Inventory of solid wastes management and disposal in Taranaki

Carried out by the Taranaki Regional Council on behalf of the Regional Solid Waste Working Party

TARANAKI REGIONAL COUNCIL

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Executive summary

The Regional Policy Statement for Taranaki (RPS) (Taranaki Regional Council, June 2009) identifies the management of wastes as a significant resource management issue in the region. Waste management (including minimisation, and the recovery of wastes for recycling, reprocessing, or reuse, and the disposal of residual wastes) engages a large number of parties (local authorities, waste generators, waste contractors, and so on). The Waste Minimisation Act (2008) requires territorial authorities to undertake an assessment of waste management in their district prior to preparing a waste minimisation plan.

Data on municipal kerbside collections of waste and recyclables is readily available to the region's four councils. However, there are large volumes of wastes that do not pass through the avenues of municipal collection and disposal services. Therefore it can be difficult to have a comprehensive or informed understanding of the nature, size, challenges, and successes of waste management in the region.

Accordingly, it is appropriate that accurate and up to date information on the range of wastes produced within the industrial sector, the nature of the industries producing such wastes, the volume and characteristics of the wastes, their present disposal fate, and the issues and opportunities facing this sector, are identified from time to time in order to facilitate waste management in the region.

The project reported in this study covers the identification of the **collection, recycling, recovery, treatment, and disposal** of industrial and agricultural wastes within the region other than through Colson Road landfill, including an assessment of the capacity of existing channels/facilities to cope with future change. It has gathered quantitative data on waste management activities in the region, across municipal, industrial, and commercial operators dealing with solid wastes, where this is available, and has provided comment and estimates in other cases. The inventory also covers liquid wastes such as used oil, paints, grease trap/sump wastes, and farm effluent. In addition, some wastes of a more commercial nature were covered, including electronic waste and cooking oils.

Individual businesses or other organisations to be contacted were identified under each type of material. In some cases, the majority of or all parties were contacted; in other cases a representative sample was selected. Information was gathered by telephone, email, and in some cases, visits.

For most activities and types of material surveyed there appear to be no problems with the existing state of management. As far as the future can be assessed, no significant issues apart from the current economic uncertainty were apparent. Capacity in terms of end users of or demand for recycled or composted materials was generally not an issue. There are clear opportunities to increase recovery/recycling of many waste types in terms of potential supply, demand, and capacity.

Information was not always available on quantities, particularly quantities being landfilled instead of recovered for recycling or reuse. The only way to assess this would be to analyse what is going into the landfill. For example, although green waste composting statistics are encouraging, there is no information about how much potentially compostable green waste is still being landfilled.

It was encouraging to note the high level of awareness of respondents to the environmental implications of wastage. This was especially evident in the industrial sector, and several local businesses affiliated to large companies with head offices overseas noted that environmental management was built into their systems.

There are however, significant areas where awareness is not high or opportunities to recycle are limited, and also anecdotal evidence of poor practice in some sectors.

This points to the need for educational programmes targeting areas where recycling rates (if known) are low, or where the environmental implications and consequences of materials being landfilled or handled poorly are high. In some cases the results also show the need for central government to provide leadership or structure under the Product Stewardship provisions of the Waste Minimisation Act to enable a conduit to be established for recycling materials difficult to manage through existing channels, for example, electronic waste.

Some obvious areas for action where the market is not providing an adequate solution, if councils are so minded, and bearing in mind that no cost benefit analyses of these have been done, are

- greater diversion of green waste and food waste from landfill by, for example, greater support for home composting and further facilitating separated green waste delivered to transfer stations
- investigation of the production of sandblasting glass from recycled glass as one option for re-use
- more active promotion of commercial silage wrap recycling
- more active promotion of used oil recycling
- targeted promotion of commercial solvent recycling
- targeted promotion of commercial oil filter recycling
- more active promotion of free drop off services for vehicle battery recycling
- more active promotion of free take-back schemes for mobile phones and investigation of having centralised locations for collecting mobile phones
- targeted promotion of cooking oil collection from food outlets
- investigation of beneficial reuse of grease trap wastes
- submission to central government to expedite a product stewardship scheme for televisions in particular, and other electronic waste in general.

