

Construction and Demolition Waste Reduction – SMF 4194

ASSESSMENT OF MARKETS FOR C & D WASTE

- Task 1
- Final
- May 2004



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1. Introduction

Construction and demolition (C & D) waste is considered in the *New Zealand Waste Strategy*¹ as high volume, low risk. It is commonly understood that this waste can be considered a resource, either for reuse in its original form or for recycling or energy recovery. Despite this, most C & D waste ends up in landfills and cleanfills.

The objective of the C & D Waste Reduction Project is to develop tools and resources to assist councils, businesses and the community to reach the *New Zealand Waste Strategy* target as follows:

“By December 2008 there will have been a reduction of C & D waste to landfills of 50% of December 2005 levels measured by weight.”

The C & D Waste Reduction Project has broadened the meaning of landfill to any type of disposal to ground, in recognition that disposal to cleanfill still results in a loss of resources.

The overall objective of this part of the project is to prepare a market development strategy with the purpose of identifying ways to increase waste diversion. The first step is to develop an understanding of the existing and future markets for typical wastes from building related construction and demolition projects. The purpose of this report is to provide:

- An overview of regional market trends associated with products made from recycled C & D materials.
- Identification of opportunities to use, substitute or combine virgin / primary products with recycled C & D waste in the manufacture of new products.
- An assessment of potential markets and demand for recycled products.
- Identification of market opportunities.
- Identification of key barriers.
- Identification and compilation of a list of industry funding support / assistance.

Recommendations for further work from this study will give direction to the key wastes, opportunities and barriers that the market development strategy should address.

1.1 Methodology

Written surveys, phone interviews and site visits were conducted with industry representatives in Auckland, Waikato and Canterbury regions (as listed in Section 11) to determine current and potential recycling and reuse opportunities for major C & D waste materials as listed below. Their opinion was also sought on the perceived market barriers for their industry. 234 surveys were sent out to cleanfill and landfill operators, waste transporters, recycling operators, waste exchanges, resource recovery centres, councils, and manufacturers. 29 responses were received.

A desktop review of the internet and published reports was also conducted to better understand the market context in New Zealand at present, and to fill in the gaps not provided in the survey responses.

The findings of the report are limited by the current data available on C & D waste types and volumes and the level of detail provided by the industry participants regarding current and future market trends. Not all businesses approached for the project gave responses and not all businesses

¹ MfE, LGNZ. 2002. The New Zealand Waste Strategy. Towards Zero Waste and a Sustainable New Zealand.



were surveyed. In most instances the industry respondents either did not have accurate records of materials handled or were unwilling to provide this information due to commercial sensitivities.

1.2 Structure of the Report

This report is structured as follows:

- An overview of C & D waste statistics is provided to attempt to identify the scale of the waste issue.
- An overview of the waste markets in Auckland, Hamilton and Canterbury is provided.
- Current and potential markets for concrete and rubble, plasterboard, wood and salvage items are detailed.
- An overview of current and potential markets for metal, plastic, polystyrene and window glass is provided.
- Common market issues are listed.
- Recommendations for the Market Development Strategy are provided.
- Funding sources are listed in Appendix B.

There are a large variety of waste materials produced at a construction or demolition site. Rather than identify and review markets for every type of waste, the survey and literature review has focused on key waste materials distinctive to the building industry:

- Rubble, concrete etc. (including fibre cement products, bricks, tiles, rubble, concrete).
- Plasterboard.
- Timber (treated, non-treated, wood products).
- Salvage (all items able to be reused in a similar form - such as joinery, fixtures, fittings, insulation, plasterboard and cladding).

Waste types of lesser volume, as listed below, were also considered in less detail for completeness. It is acknowledged that these materials (apart from window glass) are also not distinctive to the building industry, and that other industry drivers will be affecting the markets for them.

- Metal (ferrous and non-ferrous).
- Plastic – numbers 1 to 7.
- Expanded polystyrene.
- Window glass.

1.3 Previous Work

It is acknowledged that several reports and studies have been completed on various aspects of the economics and viability of recycling markets in New Zealand, which are worth mentioning for the interest of the reader:

Waste Not Limited. 1998. Survey of Recycling Businesses in the Auckland Region.

Hanne, S. 2001. Source Separation of Construction Wastes in New Zealand. University of Auckland. Thesis.

URS, NZIER. 2002. Business and Employment Opportunities from Waste Minimisation. Ministry of Economic Development.

Storey et al. 2003. The State of Deconstruction in New Zealand. Centre for Building Performance Research, Victoria University of Wellington.



2. C & D Waste Statistics

Measuring the amount and type of waste from C & D projects was beyond the brief of the C & D Waste Reduction Project. However to put the market assessment into perspective, some estimate of figures is required. Composition of waste from selected case studies and published material is given in Table 1. Overall there are few statistics on the amount of waste produced by the C & D industry in New Zealand, and what is published is up to 15 years old.

■ **Table 1 Composition of C & D Waste from New Zealand case studies – percentage by volume**

Waste Type	Projects				
	Target 2001 ¹	Zero	Hanne 2001 ²	Project 1995 ³	C & D BRANZ 2002 ⁴
Concrete and cement board				8%	12%
Plasterboard			3%	12%	13%
Wood and particle board	35%		37%	33%	20%
Metal	3%		8%	6%	
Paper and Cardboard	2%		2%	13%	
Plastic wrap	3%				
Fixings					4%
Roofing					6%
Other materials	47%		50%	28%	45%
Totals	100%		100%	100%	100%

- Notes:**
1. Christchurch City Council Case Study. College accommodation. 'Other' materials include plasterboard. www.ccc.govt.nz/targetzero/casestudies/fletcherconstruction.pdf.
 2. Hanne, S. 2001. Source Separation of Construction Wastes in New Zealand. University of Auckland. Thesis. Case Study of AUT Sports and Recreation Centre.
 3. Project C & D. 1995. Preliminary Investigation of Construction and Demolition Waste in the Auckland Region.
 4. BRANZ. 2002. Easy Guide to Reduction Construction Wastes. A Practical Guide to Reducing Wastes From Building Sites. Expected waste percentages generated by Waste Type.

The estimates in Table 1 illustrate the differences in waste categories used in record keeping as well as the different compositions of waste depending on the project. The composition of waste from any one project varies relative to the type of building (concrete versus timber, steel versus timber framing, prefabricated, domestic versus commercial, demolition versus construction etc).

In terms of the composition of C & D waste in the total waste stream in New Zealand, data is also light on detail. The National Waste Data Report² states C & D was approximately 17% of waste to landfill in 1997 and the largest source of commercial waste to landfill. In Auckland C & D waste contributed 20% of the waste to landfill⁴. It must be noted that C & D waste was defined as wood, concrete, rubble and demolition material, and may have included infrastructure waste as well as building waste.

More recent results for SWAP surveys³ from 1995 to 2002 (Table 2) show the following average composition of waste from 17 landfills around New Zealand, which indicates the 1997 estimate of C & D waste contribution as conservative. The origin of the waste is not documented in the results,

² MfE. 1997. The National Waste Data Report.

³ www.mfe.govt.nz



but it is assumed that the C & D industry contributes to the wood, metal and rubble / concrete figures.

■ **Table 2 Average composition of waste to landfill in New Zealand – 1995 – 2002³**

Waste type	Percentage of waste stream
Paper	12.5%
Plastic	6.9%
Organic	24.9%
Glass	2.8%
Ferrous Metal	4.8%
Non ferrous Metal	1.2%
Timber	12.3%
Rubble/concrete	16.2%
Rubber	0.9%
Nappies/Sanitary	1.5%
Textiles	3.4%
Potentially Hazardous	12.5%
Total %	100.0%

MfE (2002) state that nationally we dispose of over 3.4 million tonnes of waste into our landfills every year¹. It is estimated that similar amounts of waste from building and demolition activities are disposed of into cleanfill sites¹, but the validity of this figure is unclear as there is no national cleanfill data.

3. Regional Markets

Waste markets are regionally based because the cost of logistics for national collection and sorting processes is prohibitive. An overview of each of the three study regions is given below. Each region has supply, demand and cost structures that affect the amount of waste produced, disposed to ground or diverted for recycling and reuse.

3.1 Auckland

Fourteen transfer stations service four landfills in the Auckland Region⁴. All transfer stations, landfills and cleanfills are privately operated in the Auckland Region, except for one transfer station and cleanfill owned and operated by Waitakere City Council⁵.

