is rejected and no explanation is given people are inclined to think 'so much for recycling. I won't bother next time'.
- Lack of knowledge as to why they are asked to prepare materials in certain ways. People then make their own assumptions about these things and if they cannot come up with a good answer they are less inclined to participate, eg 'why do I need to squash cans? This seems pointless and pedantic to me. I just won't bother at all.'
- There is scepticism as to whether material collected is really recycled at all. Because in general recycling related communication messages focus on encouraging behaviour rather than results, people are unsure if their effort to recycle is being supported and followed through. This is exacerbated when people see large piles of material stockpiled awaiting processing or transport – they assume it is going to be dumped.
- There is also a lack of understating regarding what is involved in the various steps of recycling, and the associated costs. People feel that any benefit from what was a 'free' resource should have no cost attached to it (whether to dispose of it, or to buy back as a recycled product)

##### Practical Considerations

- The requirement to take material to a facility rather than have it collected is a significant barrier. People are more inclined to then dispose of recyclables by putting them in with their rubbish, or transport unsorted waste to the refuse station (as was noted in Marlborough). It should be mentioned that although the absence of kerbside collection was a barrier in many places, this was not the case universally. Where a central facility was available for recyclables to be left (eg Rotorua) they had good uptake of services. However, most research (and international experience) shows that the most effective schemes are those on-site for the participant, ie at their home.

- Lack of recycling facilities or programmes. If there is no obvious, available option to recycle then people are less inclined to seek out recycling facilities and/or options. They strongly desire the Council (or another organisation) to facilitate recycling in an easy, accessible way. Without this leadership they often don't know how to go about it, and are not inclined to seek out information independently.
- The requirement to prepare materials before they can be recycled is off-putting to some people eg having to check the code of a plastic item, wash items or tie them can be seen as an additional chore, especially if they don't understand why they are doing it.
- It is easier to put all 'waste' items into one container. This was especially noted of people who have opted for a wheelie bin collection for their waste. (Presumably people who are paying for a collection service may put all of their waste into one receptacle to get full value for their money, although this point was not covered in the research).
- Time – with today's busy lifestyles many people reported that taking the time to sort recyclables and prepare them for a separate collection was a burden.
- For some people storage is a problem (especially those in inner city apartments). Recycling materials can take up limited space, become obtrusive and unsightly and, where not cleaned, malodorous.
- Competing demands on attention – people are exposed to many things competing for their time and attention – messages regarding waste minimisation are low on their agenda.
- Some people found it too difficult to put recycling out for collection – these were mainly elderly or infirm people, who found the weight of a recycling crate too much to manage.

#### Misconceptions/Perception Problems:

- "Not my problem". This was a common response among those who admitted to not actively recycling. These people felt that waste minimisation was the responsibility of others - manufacturers (to come up with better packaging options), government (to enforce such responsibility) and most of all, local councils. It is felt by many in this group that councils should take care of waste - that is what the rates they pay are for.
- 'I can't make a difference'. There is a belief by a significant number of people interested in but not actively recycling that their contribution is too insignificant to have an impact. They felt that they could not affect change, or that because their contribution was small it was alright for them not to participate.
- There was anxiety expressed by some in areas where kerbside recycling is offered about possible social comment from neighbours. These people feel that others will see what they put out and in some way judge them.
- Litter in the streets. Where kerbside recycling is available some people commented that it is a source of litter with the wind blowing items out of crates, or animals rifling through material.

### Lack of Ownership

- Many people expressed a need for some input into the process – they feel they are being told what to do rather than being engaged as participants and partners.
- People want to have their contribution acknowledged by community and programme organisers. They want appreciation, or some recognition that they care enough to make the effort.