It is hoped the findings of this report will lead to enhanced waste minimisation in the region.

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1. Background

1.1 The regional policy position on wastes

The Regional Policy Statement for Taranaki (RPS) (Taranaki Regional Council, June 2009) identifies the management of wastes as a resource management issue in the region that is considered significant. The RPS notes:

'For most people, the term 'waste' describes materials or substances that are no longer needed or useable, or have lost their economic value and therefore require disposal. However, waste can be much more than useless items, which then have to be discarded. Some waste represents a resource that, with careful management (e.g. recycling), may have economic value and can contribute to the sustainable management of our environment. Increasingly, it now represents a wasted resource.

'There is a need to minimise the amount of waste generated and thereby minimise the economic, energy, social, and environmental costs associated with the wasteful consumption of resources, which can deplete critical and non-renewable resources. Waste minimisation can offer direct and immediate economic and environmental benefits....

'Increasingly, central and local governments are looking at opportunities to promote waste minimisation, reuse, recycling, and recovery. If less waste is produced, it implies that the materials and items currently consumed are being used more efficiently. Similarly, using waste as a resource by reusing, recycling and recovering energy means that other resources are subject to less pressure.'

POLICY

Waste minimisation and disposal

WST POLICY 1

Encourage waste minimisation practices and practices to avoid, remedy or mitigate the adverse environmental effects of final disposal by promoting, in the following order of priority:

(a) lower levels of waste generation;
(b) higher levels of reuse, recycling and recovery of waste; and
(c) efficient and effective treatment and disposal of residual waste in an environmentally sustainable manner.

Explanation of the policy

Policy 1 is consistent with the waste management hierarchy adopted by the Government and in other parts of the world, including the Council's *Regional Waste Management Strategy for Taranaki*. The Policy places a priority on minimising waste but also acknowledges that practical and effective means of dealing with waste in specific circumstance may include the reuse, recycling and recovery of wastes and the effective and efficient disposal of any residual waste. If this hierarchy is adopted by resource users it will not only reduce or avoid adverse environmental effects associated with final waste disposal (creating significant savings to the community), it will also achieve a more efficient use of natural resources. It also reflects that every sector within the community at large has a part to play and can make a positive contribution to waste management.

METHODS OF IMPLEMENTATION

The Taranaki Regional Council will:

WST METH 1	As appropriate, consider and apply programmes set out in the ***New Zealand Waste Strategy***.
WST METH 2	Continue to **participate** in regional waste forums, at strategic and operational levels, to develop, implement and review initiatives for waste management in Taranaki.
WST METH 3	Maintain, implement and review, in conjunction with the region's territorial authorities, the ***Regional Waste Strategy for Taranaki***.
WST METH 4	Include in the ***Regional Waste Strategy for Taranaki***, actions and targets for waste minimisation, the management of different waste streams, and for waste disposal.
WST METH 8	**Advocate** and **promote** waste avoidance by: (a) providing technical advice on recycling, the use of recycled materials, and the development and use of waste recovery processes and technology to industry, consumers, agriculture and other sectors; (b) assisting in waste audits and waste reduction plans; and (c) in conjunction with appropriate organisations, preparing and distributing educational material that promotes public awareness and encourages waste minimisation and reuse.

The RPS thus establishes an imperative, framework, and scope for the monitoring and review of waste management practices in the region by the Council. The RPS recognises that waste management (including minimisation, and the recovery of wastes for recycling, reprocessing, or reuse, and the disposal of residual wastes) engages a large number of parties (local authorities, waste generators, waste contractors, and so on). Therefore it can be difficult to have a comprehensive or informed understanding of the nature, size, challenges, and successes of waste management in the region. But such knowledge is vital if there is to be sound, factually-based, efficient, and effective waste management planning and implementation in the region.

The district councils of the region have obligations under the Health Act and the Local Government Act to make provision for the collection of refuse in their districts. Each of the councils have gone beyond this, to provide for kerbside collections of both wastes and recyclables. There is currently a single contractor providing this service in each of the region's districts, and a single landfill for municipal waste operating as a regional facility. Therefore data on this aspect of waste management and disposal is readily available to the region's four councils.