Commercial C & D waste is collected by private waste carriers and ‘cherry picked’ at private sorting facilities for the easily recovered materials prior to disposal at landfill or cleanfill. Key materials recovered are metal, untreated timber lengths (particularly native demolition timber) and concrete. Soil, concrete, rubble and other natural or manmade inert material is usually diverted to cleanfill as landfill space is at a premium. It is unknown how much C & D waste is transported directly to landfill or cleanfill with no pre-sorting, either in the Auckland region or to landfills in

⁴ Auckland Regional Council. 2000. Waste Management in the Auckland Region. Update 2000.

⁵ Jon Roscoe, Waitakere City Council. Pers com, May 2004.



the Waikato. Importantly, there are no companies offering a one-stop-shop to take all recyclables and waste from a construction site, or can provide good services to on-site sorting systems.

Waitakere City Council is sorting untreated and native timber lengths, and salvage materials, at a transfer station, and offering the materials to the public for free⁵. Supply exceeds demand, and periodically loads to timber is disposed to landfill. A planned recycling shed at the transfer station is expected to increase demand. The council is investigating plasterboard composting and concrete crushing.

Waste companies do not usually service demolition projects, however they are becoming more aware of the resale value of materials in a demolition skip and are beginning to tender for this work in order to capture more of this market.

3.2 Waikato

Private waste carriers collect and transport the majority of C & D waste in the Waikato. In Hamilton C & D waste is 'cherry picked' from the privately operated municipal transfer station pit. Materials such as untreated and native timber lengths, salvage items and metal are removed and the remainder is transported to Horotiu Landfill. Many waste carriers directly transport C & D waste from site to cleanfills and landfill with no sorting. The overall volume of C & D waste is not known.

Councils operate the transfer stations in the rural areas and small settlements in the Waikato. None of the transfer stations offer C & D recycling facilities although metal is separated for recycling at most depots and some facilities will sort out furniture and fittings for resale. Soil, concrete and rubble are usually disposed to cleanfills in the region.

As in Auckland, there are no one-stop-shop waste and recycling service providers in the Waikato.

3.3 Canterbury

The C & D waste market in the rural areas and small towns such as Kaikoura, Twizel and Ashburton differs to that in Christchurch. In the rural areas of the region community-based recovery centres collect all commercial and domestic waste and separate as much as possible prior to disposal to landfill. Cleanfills are not common in the rural areas, and landfill space is becoming scarce. The threat of having to transport waste long distances to the proposed new regional landfill in Kate Valley has led to many of these communities taking responsibility for the waste within the district.

Cleanfill space in close proximity to the city near Christchurch is plentiful, and cheap compared to Burwood Landfill. Burwood Landfill prices have been increasing steadily over the past five years, as available space has become limited. For the past two years C & D waste in Christchurch has been a desirable market for large waste companies. Economic drivers have stimulated the collection and sorting of limited waste, to 'cherry pick' the easy recyclables and dispose as much of the remaining waste to cleanfill as possible. Only residual waste not suitable for cleanfilling was taken to Burwood Landfill.

Some on-site sorting of waste has occurred but the economics favoured off site sorting. One waste company has set up an on-site sorting system for landfill waste, generally described as 'toxics' including staff food and packaging rubbish, paints, polystyrene, paint and resins, and most companies offered skips for clean 'hard fill' only.

Recently there have been some changes to the market. Firstly, Environment Canterbury reviewed cleanfill consent conditions and tightened the waste acceptance criteria and secondly the



Christchurch City Council imposed a levy on cleanfill disposal. These two decisions led to higher cleanfill disposal costs and were expected to improve waste recovery. However, Christchurch City Council has since introduced a policy to allow waste companies to transport waste directly to Burwood, to relieve pressure on the transfer stations prior to Kate Valley being commissioned. This has resulted in less sorting, and ultimately more C & D waste being disposed to landfill in the short term. ‘Cherry picking’ may still occur to a small extent.

Demolition contractors transport waste directly to cleanfill, without the requirement for a waste contractor. Mixed loads of residual waste from a demolition project are deposited at the cleanfill, and sorting is at the discretion of the cleanfill operator.

The current situation may result in more waste being taken to landfill in the short term, but the levy and the threat of increased landfill fees and transportation costs has generated some interest in developing economic alternatives to disposal. On-site sorting of waste remains at a low level, and is usually only for metal and clean hard fill.

4. Concrete and Rubble

For the purposes of the market assessment, the term ‘concrete and rubble’ includes reinforced concrete structures, asphalt and pavements, bricks and tiles, but does not include natural soil, rock or aggregate. A review of current and prospective markets and barriers for concrete and rubble is provided below, including reuse in original form and recycled aggregate. The salvage of bricks and tiles for reuse is discussed in Section 7.

4.1 Overview of Current Markets

It is unknown how much concrete waste is generated by the C & D industry, compared to infrastructure, and as a percentage of total waste generated by the industry. However, it is understood that concrete and rubble generally follow one of three routes:

1. The majority is disposed to cleanfill in all regions, with some waste going to landfill as cover material. Concrete and rubble are clean, low risk, hard fill for rehabilitation of quarries and other cleanfill sites.
2. Transported to a transfer station or sorting facility, where the material is either on-sold or crushed then on-sold.
3. Crushed and screened on-site using mobile crushing plant, then on-sold.

The following is a summary of the current options for concrete reuse and recycling.

Concrete Reuse

- Concrete blocks are used as landscaping and erosion control material i.e. defining planter areas, low scale retaining walls, shoreline protection and groynes. This occurs opportunistically in each region and is not considered a sustainable market.

Concrete Recycling

- Concrete is crushed, processed and used as base material for roads and pavements and as base material by the construction industry for filling foundations and footing and for underground pipework. Reinforcing bar is easily separated in this process and can be sold to scrap merchants for further processing.



- Asphalt is being recycled in small quantities back into roading material in Canterbury.

Respondents to the questionnaire identified that this sector is currently experiencing very high demand within the Auckland and Waikato Regions due to economic growth and the comparative economics of natural aggregate. Respondents involved in recycling of concrete believe that in the foreseeable future growth is likely to increase, as long as the regulatory framework is favourable.

By contrast the Canterbury region has not experienced the same demand for recycled / reused concrete, as the supply / cost of the natural resource is currently too competitive. Having said this, at least three companies involved in quarrying or landscape supplies in Christchurch have recently invested in machinery and are crushing demolition concrete for low quality aggregate, which signals potential growth in the near future.

Industry has identified that there has been a significant increase in both supply of waste concrete and demand for processed product over the last three to four years. This will likely continue in the foreseeable future as disposal options diminish and prices increase. This is also driven by the supply of waste concrete and the cost of alternative products i.e. quarry aggregate and the level of economic activity in the market.

4.2 Prospective Opportunities and Demand

Feedback from industry has identified the following:

- Crushed concrete can be used as aggregate in new asphalt or concrete.
- There is potential for increased volumes of crushed concrete and asphalt to replace natural aggregate for roading and construction purposes.
- There is potential for increased on-site crushing of demolition concrete for foundation work.
- Specific purchasing policies could alter the market for aggregates:
 - Large roading clients such as Transit NZ and councils could specify recycled aggregate as base course to improve the markets.
 - Councils, central government and other developers could specify recycled aggregate for construction projects, as part of a green procurement policy.

4.3 Market Barriers

Industry representatives have listed a number of barriers that contribute to the limited diversion of concrete from cleanfill.

- **Resource Management Act 1991 regulations.** Requirements for resource consents from both a land use and air quality perspective can be a barrier to concrete crushing operations. Respondents identified that compliance issues are an economic barrier.
- **Lack of standards.** The Cement and Concrete Association of NZ advised there are currently no Standards NZ standards for recycled concrete, although the standards for aggregate can be used as a de facto standard for crushed concrete⁶.
- **Perceptions of safety and quality.** Due to the lack of standard specifications there is difficulty in overcoming market safety liability concerns by engineers and other designers. Engineers will often not specify recycled material mainly because it is perceived as problematic to specify an inconsistent product. Councils and Transit NZ do not specify recycled aggregate in roading projects because of the lack of national standards or specifications.

⁶ BRANZ. Pers com. May 2004.