### What's In It For Me?:

- Apathy and disinterest - there are also those who just cannot be bothered or even admit to being lazy. For them it is easier to do the wrong thing rather than right one.
- For some there is the feeling that this is a problem for the future. Amongst some non-recyclers there is a belief that we are OK at present, and this is reinforced (particularly in rural or semi-rural areas) by the knowledge that New Zealand has a great deal of land. This implies that we have plenty of room to dispose of waste materials.
- Incentives – some of those who don't actively recycle believe that incentives (eg rates rebate, some type of credits system) would encourage them take part in recycling.
- A small number of people (generally rural, or some few older urban residents) mentioned alternatives to recycling eg burning. They see nothing wrong with this and either aren't aware of, or are unconcerned with, the environmental impact such an action might have.

### Organisation of the Scheme

- Frustration was expressed regarding a seeming lack of consistency in the collection of items placed out for kerbside collection – people were confused as to why items were rejected and they were given no reason. This highlights the need to educate not only the public, but also collectors, as to what is acceptable for collection.
- In Christchurch there was significant frustration with the Council's perceived waste policy. This centred on the reduction of black rubbish bags without an accompanying reduction in the rates charge relating to waste. There was a strong feeling that if people make an effort to take waste out of the waste stream they should be rewarded by having those charges reduced - if not, then why make the effort?
- There was a perception amongst a limited number of people (noted in recent Christchurch research) that councils in particular do not practice what they preach, or at least do not communicate it if they do. Councils need to not only lead by example, but be seen to do so, otherwise there is an implication of 'do as I say, not as I do'.

### **3.1.2 Composting**

#### Lack of Knowledge:

- Lack of knowledge as to how to compost is a significant barrier. A common theme amongst the research projects was that people either did not know how to get started, or had tried to compost but were unsuccessful. They had then given up.
- There is an assumption that organic matter in landfill is not a problem because it is organic and will break down. It is assumed that this is a good thing, and thus people see no major advantage in removing it from the waste stream.
- Lack of knowledge as to what happens to green waste that is taken to a refuse station. When people don't know what becomes of it, they indicated they were less inclined to sort it for separate processing.

#### Personal Environment

- Lack of space is a barrier for some - they don't have the room for a compost pile or bin.
- Composting is particularly low amongst those who rent. Some say their landlord does not allow it (presumably because future tenants may not be interested in it and the compost area will not be properly maintained). For others the transitory nature of being a tenant was the reason - they don't know how long they will be in that property, they can't take it with them when they move, and as a tenant they have less sense of ownership or responsibility for the property.

#### Misconceptions/Perception Problems:

- In general there is still a perception that compost is smelly, unhygienic and will attract flies or vermin. This is especially true of attitudes to kitchen waste.
- There is also the perception that it is an unpleasant task to undertake – dirty and smelly.
- There were comments in several surveys that people felt they had received mixed messages eg they were told to try and reduce the amount of green waste going into their rubbish yet were then charged to dispose of it. They felt that as they had already paid (via their rates) to have their waste disposed of they are in effect paying twice.
- There was scepticism that home made compost is of a sufficient quality to improve a garden. Linked to this view was a belief that if compost includes weeds it will only re-contaminate the garden, and thus have a negative rather than a positive impact.
- A general lack of interest in gardening also meant a lack of interest in composting – some people are just not into the idea of gardening at any stage of the process.
- Some people felt that to compost they needed to have a certain amount of compostable material, and that they did not have enough. Therefore they did not bother.
- A smaller number of people prefer to buy compost ready made – presumably because they feel assured about its quality, it requires no effort and it is packaged nicely.



- Linked to this were the respondents who said they had no need for compost and wouldn't use it. Whether this was because they had minimal garden or just didn't bother using compost is unclear.

### What's In It For Me?

- No incentives – as with recycling, for some of those not actively composting there was a belief that there should be some positive incentive to encourage them eg subsidised bins, a collection service, or to be able to take it to the refuse station for free.
- Cost was an issue – in general people do not want to invest money into setting up a compost system.