However, there are large volumes of wastes that do not pass through the avenues of municipal collection and disposal services, and therefore lie outside the normal scope of awareness or understanding of waste management on a regional basis. Accordingly, it is appropriate that accurate and up to date information on the range of wastes produced within the industrial sector, the nature of the industries producing such wastes, the volume and characteristics of the wastes, their present

disposal fate, and the issues and opportunities facing this sector, are identified in order to facilitate waste management in the region.

1.2 The management of the disposal of industrial wastes within Taranaki - 1991

This study was undertaken by the Taranaki Regional Council during 1991. It was driven by a growing concern that industrial wastes might be hazardous and that inappropriate disposal options might be utilised.

The survey involved a wide range of industrial and commercial premises throughout the region. It covered hazardous, non-hazardous, and trade (liquid) wastes, and addressed waste types, volumes, characteristics, treatment, and disposal.

The survey found that industrial wastes were in fact quite similar in character to municipal residential wastes, that disposal options existed for almost all waste types, that recycling was in wide use, that there was a need for a single clearly identified co-ordinating body, and that a small residue of problematic wastes were best addressed on a national rather than regional basis. The rate of recycling and recovery of wastes within the industrials sector was much higher than in the residential waste sector. Volumes of waste being managed within the industrial and commercial sector were much greater than those being managed through municipals kerbside services.

1.3 Regional Waste Strategy for Taranaki 2003

In 2003 the Taranaki Regional Council collected and collated a body of data and information on waste volumes and treatment/disposal in the region. This work formed the basis of the *Regional Waste Strategy for Taranaki 2004.*

In the Strategy, the 'state of play' for each of a number of waste types was examined, with quantitative or semi-quantitative data provided where this was known. Organic, special, construction and demolition, hazardous, organochlorine, and trade wastes were each examined in turn. These groupings were derived from the New Zealand Waste Strategy (Ministry for the Environment and Local Government New Zealand, 2002. *The New Zealand Waste Strategy – Towards zero waste and a sustainable New Zealand.* Ministry for the Environment, March 2002.) The Regional Waste Strategy was based on and drew from the goals and objectives of the NZWS, which were considered alongside community aspirations and technical constraints for waste minimisation and management in Taranaki.

Key findings included that the region was well serviced for transfer stations and landfills, for access to recycling facilities, and for provision of kerbside collection of recyclables. The three major limitations to the development of successful waste minimisation efforts in Taranaki are:

- the distance of Taranaki businesses from key recycling markets;
- the limited waste minimisation expertise available to or within small and medium businesses; and
- the limited control Taranaki has on the volume and types of packaging used for products sold and consumed in Taranaki.

In Taranaki the main sources of organic wastes are rural based industries such as dairy and poultry farming, meat processing and piggeries, together with abattoirs and wastewater treatment facilities. There was a very high level of recycling/recovery of organic wastes for further use in the region- dairy effluent to land, fallen stock processed for animal meal, chicken shed litter used as manure, manure produced from piggery shed wastes, and composting or rendering of abattoir by-products. Municipal sewage sludge was being converted to biosolids suitable for unrestricted use. Green waste arriving at transfer stations was for the most part being composted. The proportion of organic wastes being re-used in some form was far greater than the proportion going to landfill.

While there was a degree of recovery of construction and demolition wastes within the region, it was recognised that most of these wastes that were going to cleanfill or landfill had no practical re-use or recycling alternative.

Hazardous wastes in the region were low volume and were being well-managed, as were organochlorines (which had been substantially removed from the region already).

1.4 Background to the present study

1.4.1 Regional Solid Waste Working Group

The Regional Solid Wastes Working Group as originally formed by the three district councils of the region to address the need to secure long-term access to landfilling capacity within the region efficiently. Realising the benefits of working together, the Group broadened its objectives to include co-ordination on any matter relating to solid wastes management in the region where there is potential for regional benefits. The Group also invited the Regional Council to participate in the Group (2003).