- **Disposal to landfill and cleanfill is cheap** and therefore more competitive than recycling. In many cases cleanfilling with inert materials is necessary to rehabilitate quarries and protect exposed groundwater resources. There is a need for local government to either subsidise to encourage recycling and / or regulate to discourage the disposal to landfill and cleanfill. There is evidence of this happening in Christchurch, where a Cleanfill Licensing Bylaw has been recently enacted by the Christchurch City Council under the Local Government Act 2002 / 1974.
- **Competition with natural aggregate.** Recycled aggregate is competitively priced compared to natural aggregate in Auckland and Waikato, but is not competitive with natural sources in Canterbury. The supply of river gravel is plentiful in Canterbury and extraction is encouraged in particular locations to reduce flooding potential. Recycled concrete must be competitive with natural aggregate to be sustainable.
- **Lack of knowledge of industry support.** There is currently a lack of knowledge in the industry regarding ‘Technology NZ’, ‘Industry NZ’ and other funding and information agencies that can provide excellent support to recycling operators.
- **Lack of sorting and processing space.** Sorting and crushing facilities are not available close enough to the construction site to make reuse viable compared to other aggregate sources. The barrier is finding an affordable space and minimising the environmental effects on neighbours.
- **Perception of quality.** There is a general negative perception about using recycled products in the building market due to concerns about quality, safety and ‘fitness for purpose’.
- **Uncertainty of supply.** Crushed aggregate supplies and services come and go over time, in all three regions, compared to the relative stability of cleanfill and quarry operators. Because of the changing market for such materials, there is generally a lack of knowledge in the industry about recycling opportunities. This leads to uncertainty with those who need to get rid of waste concrete, and those who specify recycled aggregate. If recycling opportunities are too difficult to find they will not be used in the industry.

5. Wood

The term ‘wood’ encompasses treated and non-treated timber lengths, demolition materials, construction off cuts, fibreboard, chipboard and other wood products. A review of current and prospective markets and barriers for wood is provided below, including reuse, recycling and energy recovery. Joinery and other building salvage items are discussed in Section 7.

5.1 Overview of Current Market

It is unknown how much timber is disposed to cleanfill, but it makes up 12%, or 420,000 tonnes, of waste going to landfill each year, based on the SWAP figures in Table 2. Many tonnes will be diverted from the waste stream for reuse, firewood and other uses.

The following is a summary of the current options for wood diversion from disposal.

Wood Reuse

- Reuse of timber lengths is undertaken on many construction sites. If there is room on a site, timber offcuts are often kept in piles and used later in a project. Most reuse is for lower quality, temporary work such as boxing for concreting or survey pegs.



- The native hardwood market is well established. Recovered floor boards, architectural features, beams and other building features are sold for furniture, construction and renovation.
- Reusable pieces of pine timber (treated and untreated; generally 0.6m or longer) and fibreboard pieces are sold privately or through second hand retail outlets, either for construction, renovation, landscaping or for furniture and craft work. The demand is much lower than for high quality native hardwood. Some transfer stations and resource recovery centres are giving timber away for home renovations, e.g. Waitakere City, Kaikoura District and Ashburton District.
- The second hand timber market is mostly small businesses and the public, and is not common on commercial projects unless specified by the designer (usually as a feature of the building).

Wood Recycling

- Non-treated timber off cuts are chipped into mulch and sold for landscaping in Auckland by Reharvest Timber.

Wood Recovery

- Non-treated timber and wood products are converted into heat energy through combustion. In Christchurch, some wood product waste is chipped for hog fuel at Carter Holt Harvey (CHH) Panels in Ashley, north of Rangiora. The chipping process removes most contaminants such as stones and nails. In recent years CHH have taken all types of timber and wood product waste (except treated timber), but demand has been reduced because of the problems with contamination from treated timber, nails and other non-combustibles.
- Non-treated timber off cuts are used for domestic firewood, particularly in Canterbury. These are either gathered directly from the construction site or from sorting facilities.

5.2 Prospective Opportunities and Demand

Feedback from industry has identified the following opportunities to divert wood from disposal, with most emphasis in the industry focussing on using wood as a renewable energy source.

Wood Reuse

- There continues to be a demand for recycled native timber for furniture, construction and renovation.

Wood Recycling

- There is potential for uncontaminated pine offcuts to be chipped and recycled into chipboard and fibreboard, although the quality has to be very good to match the quality of raw materials.
- Green procurement policies may create a demand for chipboard and other products made from recycled wood waste.
- Technology for wood chipping and screening is currently available⁷.

Wood Recovery

There is good potential for uncontaminated wood waste to be used in commercial boilers. The Government has set a target of 30 Petajoules of consumer energy from renewable sources by 2012, in the Renewables Energy Target Strategy⁸. Wood waste is considered a renewable biomass

⁷ Brian Court, Screening and Crushing Systems Limited. Pers Com. April 04.

⁸ MfE EECA. 2003. New Zealand's Renewable Energy Target.



energy source in the Strategy, and there is potential for the C & D industry to contribute to the energy and manufacturing sector reaching this target. Further research into the quality and quantity of supply, responsibilities and roles of the C & D and energy sectors and other issues is required.

- Wood waste sorting and chipping for hog fuel is being investigated by several firms in Auckland, Waikato and Christchurch, in negotiation with companies with commercial boilers. Logistics such as sorting, storing and transport need to be resolved, but the technology to chip and burn all types of wood waste is currently available in the market place. Treated timber may not be burnt in some facilities depending on resource consents.
- One business has advised that they are planning five wood waste and energy plants operating in Auckland within the next seven years. These plants will consume most of the 100,000 or so tonnes of wood waste going to Auckland landfill and will be replacing the need for 750,000GJ/year natural gas equivalent. The design allows for the combustion of unprocessed wood waste material. There would be no need for hogging, chipping or separation of contaminants such as concrete, steel, glass etc. Resource consent issues will need to be addressed. It is unclear whether treated timber would be a viable fuel source.
- A company is investigating the use of waste wood and coal into pellets for fuel.
- Uncontaminated firewood will continue to be in high demand in Canterbury, particularly through the winter.

5.3 Market Barriers

General barriers to more diversion of wood are:

- **Low disposal costs** to landfill and cleanfill.
- **Demolition issues.** The amount of good quality, uncontaminated timber salvaged from demolition depends on the time taken (as allowed by clients) and skills of demolition crew. Time pressures lead to more damage and less sorting, which leads to lower value recycling options rather than reuse. Finding and keeping skilled labour is an issue in the industry.
- **Contamination and the need to sort waste.** There is a lack of alternative uses for waste treated timber, and more research is required to address this barrier.

The demand for waste wood is generally for separated, uncontaminated consignments, whereas it is usually well mixed, containing treated timber, untreated timber, wood products, shavings, offcuts, sawdust, demolition timber and new timber. There is also the potential for contamination from nails, glues and other building materials.

Sorting mixed consignments has to be done manually, which can make the process expensive. In some instances, separation of contaminants is difficult or impossible, such as removing paint, or linoleum.

Identification of treated timber is difficult, particularly for timber more than 15 years old. Framing timber less than 15 years old is colour coded, but this still requires some training to educate sorters. Many community based sorting facilities see this as a major barrier, and would rather dispose timber to landfill than risk selling firewood that is treated. The predicted increase in treated timber use in future will increase the percentage of wood waste with no alternative to landfill disposal (except some reuse).

On site wood waste sorting is not common. More on site sorting would reduce contamination issues.



Wood Reuse

- **Lack of specifications and standards.** There is no grading system, specifications or standards for demolition timber, which creates a barrier for specifying the timber for reuse, particularly in structural applications.
- **Competition with raw materials.** Low cost imported furniture competes with recycled native hardwood furniture, although demolition firms notice that the ban on native timber logging on crown land has increased demand for recycled wood.
- **Fixing methods** such as screwing, to replace gluing, and more careful planning and design for deconstruction, will assist in reuse and recycling.

Wood Recycling

- **Lack of business acumen and access to capital.** Business management skills such as planning and marketing are lacking, which hinders growth. Not many investors have been willing to take a risk with the recycling industry. This is starting to change as investors look at companies with proven products that have been round for a long time.
- **Competition with raw materials.** Low cost, plentiful supply and low contamination issues with virgin pine timber for construction and chips for fibreboard manufacturing means using post consumer wood waste is uneconomic.

Wood Recovery

- **Resource Management Act 1991 regulations.** Regional Plan rules under the Resource Management Act 1991 for burning timber are not consistent around the country. In many regions the burning of treated timber, chipboard and fibreboard is regulated. In other regions the burning of any waste is limited or prohibited. This means the burning of wood waste in kilns or boilers in many regions is likely to require a resource consent. Even an existing coal-fired boiler would require a new consent to burn wood.
- **Capital expenditure.** Modifications to commercial coal boilers are required if wood waste is to be a large volume of the fuel intake, for example new conveyors.
- **Contamination.** Businesses that could use wood waste as a fuel have mentioned they are not prepared to take the risk with contamination; which can wear out plant and machinery, or cause compliance issues with air discharges or the disposal of ash.
- **Logistics of supply.** The expense and logistics of getting large amounts of sorted wood waste to a kiln or boiler can be prohibitive. Major wood waste to energy plants would need to be located close to where the wood supply is, ie. urban centres.
- **Competition with raw materials.** C & D wood waste competes with forestry and timber manufacturing wastes as a fuel. Forestry and manufacturing wood wastes are more centralised and more consistent in supply and quality⁹.