### Organisation of the Scheme

- Where people took their green waste to a transfer station there was general dissatisfaction at being 'charged twice' (particularly if they could put it out in their rubbish bags at no extra cost).
- In surveys where a free collection service was mooted it was considered to be a positive proposal. People (in general) did not want to pay extra for such a service and if this was to be the case they would be much less inclined to want the service. Those who would pay opted for a minimal payment. However, where people had experienced collection in a trial (as in Christchurch in 2002) they were more willing to pay for it in future.
- Allied to this was frustration at having to pay to buy compost back again. It was considered that as it was 'waste', and if people had to pay to dispose of it at refuse centres, they should not then have to pay again to make use of the finished product.

### Practical Considerations

- Transport to a facility was a barrier which came up in all studies relating to organic matter. It is difficult for many people to get to the refuse station to dispose of green waste (no car, no tow bar, organisation etc).
- Time – with today's busy lifestyles many people reported that taking the time to sort organic waste, prepare and compost it or transport it elsewhere was a burden.
- It is easier to put all 'waste' items into one container. This was especially noted of people who have opted for a wheelie bin collection for their waste. (Presumably people who are paying for a collection service may put all of their waste into one receptacle to get full value for their money, although this point was not covered in the research).
- Composting is considered to be too much hassle by many respondents – with busy lifestyles they do not consider making and maintaining compost a priority.
- For those with a sink disposal (which requires little effort and processes kitchen waste quickly and cleanly) there is little incentive to use a composting alternative.

## 4. Key Outcomes and Recommendations

It would appear that sufficient general research already exists to allow future resources to be concentrated on breaking down many of the barriers themselves, rather than conducting further research. However, several recommendations for possible further research are included in this report (see page 15).

All of the studies indicate that removal of a single barrier will not effect a dramatic change; rather several must be addressed together, and they require long-term commitment. Several studies on behaviour related campaigns or trials (both for recycling and composting) reinforced that to encourage a positive behaviour change required “significant and sustained investment to achieve only incremental change. Public education to promote voluntary behaviour change must be clearly integrated with other policy objectives and tools such as regulation and economic incentives.”<sup>3</sup>

Lack of knowledge is key to removing many barriers. It is vital to build a better understanding of the need to recycle and compost amongst the public, and to increase knowledge of how to do this and the implications of not doing it. By supporting increased education with better and more convenient systems, and perhaps supplementary measures such as the use of incentives and disincentives, many of the existing barriers could be overcome.

Given that multiple overlapping barriers exist which require ongoing attention, and that many of these barriers exist in almost every district contacted, it would seem advisable to consider working on addressing these barriers at a wider regional level ie Canterbury wide. Otherwise each council or local body must in effect ‘reinvent the wheel’. Cohesion of planning and funding would provide an opportunity to unite strengths, knowledge and resources to remove the present barriers.

### Convenience

- All research indicates that the best uptake comes from bringing the option to dispose of recyclables or organics to the door. Kerbside recycling and organic collection would seem to be obvious answer, therefore it would be worth investigating implementing kerbside recycling collections where they do not exist.
- Survey people to find out their preferred options for dealing with organic waste. Collection would seem to be the most popular answer, although home composting is preferable. What would it take to make home composting the more attractive option?
- Where kerbside collection does exist explore options to help overcome any difficulties in accessing such a collection for certain people (eg for those in apartments, for those in semi-rural areas where kerbside

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<sup>3</sup> Menzies – Section 12 - ‘What did we learn’

collection is limited, or for those who find it difficult to take their collection out to kerbside).

- Encourage and support alternatives to kerbside collection where it is not offered – eg community groups getting together to take neighbourhood recyclables to the recycling centre, subsidised trailer hire to take green waste to the transfer station for composting, offering communal composting sites in each neighbourhood.
- Investigate offering neighbourhood drop-off points for recyclables eg at supermarkets, in car parks – these are easier to access for the public, and the collection required is limited.
- Investigate whether a bin system with lids is feasible – if so, it will counter the problem of litter in streets, and quell people’s fears of judgement by their neighbours for what they put in their bins.
- Promote feasible composting alternatives to those with small gardens or those in apartment blocks eg worm farming, communal composting sites in the car park of the apartment block.
- Consider establishing a working party to liaise with architects and developers to raise their awareness of the need for space for recycling and composting in plans for new urban developments. Implement building regulations which require planned apartment blocks to incorporate a communal area for recycling and composting.
- Explore options for working with commercial collectors who offer recycling or green waste collection.