One of the main initiatives supported through the Group is the employment of a Regional Waste Minimisation Officer, jointly funded by all four councils and administered through the Regional Council.

1.4.2 The Waste Minimisation Bill

In March 2008 the Regional Solid Wastes Working Group requested from the Council a brief for undertaking a further study of waste disposal practices in the region, with a view to updating the earlier information and to assist it to identify key areas on which to focus. At the time, the passage of the Waste Minimisation Bill (which has been subsequently enacted) was providing a stronger imperative for effective engagement in waste management in the region.

The Act requires each territorial authority (clause 49) to conduct a waste assessment in its district, prior to preparing, amending, or revoking a waste management and minimisation plan. The assessment must contain:-

(a) a description of the collection, recycling, recovery, treatment, and disposal services provided within the territorial authority's district (whether by the territorial authority or otherwise); and
(b) a forecast of future demands for collection, recycling, recovery, treatment, and disposal services within the district; and

(c) a statement of options available to meet the forecast demands of the district with an assessment of the suitability of each option; and
(d) a statement of the territorial authority's intended role in meeting the forecast demands; and
(e) a statement of the territorial authority's proposals for meeting the forecast demands, including proposals for new or replacement infrastructure; and
(f) a statement about the extent to which the proposals will (i) ensure that public health is adequately protected; (ii) promote effective and efficient waste management and minimisation.

In order to provide a robust input into the assessment required by the Act, each district council of Taranaki would need to undertake a waste inventory. For reasons of efficiency and in recognition of the regional nature of waste management in Taranaki, the Group decided that a single inventory covering the region was appropriate.

The project was to cover:

- the current and predicted future **generation** of solid wastes throughout the region, other than those collected by municipal kerbside collection and other than those arising from domestic properties including delivery by private vehicles to transfer stations;
- identification of the **collection, recycling, recovery, treatment, and disposal** of industrial and agricultural wastes within the region other than through Colson Road landfill, including an assessment of the capacity of existing channels/facilities to cope with future change; and
- identification of **options to enhance** effective and efficient waste management and minimisation in the non-municipal waste management sector.

1.4.3 Project description

The project methodology was to identify and gather quantitative data on waste management activities in the region, across municipal, industrial, and commercial operators dealing with solid wastes. The inventory would also cover used oil, paints, grease trap/sump wastes.

The survey would not attempt to quantify private domestic activities such as backyard composting, nor would it attempt to quantify trade in second-hand goods and items such as used vehicles, drop-off delivery to roadside clothing bins, garage sales, internet-based or publication-based trades and exchanges, second-hand retail outlets, and demolition yards.

That is, the study would deal with activities that deal with wastes as materials, rather than with the trade in items that still have a perceived value in their current form for both buyers and sellers.

The inventory would not examine the costs/economics of any element of the waste streams, except to indicate whether each element is considered economically sustainable i.e. whether a market exists, and whether there is capacity within the market for further growth.

2. Methodology

A listing was prepared of industrial and commercial activities that were likely to be generating or managing the types of materials relevant to the project brief.

Individual businesses or other organisations to be contacted were then identified under each type of material, a spreadsheet was set up to record the data to be gathered, and questionnaires were developed for each type. (See Appendix V for an example).

In some cases, all relevant businesses were surveyed, in others only a sample. This decision was determined by the type of information to be collected, resources available to gather that information, the number of businesses in the category, and the results of the initial information gathering. For example, of approximately 80 motor vehicle workshops identified, twelve were contacted. More waste categories were also identified as the data gathering proceeded, for example, oily sludges, oil filters, and antifreeze as particular waste streams requiring specific management.

It also became clear as the survey progressed that contacting head offices of sites which were part of a national company would also be useful, so this was done where relevant. For example, the head office of Exide Technologies was contacted for information about vehicle battery recycling.

Each business was first contacted by telephone and a contact person identified who could supply the information needed. Initially questionnaires were emailed to respondents who filled them in and returned them, and the data was entered into a spreadsheet. Telephone interviews were also used extensively, with information entered directly into the spreadsheet. Sometimes these were the only contact with the respondents; sometimes they were used to clarify answers to the questionnaires and to gather additional information. Emails were also used extensively for the same purposes.