6. Plasterboard

Plasterboard is also known as Gib Board (the Winstone Wallboards brand), sheetrock, drywall or wallboard. Winstone Wallboards is the leading manufacturer and supplier of plasterboard in New Zealand. The major ingredient, gypsum, is imported into New Zealand from Australia. Most plasterboard is disposed to cleanfill and landfills, however there is small scale reuse and recycling

⁹ Nielsen, P.; Fredricsen, P.; Ware, P., Tritt, S.; Lee, C. and Duignan, A. 2002. *Utilisation of Wood Waste – Challenges for the Sector*. Paper Presented at the WasteMINZ Conference, Rotorua 2002.



ventures, as explained in the overview of the current market. The volumes of waste produced from plasterboard installation and demolition is unknown.

The potential for gypsum to produce hydrogen sulphide gas when buried has led to the definition of 'conditionally acceptable' in the Ministry for the Environment guideline 'A Guide to the Management of Cleanfills'.

6.1 Overview of Current Market

The total quantities of waste produced annually is unknown, but it is estimated that 90 – 99% of the waste is disposed to ground.

Plasterboard Reuse

- Reuse of oversupply and offcuts of plasterboard from construction occurs on a small scale. Some installers will reuse leftovers on another project, or leftovers will be sold to second hand retailers or through trading magazines, classifieds and websites. Sheets must be a minimum of half an original sheet for reuse to be desirable¹⁰. It is not common for product suppliers to take back oversupply, and anecdotal evidence suggests that oversupply often ends up in the skip rather than reused on the next project¹¹. This is because the client has already paid for the product and transferring materials to another project is often seen as a hassle.
- The reuse of demolition plasterboard has not been identified in this study. It is difficult (if not impossible) to remove plasterboard in complete pieces because of the method of fixing¹². Additionally it is difficult to determine the fire resistant nature and other qualities of demolition plasterboard, further limiting the ability for reuse.

Plasterboard Recycling

Small scale trials are starting to occur in the South Island.

- A landscape supply company in Christchurch has just started crushing plasterboard, separating the paper, and spreading the gypsum on pasture. The plan is to start selling the gypsum as a soil conditioner.
- Small scale operations in McKenzie District and Christchurch are grinding plasterboard and blending the gypsum and paper into composting operations¹³.

6.2 Prospective Opportunities and Demand

There is a lot of potential for plasterboard recycling, either back into new product, or as a soil conditioner or compost additive.

Plasterboard Reuse

- Potential exists for retail suppliers to collect oversupply for credit, or change supply systems to 'just-in-time' delivery. Construction managers have observed that more reuse of smaller pieces occurs on site when there is just enough material delivered, rather than when supply is plentiful.
- Fixing methods such as screwing, to replace gluing, and more careful planning and design for deconstruction, will assist in reuse and recycling.

¹⁰ Musgrove Brothers, personal communication. Troake Group, personal communication 1 April 04.

¹¹ Troake Group, personal communication 1 April 04.

¹² BRANZ. Pers com. May 04.

¹³ McKenzie District Council. Survey response March 04.



Plasterboard Recycling

Processing into New Plasterboard

- Presently there is no recycling of plasterboard back into new product in New Zealand by Winstone Wallboards. Technology is already available to crush and separate plasterboard sheets into gypsum and paper, ready for recycling back into plasterboard^{14,15}. Crushing and screening plant can be set up at the plasterboard manufacturing plant or at a separate location to process demolition and construction plasterboard waste back into raw materials.

Environmental Choice¹⁶ has a specification for recycled plasterboard (EC-19-01), developed with Winstone Wallboards. Studies have shown that new plasterboard can include in excess of 25 percent recycled gypsum¹⁷. The quality of plasterboard with recycled content is considered to be consistent with 100% virgin materials, therefore the demand is likely to be the same as present.

Research carried out in 2001 calculated a three year payback for investment in capital for Winstone Wallboards to set up a recycling system in two existing manufacturing plants in Auckland and Christchurch¹⁸.

- Green procurement policies may create a demand for products with recycled content.

Soil Conditioner

- The use of recycled plasterboard as a soil conditioner is common in the United States¹⁹. Gypsum, or calcium sulphate, is a natural fertiliser, adding essential plant nutrients calcium and sulphur to the soil and in some cases raising the pH of soil. New Zealand trials²⁰ showed improved water infiltration rates with added gypsum (recycled and raw product). Magnesium tends to be displaced by the addition of calcium and leached due to improved infiltration¹⁹, but this may be mitigated as part of effective farm pasture and soil management.
- Based on the overseas experiences, there is good potential in New Zealand for recycled plasterboard to be crushed and screened and the gypsum marketed as soil conditioner for agriculture, horticulture and forestry, particularly where acidity and / or low water infiltration rates are an issue.
- In a similar manner, but on a smaller scale, crushed plasterboard is used for landscaping on building sites in the United States¹⁷. Mobile machinery is used to crush waste plasterboard, which is then blended with topsoil during landscaping.
- There is potential for more use in municipal composting operations, pending research into optimum blends, and the positive and negative effects of the gypsum and paper in the final product. The risks to composting are discussed below.
- There is potential for landscaping and other domestic and commercial demands for compost and soil conditioning.
- Green procurement policies may create a demand for landscaping supplies created from 'waste'.

¹⁴ Brian Court, Screening and Crushing Systems Limited, pers. com 20 April 04.

¹⁵ New West Gypsum Recycling Inc. www.nwgyypsum.com

¹⁶ www.enviro-choice.org.nz. Environmental Choice product labelling.

¹⁷ www.nwgyypsum.com/english/rp_01.htm

¹⁸ Lawrence - Sansbury, D. 2001. *The Feasibilities and Practicalities of Recycling Gypsum Plasterboard Waste in New Zealand*. Thesis, School of Engineering, University of Auckland, New Zealand.

¹⁹ Wolkowski, R. 2003. *Using Recycled Wallboard for Crop Production*. University of Wisconsin.

²⁰ Neilson, G; Shannon, P. 1998. Re- Milled Gypsum trial To Evaluate Waste Gib Board as a Soil Conditioning Agent. Agricultural Testing Services.



Cement Manufacture

- Gypsum is a raw material in the manufacture of cement. The cement industry is the second largest consumer of gypsum in New Zealand behind plasterboard manufacture²¹. There is potential for crushed and screened gypsum, from waste plasterboard, to be used in place of raw gypsum²². Quality and quantity of supply, along with capital expenditure and transportation logistics are the key concerns for the cement industry, none of which have been addressed to date. Further research is required into the reality of this opportunity.

6.3 Market Barriers

Plasterboard Reuse

- **Quality.** Reusing a number of small offcuts of plasterboard in a building creates more join lines, which creates a perception of poor craftsmanship and is undesirable from a client's perspective²³.

Reuse of demolition-sourced plasterboard is not done because it is difficult (if not impossible) to remove plasterboard in complete pieces because of the method of fixing. Additionally it is difficult to determine the fire resistant nature and other qualities of demolition plasterboard, further limiting the ability for reuse.

- **Oversupply.** The client pays for all the plasterboard ordered for a project (regardless of whether there is oversupply or not). Subcontractors are therefore not 'out of pocket' if they are inefficient with installation, or dispose of oversupply at the end of a job. There is no incentive to keep the oversupply materials for the next project, or to have them credited by the supplier.

On site reuse of plasterboard off cuts is less likely when there is oversupply of plasterboard, created by an overestimate of materials by the quantity surveyor.

Retail suppliers generally do not want to take back oversupply due to concerns of contamination or damage during its time on site²⁴.

Plasterboard Recycling into New Plasterboard

- **Insufficient commercial imperative.** Winstone Wallboards do not consider plasterboard recycling financially viable presently, and are not willing to invest in plant until there is a business case for doing so.
- **Low disposal costs** to landfill and cleanfill.
- **Low cost of raw materials.**
- **Logistics and costs** of gathering and crushing enough waste plasterboard to offset the equivalent cost of raw materials.