### Education

- Several research studies indicated that positive behaviours can be stimulated by the influence of those close to an individual, or by other members of a household. Education programmes are therefore vital to foster positive attitudes and behaviours. Where they do not exist school education schemes should be implemented covering both recycling and composting. These should be accessible to all schools and efforts made to encourage schools to participate. Apart from providing information these programmes should encourage children to become an advocate for recycling or composting at home.
- Implement community education programmes if they do not already exist - talks, seminars, written information and videos etc should be organised and actively promoted.
- Several of the studies indicated that people do not actively seek information regarding recycling or composting, so it makes sense to explore how best to make information available in the course of their everyday lives. For example, send posters to libraries, schools, council

service centres, community groups, sports groups or halls and recreational venues. Consider using popular events to showcase the recycling/composting message. Make information available at the organics drop-off site, on the back of rates sheets or through news articles.

- Assess opportunities to work with local businesses to gain exposure eg work with garden centres or garden societies to encourage composting, or use them as a venue for seminars. Perhaps contact shops about putting up information on how to recycle the packaging of items they sell in boxes.
- Work with commercial recycling collectors to ensure that new collections staff are well informed about what items are acceptable for collection, and in what state.
- A strategy which has worked well in the USA is to set up a friendly competition between universities called 'Recyclemania'<sup>4</sup>, where the universities compete to see who can recover the most recyclables in a year. Beginning as a competition between two universities in 2001 it has now escalated to involve 47 universities. Not only do the students recover materials, they have become more environmentally aware and take those attitudes home and to into workplaces with them. Something similar could be encouraged amongst local schools or businesses, amongst the country's universities, or perhaps between different regions in the South Island.

### Communication Strategies

- Develop long-term communication programmes for whatever system is currently in place. It is important that communication is maintained long-term to encourage uptake, correct behaviour and buy-in. However, too much information at one time dilutes the message. Research indicates that people prefer a series of focussed messages gradually rolling out to a campaign with multiple messages.
- Communication messages need to be positive and personalised so that people feel engaged and feel part of the process - reinforce the 'you' message in order to make individuals see that this is about them, the choices they make, their contribution – what are they doing to make a difference?
- Communication messages should not only focus on sharing information (i.e. what can be recycled, how, why) but need to encourage positive attitudes to recycling. Research shows that if people are positive about recycling or composting they are more inclined to do it correctly.

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<sup>4</sup> Recyclemania website

- Highlight positive results - people want recognition, and they want to know their effort is helping.
- Highlight the personal benefits from taking part in composting or recycling – the ‘what’s in it for me’ messages.
- Bolster communication campaigns that focus only on what to recycle and how to prepare it with supporting information (such as posters in libraries, council services centres etc or news articles) about why it needs to be prepared, why certain items are unacceptable, and what happens to items after they taken for recycling.
- Devise a PR campaign for compost – show how easy it is to do, reinforce that it does not have to be messy, time consuming or unpleasant, and that the end product is a great resource. Reinforce the message that organic matter in landfill is damaging.
- Utilise PR and publicity to bring attention to what happens to material once it is collected for processing – where does it go and what happens to it. This will help the public understand costs involved in recycling and organic waste processing and will allay fears that this material ends up in landfill.
- Leverage the concern for environment and the desire to foster New Zealand’s clean green image into communication messages.
- Commitment to community and a feeling of ownership can also influence positive behaviours, so where appropriate tie these ideas into communication strategies.
- Highlight the work of the individual councils or waste agencies involved in their own efforts to minimise waste through recycling and composting – be seen to ‘walk the walk’.