In a few cases, a site visit was made, either where it appeared necessary in order to gather the information, or to become better informed about an operation.

3. Results and findings - summary

Each of the major categories of waste type is discussed more specifically in the sections following. A brief overview of key points is presented below.

For most activities and types of material surveyed there appear to be no problems with the existing state of management. As far as the future can be assessed, no significant potential or emerging issues apart from the current economic uncertainty were apparent. Capacity in terms of finding end users of recycled or composted materials was generally not an issue. If anything, in some cases demand for the resource was greater than supply, for example wood shavings for use as animal bedding. The issues that were raised or became apparent were specific to certain material types, and are covered in each section below.

It was encouraging to note the high level of awareness of respondents to the environmental implications of waste. This was especially evident in the industrial sector, and, not unexpectedly, among industrial and commercial recycling and composting operators.

Some innovative solutions were uncovered, for example, the purchase by a surface coating company of equipment to recycle their own used solvents.

There are however, significant areas where awareness is not high, and/or opportunities to recycle are limited, and there was also anecdotal evidence of poor practice in some sectors. For example, a national survey showed only 7% of people purchasing a new mobile phone returned their old one to a take-back scheme, and there is no reason to believe that the residents of Taranaki behave any differently; and the silage wrap recycling rate in Taranaki is also low. Of note for both these examples is that the waste generation is distributed among large numbers of individuals and small businesses, and that recycling involves behaviour change and a commitment to recycling.

Accurate information was not always available on quantities, particularly quantities being landfilled instead of recovered for recycling or reuse. The only way to assess this would be to analyse representative loads of what is going into the landfill. For example, although green waste composting statistics are encouraging, there is no information about how much potentially compostable green waste is still being landfilled. In a few cases, information from national surveys or on national quantities of material used has been referenced to give some indication of the proportion of the total which was being recovered. In some cases information on quantities was not released because it was commercially sensitive. In many cases the information sought was not being formally collected and so was estimated by the respondents.

Each category of material is covered in depth in the sections which follow. For convenience a summary table of amounts (where known) is provided below. This illustrates that very large amounts of some materials are being recycled in the region. Table 2 identifies targets within the Regional Waste Strategy (2004) which this survey and report have helped meet or illustrate progress on, and Table 3 provides a brief look at the state of recycling and what options exist for enhancing recycling/recovery in the region.

This information was gathered from the more than 120 businesses and other organisations which responded to the request for information; and was provided by over 140 individuals.

Table 1 Summary of annual amounts of materials to landfill, cleanfill and reuse or recycling

Category	Material type	Amount to landfill or cleanfill or burned as waste	Amount to reuse and recycling including composting[1, 2]
Paper and card	Paper	unknown	1800
	Card	unknown	4500
Plastics	Agrichemical containers	unknown	Unknown (approx. 2000 items)
	Silage wrap	unknown	50
	Shrink wrap and other plastic film	unknown	100
	Plastic Type 1	unknown	130
	Plastic Type 2	unknown	190
Glass	Glass	unknown	1140
Metals	Ferrous steel	unknown	17,000
	Other metals	unknown	<1000
Electronic wastes	Computers and related equipment	unknown	39
	Televisions	unknown	0
Untreated timber, sawdust, wood shavings, bark, chip, waste wood	Sawmills and other timber processors	4800 (minimum)	12,700 (minimum)
	Other waste timber	1000	25
	Bark	unknown	2800 (Taranaki sourced)
Organic wastes	Composted green waste and wood shavings	unknown	7360
	Piggery effluent solids composted or otherwise applied to land	unknown	330
	Other organic materials composted or otherwise applied to land eg as fertiliser	unknown	40,000
	Meat processing by-products	unknown	commercially sensitive. Above 75000- 80000 in 2003.
	Mulched green waste (not composted)	unknown	3400 (minimum)
	Food waste diverted to animal feed	unknown	1600 (minimum)
Tyres	Tyres	unknown	70000 items (1200 t) to 250000 (4300 t)
Concrete, roading, construction and demolition	Concrete, rubble and bricks	unknown	not available
	Street cleaning and sumps	1250	0
	Roading: carriageway and footpath reseals	'very little'	unknown
	Roading: Pavement repairs	7500 (cleanfilled)	unknown