Plasterboard Recycling into Soil Conditioner / Compost

- **Low disposal costs** to landfill and cleanfill.
- **Competition with raw materials.** Well established agricultural markets for competing products such as lime.
- **Logistics and costs** of gathering and crushing enough waste plasterboard to offset the equivalent cost of raw materials.

²¹ Winstone Wallboards. Pers com. April 04.

²² Michael Rynne, Holcim Westport. Pers com 28 April 04.

²³ Troake Group. Pers. com 1 April 04.

²⁴ Carters, Pers. com. 1 April 04.



- **Perception of quality.** Perception of the use of ‘waste’ as a soil enhancer, and the risk of contamination, compared to the reliability of the quality of raw gypsum or lime.
- **Lack of documented research.** The limited research in New Zealand to document the positive and negative effects on compost, soil structure and nutrients and the optimum blending or application rates.
- **Health and environmental hazards.** The production of hydrogen sulphide during the composting process creates a potential health and environmental hazard.
- **Resource Management Act 1991 regulations.** The potential RMA issues with respect to ‘land disposal of waste plasterboard’, and whether recycled gypsum is considered a ‘fertiliser’ or a ‘waste’.

7. Salvage Items

The salvage of building items is defined as the retrieval of anything for reuse in its original, or near original form. These materials may be characterised as follows:

- Usually salvage items have undergone some manufacturing process that adds value above its raw material.
- May be composed of more than one type of material.
- Usually do not require a process prior to reuse, other than for aesthetic purposes.

These characteristics separate salvage items from recycling items although the line may not always be so clear. Examples of salvage items include complete windows, doors, ovens, air conditioning units bathroom or kitchen fittings, light fittings etc. Salvage items are sourced during the renovation or demolition of buildings, both commercially and privately.

7.1 Sector Overview and Market Trends

The salvage item market is fairly stable which may be seen in the fact that demolition operators are successfully running large retail yards. The market tends to be slightly inverse to the economy and salvage is more popular during periods of low economic activity. There is no data on the volumes and types of materials salvaged as the industry does not keep good records.

Retailing salvaged material requires large preferably covered areas for the collection, storage and viewing of items prior to sale. Salvage items may also however be sold through informal markets such as web sites or trade magazines and newsletters. Much of the demand is from private residents or builders working on residential renovations.

Most salvage items may be broken down to their constituent materials and recycled or recovered however salvaging an item for use of its original purpose usually tends to return a higher profit than recycling the item. This however depends on the market for the particular product. Demolition and salvage retailers are willing to provide anything that the market demands.

Salvage Item Reuse

- Salvage items are generally reused for their original purpose, i.e. windows are reused as windows, doors are reused as doors. Reusable items may include:
 - Architectural features for renovation or construction, interior / exterior – in particular older style houses such as classic villas or old churches.
 - Hardwood for flooring, beams, countertops.



- Structural and building components, including entire building removal.
- Fittings.
- Some items may also be reused for different purposes such as:
 - Carpets as mulch around nursery trees.
 - Decorative features such as old machinery in gardens.
 - Weatherboards for flooring.

Salvage Item Recycling and Recovery

When a salvage items' value has decreased below the value of its individual components, material recycling is a better option for the operator. Old machinery is an example of this where the metal value is usually sufficiently high to warrant recycling. Refer to the other sections in this report for discussion on recycling markets.

Some energy recovery of salvage material occurs, either due to damage or lack of demand for products; ie. wood (refer to Section 5).

7.2 Prospective Opportunities and Demand

- There is further potential for deconstruction compared to demolition in the market, to increase the volume and quality of second hand materials available²⁵.
- There is further potential for designers to incorporate second hand materials into new designs or renovations.
- Green procurement policies could increase the demand for second hand materials.

7.3 Market Barriers

- **Low costs** of waste disposal and many new raw materials, creating a financial incentive to use building resources in a linear, rather than cyclic, approach.
- **Methods of the salvage process.** Time pressures and low level of skilled labour leads to less salvage, and more damage during the salvage process. There is a general lack of knowledge, skills and machinery in the demolition industry for good quality deconstruction compared to destructive demolition.
- **Lack of market information.** The second hand market is generally imperfect due to a lack of information on the materials in supply and demand. Websites are improving, such as www.demolition.co.nz and www.trademe.co.nz, however the market still relies on word of mouth, salvage yard business, and trade magazines and newspapers. Council, Recycling Operators of New Zealand non-profit organisation funded waste exchanges and directories are also improving market information. Businesses and home renovators may not realise the resale potential of items, or what to do with them, which leads to unnecessary disposal. Conversely, demand may not be met due to a lack of information.
- **Quality of materials and components.** There may be a perception among potential buyers that materials are of a lesser quality than new materials. This is dependant on the item in question. In addition, those interested in using second hand materials are not likely to be able to know what the quality, including hazardous nature, of the raw materials are; such as chemicals in carpets or timber, or the fire rating of insulation.

²⁵ Storey, J.; Charleson, A.; Gjerde, M. and Pedersen, M. 2003. The State of Deconstruction in New Zealand. Centre for Building Performance Research, Victoria University of Wellington.



- **Storage space.** Retail of salvage items requires a lot of storage space. Some items such as windows with frames are collected in great quantities by salvage yards and these can often require long periods of storage prior to sale. Damage may occur to these products as a result of weathering or simply by accidental breakage, making them almost worthless.
- **Marketing / time delay before sale.** As salvage items are not usually high value items marketing is often only done through word of mouth or buyers simply come across the item after visiting or ringing the yard. This lack of marketing increases the length of time that a product requires to be sold.
- **Unreliable supply / non-uniformity.** As salvage items come from a variety of sources their uniformity or supply assurance cannot be guaranteed to buyers. This uncertainty in the market makes it difficult for commercial operators to source items from a salvage yard.
- **Desirability.** Many of the salvaged items are from a bygone era, and are considered outdated. Fashion is a key driver of the construction industry and the style of these items is no longer contemporary. While this can also make items unique and elevate them to a boutique / antique market, it is usually the opposite. Salvage items have to compete with new components.
- **Quality of building components.** Retrieval of salvage items will not occur where buildings are in poor condition or made of materials that do not have a market. Many modern building materials do not have a reuse market, such as polystyrene and fibreboard²⁵.
Buildings are not designed or constructed with deconstruction and salvage in mind, and can create barriers to the removal of quality components without damage.
- **Lack of specifications or certification.** There are no standards or specifications under the Building Act 1991 for second hand building components, limiting the reuse by industry professionals and tradespeople. Engineering certification can be sought, however the implications of liability can create a barrier. The current building standards and specifications imply new materials should be used²⁵.
- **Industry priorities** are time, budget, safety and quality, all of which create barriers to better retrieval rates during deconstruction, and the use of salvage items compared to new materials in construction and renovation projects.
- **Health and safety regulations.** Industry sees the compliance requirements as a barrier to availability of trained labour and increases the cost and time structures for deconstruction / demolition projects.

8. Metal, Plastic, Expanded Polystyrene and Window Glass

A brief overview of the markets is given for:

- Metal (ferrous and non-ferrous).
- Plastic.
- Expanded polystyrene.
- Window glass.

These waste materials are not distinctive to the construction industry, and occur in smaller volumes in the waste skip compared to the key wastes detailed in the sections above, but are included in the assessment for completeness.



8.1 Metal

Metal is a commodity item on the global market and has a high return value²⁶. There is already considerable recovery in the C & D industry. Industry commentators suggest demand for ferrous metal is strong and stable and is expected to continue to increase in the near future²⁷.

Approximately 400,000 – 450,000 tonnes are recycled annually, and approximately 13% of this is from the C & D industry²⁵. Most ferrous metal recycled in New Zealand occurs at two steel mills in Auckland. Smaller foundries around the country recycle non-ferrous metal such as brass and copper. Most of the ferrous metal from the South Island and parts of the North Island are exported, as this is more economical than transporting the metal to Auckland²⁶. There is no loss of quality in the recycling of metal, and common recycled products include steel beams and reinforcing bar for concrete work.

Metals, both ferrous and non-ferrous, are collected in bins and transported to a processing plant, either directly from the construction or demolition site, or from sorting facilities. Contamination of metal bins is not an issue as the treatment process separates out different metal types as well as removing any other materials such as plastic, wood etc. which may have found their way into the bin. All metal types are screened together and the resulting fragments are separated out using various processes.