### Incentives

- Consider the introduction of incentives appropriate to the current recycling/composting options available in each region. These might include offering a free or subsidised compost bin, subsidised composting materials, or free seminars on how to recycle or compost.
- Other indirect incentives might include free collection of material, a lower waste fee component in rates for those who actively compost, free dumping of green waste at transfer stations, or an option that those who take green waste to the transfer station can buy it back as compost at a reduced rate.

- In the USA Philadelphia has introduced 'Recyclebank'<sup>5</sup>, an innovative credit system where points are built up for quantities of materials recycled per household. Credits are deposited in bank accounts, and these are drawn as coupons which are then redeemed at businesses sponsoring the scheme. The results have been amazing – an increase in the recycling rate from 15.5 to 50%, and an increase in participation from 30 to 85%.

### Disincentives

- Disincentives might be considered as a way to remove barriers, but would be best introduced in conjunction with positive actions - opposition to penalties for the 'public' was evident in the collated research. The most obvious disincentive is price differentiation in fees for dropping off material to go to landfill, and those for organic matter to be composted or items capable of being recycled. This would encourage people to seek to save money by sorting their waste.
- Enforce violations for bylaws for illegal dumping of waste and fine as appropriate.
- Discourage alternatives to recycling or composting by making it less attractive to dispose of unwanted materials as refuse eg increase the cost of refuse disposal, limit collection days or times, make recycling or organics collection or disposal cheaper than refuse disposal.

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<sup>5</sup> RecycleBank website

## 5. Recommended Further Research

The research collated was quite extensive and covered all relevant areas - recycling, green waste and kitchen waste. It included studies on the 'general population' of a range of cities in both the North and South Islands, and these produced similar results. It also included more specific studies on certain populations, such as those in urban serviced apartments or tertiary populations.

It would seem unnecessary for other cities to conduct further general research into barriers to recycling or composting, unless they have unique circumstances. For general direction the current, existing research summarised here would seem to be sufficient for a variety of moves forward regardless of current system of dealing with organic or recyclable materials.

However, there may be scope for further research into organic waste, particularly into preferred systems of disposal. Current research has indicated that while a collection service works well where offered, and is a popular option amongst many of the public, it does discourage the preferable and cheaper alternative of home composting. If one system is shown to have a clear preference amongst the public then consideration needs to be given as to whether that is the option endorsed and promoted, or whether councils put more effort into promoting a 'better', but less preferred, option.

There is also scope for research into willingness to take up and pay for collection services. However, as people will obviously opt for either no or minimal payment it would seem more valuable to undertake such research after an information campaign about waste issues and the need to divert resources from landfill. When people are better informed their responses will be more considered and more valuable.

There is no detailed research on rural or semi-rural populations, and this is worth considering as much of Canterbury fits that category. It can be expected that many of the results will be the same, but there will no doubt be some significant differences as well.

There is also an indication from the various research that there may be profiles of typical recyclers and composters, and those that do not participate. Some of the research examined was contradictory as to this typical profile. This may be indicative of the date of research as attitudes and participation have changed in the last five years. Further research could be done into this to establish the profile of the hardest to reach audiences and how best to bring them on board.

## **Appendix I – Anecdotal information provided by councils (not included in written research)**

In general most councils conduct annual residents' opinions surveys, and these include questions on rubbish collection and/or recycling. However, these are only concerned with participation and/or satisfaction, not opinions, motivations or behaviours and reasons behind them.

### **Comments/Anecdotal evidence:**

**Grey District** - do not have the budget for either extensive recycling or green waste composting. Have the budget to promote and assist the private sector and do this by assisting a recycler with a cardboard collection.

**Timaru** – issues they are aware of include affordability; the fact that it is usually up to one person in the house to take responsibility for organising recycling; out-of-town people are not familiar with what to do. The council is at present calling for proposals to operate a kerbside collection, and they are doing research into collection systems.