Market Barriers

- **Lack of financial incentive.** Recycling of metal on a C & D site often will not occur if there is not a financial incentive at the construction site, such as the load being too small or of lesser value metal.
- **Transportation costs** can also create a barrier to recycling. This is despite the alternative (usually higher) cost of disposal.
- **Lack of space** reduces the potential for on-site separation of metal.
- **Lack of knowledge** in the construction and demolition industry about who to contact and what they will accept. This is a result of a lack of marketing in the scrap metal industry.

8.2 Plastic

Approximately 21% of the plastics products manufactured in New Zealand are for construction purposes, however recycling of construction plastics is very limited in New Zealand²⁵. Plastic products and packaging in the C & D industry that contribute to waste include (but are not restricted to) the following:

- Plastic cable reels.
- Buckets.
- Film and shroud wrap.
- Flexible PVC cable.
- Rigid PVC pipe and spouting.

In New Zealand, the landfill is still the prevalent destination for waste plastic products, with only 18% of plastic packaging currently being diverted through private and public recycling operations²⁸.

²⁶ Trevor Munro, Scrap Metal Recycling Association of New Zealand. Pers Com. June 04.

²⁷ Sims Pacific Metals. Pers com. April 04.

²⁸ <http://www.plastics.org.nz/page.asp?section=recycling>



The plastic recycling industry is diverse, with multiple players who collect various resins from type Number 1 to Number 7. Markets fluctuate over time, however there are a large number of companies who collect Numbers 1,2 and 4, for which markets are more stable. The main source of waste plastic is post consumer packaging through kerb side collection and post-industrial waste.

Plastics are collected and transported to a sorting facility, and either baled for export or cleaned to remove dirt contamination. New Zealand plastics manufacturers produce construction related products from waste plastic such as drain and culvert piping, concrete mixers, damp proof course and flashings²⁹. Plastic timber is produced in Australia³⁰.

Under the new Packaging Accord³¹ recycling targets will be set for all of the major packaging material categories, including plastics. The Accord has a 5 year term, and will be signed by product manufacturers, the packaging industry and the recycling industry in August 2004³². It will bring together all the main sectors responsible for waste production and recycling to improve the diversion rates of packaging from landfills. The main benefit to the construction and demolition industry is that the Accord could assist with the collection and recovery of packaging such as paint buckets, film wrap, conduit reels and other plastic packaging waste.

The following existing and potential options for the diversion of building-related plastics are as follows:

Plastic Reuse

- Small amounts of plastic cable reels and buckets are used by non-profit organisations.
- Film and wrap is sometimes reused on site.
- There is potential for cable reels, wrap and other forms of packaging to be returned to the manufacturers for reuse.

Plastic Recycling

- C & D plastic waste recycling has been limited due to the problems with contamination from dust, glues, resins and water.
- Several companies in Auckland and Christchurch collect and process film plastic (LDPE) presently³². Some companies have more strict criteria than others for the level of contamination from such things as dust, water and paper labels, although there is a published standard for LDPE recycling.
- Flexible PVC cable can be recycled.
- Companies are currently trialing rigid PVC / pipe recycling.

Plastic Recovery

- Plastics can be converted to heat and energy by combustion³³. The potential for plastics burning in New Zealand will depend on Regional Air Quality Plans and other provisions of the Resource Management Act that apply to the discharges to air from combustion sources. It is unlikely to be an acceptable solution.

²⁹ <http://www.plastics.org.nz/page.asp?section=recycling>

³⁰ <http://www.a-p-r.com.au>

³¹ The New Zealand Packaging Accord is a voluntary agreement between the New Zealand Government and Industry to improve the sustainability of packaging used in New Zealand. www.ronz.org.nz.

³² Melissa Arsenault, Recycling Operators of New Zealand. Pers. com May 2004.

³³ <http://www.plastics.org.nz/page.asp?id=512>



Market Barriers

- **Comparatively low disposal costs** for plastics.
- **Lack of knowledge of recycling options.** There is currently a lack of knowledge in the construction industry about what types of plastic can be recycled, and how they can arrange collection and transport.
- **Lack of central coordination of the industry.** There is concern identified by resource recovery industry representatives that recycling plastics should not be left to the industry to sort out, and there needs to be some kind of government influence, whether this be at a national level through government policy / national targets or at a local government level.
- **Quality and supply issues.** The balance of quality and consistency of supply with the demand for plastics recycling. Agreements between major plastic recycling companies (who collect plastics) and building companies (who generate plastic waste) would create long term viability and assist with quality, volume, and cost issues which are the current barriers.
- **Economies of scale.** Construction companies have problems getting companies to pick up their waste plastic when there is a relatively small volume of material.
- **There is no concept of extended producer responsibility (EPR),** with respect to packaging or product waste. EPR initiatives would assist with collection of packaging and products.
- **Contamination** on construction and demolition sites from dust, water, paper labels, glues and resins.
- **Lack of labelling** of construction plastics for appropriate recycling.

8.3 Expanded Polystyrene

Presently there is little reuse of recycling of expanded polystyrene, particularly post-consumer waste. Expanded polystyrene manufacturers in the EPS Environmental Working Group have discussed the issues and researched technology to identify a workable solution³⁴.

Technology exists to degas and increase the density of the product and there is potential for plant to be established in New Zealand, to process ingots of dense polystyrene product for either export or for reuse in low value plastic items locally such as coat hangers, cutlery and toys³⁴. The expanded polystyrene industry do not wish to operate such a plant themselves, but are willing to provide the knowledge, research, methodology and capital to a third party operator³⁴.

Some polystyrene insulation product suppliers in Auckland and Christchurch are collecting off cuts from construction sites for chipping into other products. Manufacturers have an agreement with particular installers to return off cuts to the plant. This is occurring on a small scale and the companies indicate that they could not cope with large volumes of waste.

In Palmerston North a company is recycling post consumer polystyrene into pods for underfloor insulation in buildings³². Acrofibre Insulation Services in Otahuhu also make products out of waste polystyrene³⁵.

The main barrier to more recycling is the cost in collecting and transporting lightweight material. The recent decision by landfill operators in Auckland to impose a \$1100/Tonne charge on expanded polystyrene may assist the resource recovery industry to find a sustainable recycling solution.

³⁴ Wren Bracegirdle, Bondor NZ. Pers. com 19 April 04.

³⁵ www.zerowaste.org.nz



8.4 Window Glass

Tasman Insulation recycles window glass into 'Pink Batts' insulation³⁶ and Auckland Glass Recyclers recycles window glass into sand blasting media and fibreglass insulation²⁵. Supply of window glass depends on the level of activity in the construction industry, and relies on the separation of the material from the C & D waste stream. There are no issues with the quantity or quality of supply presently and there is capacity to recycle more glass²⁵. No figures of tonnage or volume processed have been given by the industry.

Demand for the insulation product also depends on the activity in the construction industry and although there are competing products in the market, Pink Batts remains a strong brand. Green procurement policies and increased energy efficiency specifications in the new Building Bill (2003) may increase demand for insulation and products with recycled content.

Pink Batts and other insulation can be reused from demolition projects as long as they have kept their shape and insulating characteristics. Charity organisations insulating low income housing accept demolition insulation, and insulation off cuts.

There is potential for crushed glass to replace sand in cement mix for roading, landscaping and similar applications.

9. Common Market Issues

Common to all material types and all recycling, reuse and recovery options are the following comments provided by the industry, relating to the ability to conduct business in the existing economic and social environment.

- Lack of knowledge on the scale of quality and quantity of supply of waste materials and the demand for products, and the subsequent lack of sustainable markets³⁷.
- Funding assistance and initiatives dictates the risk profile that a company will take.
- Access to capital is a key barrier, and the business skills to develop and expand business.
- Disposal to landfill and cleanfill is considered too cheap in all three regions. This hinders the ability for the economy to support profitable, sustainable recycling and reuse opportunities.
- Levies and other economic tools would be useful for changing the cost structure of disposal / recycling.
- Green procurement policies for large companies, local government and central government could positively affect the market for recycled and reusable materials.
- Relatively high transportation costs³⁷.
- Education of key players is important i.e. builders, designers and contractors, in order to increase the rate of change and to give confidence to the recycling market.
- Assistance by councils to provide sorting facilities and provisions in district plans for sorting and recycling facilities.

³⁶ Darren Thornton, Tasman Insulation NZ. Survey Response April 04.

³⁷ URS, NZIER. 2002. Business and Employment Opportunities From Waste Minimisation. Ministry for Economic Development.



10. Recommendations for the Market Development Strategy

1. The Strategy should focus on the key C & D wastes: concrete and rubble, plasterboard, wood (treated and non-treated timber and wood products) and salvage items.
2. Expanded polystyrene should also be included as a ‘problem waste’, with few options for diversion currently. Less emphasis will be given to expanded polystyrene compared to the four main waste categories.
3. Pursue qualitative analysis of scale of waste flow in order to understand the significance of potential options.
4. Isolate the **key** potential opportunities for each waste, in each region, and engage in further research to develop strategies to overcome the issues and barriers.
5. Identify the participants and their potential roles in the resource recovery market, including the C & D industry, recycling operators, local government, the community, manufacturers, private industry and non-profit organisations.
6. Focus the strategy on non-regulatory tools and methods for market development, as regulatory methods have been addressed elsewhere in the C & D Waste Reduction Project.
7. Explore the following:
 - Existing research, and research gaps, on the characteristics of recycled and reusable products.
 - Understanding and improving the links between waste producers, transporters, storage and end users.
 - Identifying solutions to barriers such as information, infrastructure, funding and marketing.
 - The development of specifications, standards etc for recycled and reusable materials.
 - Influence demand by improving the knowledge of products to potential end users.
8. Acknowledge that best practice guidelines for the C & D industry and the resource recovery industry are addressed elsewhere in the C & D Waste Reduction Project.

11. Acknowledgements

The following companies and organisations are thanked for their involvement in completing surveys, providing access to their business operations, or otherwise providing valuable information for this report:

- | | |
|--------------------------------------|---|
| ▪ Ashburton Wastebusters | ▪ K.J. Bleakley (1982) Limited |
| ▪ Banks Peninsula District Council | ▪ MacKenzie District Council |
| ▪ Bondor New Zealand | ▪ Mastagard Commercial Services Limited |
| ▪ BRANZ Limited | ▪ Ministry for the Environment |
| ▪ Carter Holt Harvey Panels Ashley | ▪ Musgrove Bros. Limited |
| ▪ Carter Holt Harvey Panels Kinleith | ▪ Nikau Contractors Limited |
| ▪ Carters | ▪ North Shore City Council |



- Cement and Concrete Association of New Zealand
- Christchurch City Council
- City Care Limited
- Collective Recycling Limited
- Crusaders Landscaping Supplies
- Department of Conservation
- Econ Products Limited
- Envirowaste Services
- EPS Working Group
- Fletcher Steel
- Forest Roding Services Limited
- Franklin District Council
- Fulton Hogan Limited
- Golden Bay Cement
- Green Acres Waste Bins
- Gremara Contractors
- Hamilton City Council
- HG Leach and Company Limited
- Holcim Cement
- Innovative Waste Kaikoura Limited
- Otago Metal Industries
- Otorohanga District Council
- Plastics New Zealand Inc.
- Recovered Materials Foundation
- Recycling Operators of New Zealand
- Reharvest Timber
- Scrap Metal Recycling Association of NZ
- Screening and Crushing Systems Limited
- SIMS Pacific Metal
- Slash Trash
- Tasman Insulation NZ
- The Timber Recycling Company Limited
- Timaru District Council
- Troake Group
- Victoria University of Wellington
- Waitakere City Council
- Ward Demolition
- Waste Energy Burners Limited
- Waste Management NZ Limited
- Winstone Wallboards



Appendix A Funding

A.1 WasteWise Fund

North Shore City Council

www.northshorecity.govt.nz

Phone 09 486 8600

The fund is available to businesses, individuals, community groups and schools to support projects that reduce waste in North Shore City. Around \$100,000 is available through four funding rounds annually to assist initiatives that help the city achieve the target of 'zero waste to landfill'.

The council expects most grants to be less than \$5000, although it will consider larger amounts. Projects eligible for funding include:

- Service grants to approved organisations that offer waste reduction services and programmes.
- Sponsorship and awards for waste reduction activities.
- Feasibility studies for enterprises.

A.2 EnviroFund

Hamilton City Council

www.hcc.govt.nz

Phone: 07 838 6699

The Envirofund has been established to assist individuals, groups and community agencies to fund projects and initiatives, generally outside Council's core responsibilities, which encourage sound environmental improvement in Hamilton and contribute to the sustainability of the city, such as:

- Local environmental restoration projects.
- Environmental seminars and workshops.
- Environmental research that could provide direct benefits to Hamilton's environment.
- Educational or promotional activities that raise awareness about environmental issues.
- Practical environmental initiatives that involve community participation or increase community involvement.

Individuals, schools, community groups and environmental groups can apply to the fund. However, proposals designed to generate personal or commercial profit are not eligible.

A.3 Environmental Initiatives Fund

Environment Waikato

www.ew.govt.nz

info@ew.govt.nz

Phone 0800 800 401

The fund provides one-off grants to projects, which directly enhance and / or benefit the environment or provide environmental education. Up to \$40,000 is available to any one project. Anyone can apply to the fund, however proposals designed to generate personal or commercial profit or compensate individuals are not eligible for funding.



Funding can be provided to specific projects designed to:

- Enhance the environment.
- Promote and / or contribute to sustainable management of the environment.

A.4 Environmental Initiative Fund

Auckland Regional Council

www.arc.govt.nz

Phone 09 366 2000

Funding not-for-profit practical projects in the Auckland region. Applicants can apply for up to \$5000.

A.5 Recycling Works Business Development

Recovered Materials Foundation

www.rmfmf.org.nz

Phone 03 348 0595

This package comprises both a grant scheme to develop business and marketing plans, and based on these plans, a low to no interest loan to set up commercially viable recycling operations. “Commercially viable” in this instance means an operation that is not dependent on on-going financial assistance. However, other assistance may be available if the business is marginal but achieves significant waste stream reduction or employment creation. In these cases, assistance may include transport, resource recovery, accommodation, administration services, promotion and advertising through the RMF infrastructure. However, this must be incorporated into the business and marketing plans and included in the funding application.

Recycling Works Business Development comprises two separate packages:

1. Business Plan Development Grant

Support and / or grants to develop business and marketing plans for the proposal. This includes:

- a) A preliminary concept feasibility analysis.
- b) Identifying the need for further research and investigation in developing business and marketing plans and resourcing this where appropriate.
- c) Support and / or financial assistance to develop professional business and marketing plans.

2. Business Establishment Loan Fund

Application for financial or other assistance based on the business and marketing plans, or other documentation if applicable.

A.6 Canterbury Economic Development Fund

Canterbury Development Corporation

www.cdc.org.nz

Phone 03 379 5575

The fund has been established by the Christchurch City Council and is administered by the Canterbury Economic Development Fund Trust. Eligible projects will need to supply one or more of a number of benefits to Canterbury, including the generation of exports or replacement of



imports, providing new services, attracting new investment, creating new business or employment, or supplying a new invention or innovation. Projects will also be judged on the social, cultural and environmental impact they have within the region.

A.7 Christchurch City Council Loans Scheme

Christchurch City Council

www.ccc.govt.nz

Phone 03 941 8999

The loans scheme is designed to help not for profit organisations to improve or develop new or existing facilities or for capital expenditure. This is the only category where applications for facility development can be considered. Loans are for a maximum of 10 years (normally five years) and at 2% interest per annum. Organisations which have the ability to repay loans are encouraged to apply for this means of assistance for major capital projects.

To be eligible for a loan the applicant must be a legally constituted not-for-profit organisation and must have provision in its constitution to borrow money.

A.8 Envirofunz

Ministry for the Environment.

www.envirofunz.org.nz

Envirofunz is a website managed by the Ministry for the Environment, which is a searchable database of funding sources.

A.9 Sustainable Management Fund.

Ministry for the Environment.

www.mfe.govt.nz

Phone 04 917 7400

The objectives of the Sustainable Management Fund (SMF) are to make a positive difference to the environment by:

- Building partnerships and encouraging community involvement.
- Promoting the innovative use of existing information to encourage positive behavioural changes and improved environmental management.
- Providing models and examples that can be adapted and used by other people.
- Stimulating environmental action that would not otherwise occur.

The SMF achieves its objectives by either funding publicly submitted applications for funding or calling for tenders.

A.10 Enterprise Development Fund

New Zealand Trade and Enterprise

www.nzte.govt.nz

Phone 0800 555 888



The Enterprise Development Fund (EDF) is available to entrepreneurs, start-ups, existing businesses and groups of three or more businesses. The Fund is divided between Enterprise Development Grants and Enterprise Network Grants. Grants are offered to successful applicants on a 50:50 reimbursement basis and up to a maximum of \$20,000 from the EDF each year, from 1 July - 30 June.