**McKenzie** – may be commissioning research in the near future.

**Tasman** – did kerbside recycling a few years ago but have now dropped it.

**Marlborough** – no kerbside collection and just a single drop-off centre, although there will be more of them soon. Costs would increase if they offered kerbside collection and these would have to be shared by the public. Difficult for some to drop it off (eg elderly, those with no transport). Those who come to central drop-off bring mixed waste – they don't want to separate it, and it is the same problem with those who use skips/bins. The council tries to encourage sorting by differentiating the costs of disposal of green waste and rubbish.

**Dunedin** – in September 2005 will send out contracts for recycling and solid waste working parties.

**Southland** – did an internal council survey only, not a public one.

**Gore** – offers kerbside bins and trialed green waste collection. Will move from landfill to transfer station in June 2005.

**Auckland City**– have a presence at expos etc about recycling, composting and run free composting courses. Are looking at organics collection in future. Last attitudinal survey was 1996/97; current surveys focus more on participation.



**North Shore City** – big on dealing with organic waste. They run composting and worm farming courses and provide free bins. The programme has moved across all Auckland regions – Manakau, Auckland, Rodney, and Papakura.

**Manakau** – undertook some telephone research recently which showed that in general people are not that interested, are too busy, can't be bothered, have unrealistic expectations (eg want to have every bit of plastic picked up otherwise they see it as a waste of their time separating it in the first place) and don't have the room for composting.

**Wanganui** - feedback has included -

- lack of ease of use e.g. kerbside vs. drop off centre, bin vs. no bin, weekly vs. monthly, inclusiveness of product vs. exclusiveness of products (certain plastics)
- costs involved i.e. rate funding costs vs. cost to dump. Often dearer to recycle (per tonne) than dump
- limited knowledge of alternatives to dumping e.g. worm farming, composting
- time.....simply don't have time to make the effort not to dump
- sceptical that products are actually being recycled or that recycling is sustainable practice here in NZ e.g. glass
- what's the problem with dumping? No land issue (we have plenty) and now landfills are environmentally designed and consented
- wasting our time when the real issue is with producer responsibility, best lead by Government.

**Rotorua** – no kerbside collection. The council operates one central site in centre of town which has high usage – up to 70 cars an hour. However access to this is a problem for the ill, elderly or those who can't drive.

**Hastings** – have established the need for recycling centre in Havelock North.

**Manawatu** – offer a co-mingled kerbside collection.

**New Plymouth** – offers kerbside collection where items are put out in supermarket bags.

**Thames/Coromandel** – has offered kerbside recycling for one and a half years; it is user pays. About to start a 'Seagull Centre' – recycling centre.

**Wellington** – user pays for rubbish - \$1-85 per bag. Collection and price are an incentive to recycle. Starting a year long trial collection of kitchen waste at kerbside.

**Upper Hutt** – have kerbside collection with good participation.

## Appendix II – Other Contacts

### Interest groups/businesses contacted:

Living Earth  
Zero Waste Academy  
Environment Canterbury  
Hurunui Recycling  
Waste Management NZ Ltd  
Waste Busters Trust Canterbury  
SORT – South Island Organic Recycling Team

### Websites:

RONZ [www.ronz.org.nz](http://www.ronz.org.nz)

WasteMinz [www.wasteminz.org.nz](http://www.wasteminz.org.nz)

Ministry for the Environment [www.mfe.govt.nz](http://www.mfe.govt.nz)

University of Canterbury – School of Engineering – Compost  
[www.civil.canterbury.ac.nz/compost/](http://www.civil.canterbury.ac.nz/compost/)

Reduce Your Rubbish [www.reducerubbish.govt.nz](http://www.reducerubbish.govt.nz)

NZ Business Council for Sustainable Development  
[www.nzbcSD.org.nz/mission.asp](http://www.nzbcSD.org.nz/mission.asp)

ZeroWaste [www.zerowaste.co.nz](http://www.zerowaste.co.nz)

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