Enterprise Development Grants

Grants available for entrepreneurs and businesses to:

- Engage the services of a business mentor.
- Undertake advanced management or technology training.
- Obtain specialist advice and / or expertise for a specific project.
- Investigate a new international market or to rent space at an international trade fair.

Enterprise Network Grants

Grant available to qualifying groups of businesses (Enterprise Networks) to assist them build business capability or undertake international market development activity.

The fund is aimed at businesses with an annual turnover of less than \$50 million.

Please note: An Enterprise Network is a group of three or more New Zealand organisations co-operating strategically to increase earnings through building capabilities and / or targeting specific commercial opportunities. All members of an Enterprise Network must be New Zealand tax-registered companies with no common ownership.

A.11 Growth Services Fund

New Zealand Trade and Enterprise

www.nzte.govt.nz

Phone 0800 555 888

The Growth Services Fund is accessible to companies who:

- Have been identified as having clear and significant growth potential.
- And for whom a development plan has been compiled by Client Services staff at NZTE.

The fund is intended to assist with new initiatives and new directions aimed at having a significant impact on the business leading to substantial, sustained growth. Co-funding of up to 50% will be offered by NZTE.

The focus of the fund is to increase the capability of the company, to reach its growth potential.

The types of activities we would expect to fund under the scheme include:

- Preparation of documentation to obtain finance for business development.
- Feasibility studies.
- Development of prototype design and testing.
- Development of business, strategic or marketing plans, including market research.
- Advice and assistance for human resource development (not pure recruitment costs).
- Assessment and implementation of total quality management, quality assurance, and business excellence programmes (e.g. ISO certification).



- Development of intellectual property protection and commercialisation.
- Financial planning and development of improved financial systems as part of a development project.
- Advice on legal, tax or other issues relating to a new business structure underpinning a new business initiative.
- Assistance to fund external, professional mentors or project managers to assist with the implementation of a growth initiative for up to 12 months.
- International business exchanges.

Note there are several ineligible activities.

A.12 Business Incubator Awards

New Zealand Trade and Enterprise

www.nzte.govt.nz

Phone 04 910 4353

A Business Incubator is a facility designed to assist businesses to become established and profitable during their start up phase.

They do this by providing:

- Shared premises.
- Business advice.
- Business services.
- Networking.
- Mentoring.
- A full time manager.

The incubation period for an individual business is normally one to three years.

NZTE Incubator Awards provide one-off, contestable cash rewards to participating New Zealand incubators. Applications for funding are called for once a year. Funding is not ongoing or automatic, and incubators cannot rely on awards for continued viability.

A.13 The Foundation for Research, Science and Technology

Foundation for Research, Science and Technology

www.frst.govt.nz

The Foundation is responsible for investing public money to stimulate prosperity and improve the well-being of New Zealanders and the environment through investing in innovation and fostering the creation of new knowledge. The Foundation invests its money through a number of funds and schemes (some of which are detailed below):

- Public Good related science and technology.
- Technology New Zealand.
- New Economy Research Fund.
- Grants for Private Sector Research & Development.
- Pre seed accelerator fund.



For more information: Phone: 09 912 6730.

New Economy Research Fund (NERF)

The intent of NERF is to invest in basic research with a focus on developing knowledge and capability to support the development of new, and emerging, RS&T intensive enterprises in New Zealand. NERF research:

- Is targeted basic research, which meets international standards of excellence and has the potential to create advanced technology or science platforms that will help create or develop new and emerging enterprises and sectors for NZ.
- Helps build a critical mass of research capability and knowledge in emerging science and technology areas.
- Develops advanced human capital and skills that draw from rapid advances in international science and technology.
- Develops new areas of knowledge to a point where it may be further developed, sustained and / or exploited through other public or private investment.

Through NERF, the Foundation is looking to make some high risk and (potentially) high return investments, so they invest in exciting, leading-edge, basic research — research done by world-class research teams that also have some awareness of the commercial environment.

Pre-seed Accelerator Fund

The Pre-Seed Accelerator Fund (PSAF) is intended to help to bridge the gap in publicly funded R&D between generating potentially valuable new knowledge and producing a first prototype so that a commercial prospect is 'investor-ready'. The objective of the PSAF is 'to accelerate the commercialisation of new knowledge that arises from publicly funded research carried out by public sector research providers'.

Technology NZ Funding: Technet (Expert Access) Programme

Companies occasionally need advice to solve technical problems that are impeding innovation and future growth. Two good sources of technical expertise are:

- Research groups; e.g. Crown Research Institutes and Research Associations.
- Tertiary institutions e.g. Universities and Polytechnics.

Technology NZ has negotiated access to these experts for a limited period of consultancy. Maximum funding is \$2000 (incl. GST).

TechNet funding:

- Is available for companies with a turnover under \$50M p.a.
- Can be used just once for each technical problem.
- Is intended to be used strategically — ideally contact with the Expert leads to an ongoing working relationship and future innovation within the company.

Technology New Zealand: SmartStart

SmartStart supports the investigation and resolution of early stage barriers to technological innovation R&D projects. (Previously TechLINK) The objectives of SmartStart are to assist firms to address any or all of the following issues, using external resources:

- Technology.
- Project design.



- Planning and assessment.
- Technology gap and opportunity assessment, advice and guidance, feasibility, investigation and acquisition.
- Strategic technology planning.

Areas for funding include:

- Current position analysis.
- Technology consultancy – developing technology.
- Technology strategy – to prioritise opportunities.
- International technology acquisition.

A.14 NZ Recovered Materials Enterprise Trust (RMET)

E-mail: recycloans@pl.net

RMET is a community trust that operates the RecycLoans Fund, a loan fund that has been established to support the development of products and markets utilising recovered materials. Its objectives are to achieve waste reduction, job creation and community economic development.

The primary client markets of RMET are individuals and small businesses who require seed capital to demonstrate the viability of a business idea featuring the reuse of materials recovered from the waste stream and may also create employment through the project. Community based trusts involved in job-creating waste reduction initiatives may also apply to the fund.

The loans are intended to provide applicants with an opportunity to further investigate the potential viability of their product or process.

A.15 Zero Waste New Zealand Trust Funding

Zero Waste New Zealand Trust

www.zerowaste.co.nz

Phone: 09 486 0734

Email: mailbox@zerowaste.co.nz

This fund established to encourage and motivate all sectors of New Zealand society to work towards a target of Zero Waste. The trust accepts applications for waste minimisation initiatives from individuals, businesses, local authorities and non-profit organisations. Preference will be given to a project that has the following qualities:

- Demonstrates a clear commitment to zero waste.
- Has significant waste diversion potential.
- Will create employment and business opportunities.
- Is an innovative, practical solution.
- Provides a model that can be shared with others.
- Draws funding from a variety of sources.
- Builds capacity and leads to empowerment within your community.
- Capital expenditure or purchase of capital items.
- Lease of buildings, vehicles or equipment.
- Development of new products.



- Development of education / training programmes.
- Participating in an education / training programme.
- Hosting or attending a conference or event.
- Local travel.
- Writing a booklet or book.
- Research and development project.
- Policy development.

Non-Eligible Projects (January 2004):

- Venture capital - the establishment or development of business activities, marketing a new idea in order to sell it or to make a financial profit, or develop an activity that will be patented or its public use restricted by copyright.
- Running costs.
- Backdating.
- Statutory obligations (activities that individuals or organisations are required to do by law).
- Central Government responsibility.
- Projects that would be more appropriately funded by other funding agencies.
- Fundamental or strategic research - this is the creation of new ideas or the promotion or implementation of existing knowledge.
- Duplication of demonstration projects or pilot studies.
- Academic scholarship.

A.16 The Tindall Foundation

The Tindall Foundation

www.tindall.org.nz

To support initiatives in New Zealand which assist communities to help themselves and to heal problems rather than manage them. Funding Focus Areas for 2004:

- Supporting Families & Social Services.
- Encouraging Enterprise & Employment.
- Caring for our Environment & Preserving Biodiversity.
- Strengthening the Third Sector.
- Promoting Generosity.

Note there are many exclusions. Applications are taken throughout the year, and are assessed against the goals of the focus areas and the ability to make a long term impact.

A.17 Funding Information Service - Te Ratonga Whakamarama Putea

www.fis.org.nz

The service is a not-for-profit organisation collecting and distributing information on funding resources available in New Zealand by way of two searchable computer databases:

- Fundview contains information about funding for community groups in New Zealand.
- Breakout holds information about awards, scholarships and grants for individual development.