[1] In tonnes unless otherwise noted; and excluding materials sourced from out of the region
[2] Where applicable, the quantity includes recyclables recovered through the municipal kerbside collection

Category	Material type	Amount to landfill or cleanfill or burned as waste	Amount to reuse and recycling including composting[1, 2]
	Roading: Major reconstructions	unknown, but far larger than for pavement repairs	unknown
	Construction and demolition	unknown, but estimated to be 50% of total waste to landfill	unknown
Special wastes	Used engine oil	unknown	434[3]
	Oily sludges	unknown	500[3]
	Oil filters	unknown (potentially 100,000 items)	7000 items
	Antifreeze	unknown	unknown
	Used paint	unknown	26
	Solvents	unknown	17[3]
	Vehicle batteries	unknown	unknown
	Farm effluent organic solid wastes (solids only, ex dairy shed treatment ponds)	0	7700 (solids only)
	Effluent sludge and other municipal waste water treatment wastes	305	1270
	Drilling muds	0	Unknown- highly variable
	Hazardous	unknown	NB Safe collection & treatment, not recycling: variable, only some quantities known
	'Problem' wastes	unknown	highly variable
	Waste cooking oils	unknown	120
	Grease traps: oil and food scraps	215 tonnes	0
Cleanfill	**Cleanfill totals**	**110,000-140,000 tonnes**	
Landfill	**Landfill totals**	**64,000 tonnes**	
Re-used and recycled			**180,000-188,000 tonnes**

It appears that the quantity of wastes in Taranaki being recovered for re-use each year is around 3 times the amount going to municipal landfill, and similar to the total going to landfill and cleanfill combined.

For the purposes of this analysis, wastes to cleanfill are regarded as disposed of with no beneficial end-use. In reality, cleanfilling can be intended for land reclamation or reinstatement (e.g. former quarry sites), so there is a benefit, but not arising directly from re-use of the wastes concerned.

As far as can be ascertained, the greatest volumes of materials recovered for further beneficial use are in the categories of timber/sawdust (for animal bedding, landscaping, and firewood), green wastes and other organic material (composting or fertiliser), animal by-products (rendered for livestock feed), scrap metal (recovered for re-melting), and solids/sludges from dairy effluent treatment ponds applied to land (pasture fertiliser/conditioner).

This analysis does not address the question of how much in each of these or any other categories still remains to be captured, nor the efficiency of recovery within any

[3] Converted from litres to tonnes on a 1000:1 basis

category. For example, for tyres, anecdotal evidence is that within the region, demand for old tyres is still matching supply, and no third-party intervention is necessary to ensure tyre exchange proceeds adequately. Thus, there is both capacity for, and also implementation of, 100% recycling for the time being.

Table 2 Targets from the Regional Waste Strategy for Taranaki 2004 that are relevant to this study

Waste minimisation 1. By December 2005, Taranaki Regional Council will have investigated waste minimisation opportunities for the petrochemical and dairy industries and will report on findings to central government. 2. District councils will maintain the level of access of the population to community recycling facilities at a minimum of 95 percent[4]. The extent of the use of these facilities will be measured with a view to increasing the number of people using them and the volume of recyclables deposited, with the further objective of increasing the ratio of recyclables recovered (whether by kerbside or drop-off facility) to landfilled volumes. 3. Taranaki Regional Council will encourage the adoption of waste minimisation and management programmes and endeavour for at least 25% of all industrial operations to have addressed waste minimisation and management by December 2010. This may be done through informal means if there are no legal processes that allow this. 4. By December 2003 a Regional Waste Minimisation Officer will be funded to facilitate reaching the waste targets adopted by regional and district councils in Taranaki.
Organic wastes 1. By December 2003, Taranaki Regional Council, in association with the district councils, will establish programmes to analyse residential, commercial and rural waste. 2. The local authorities in Taranaki will continue to encourage diversion of garden waste from landfill so that by December 2010 the diversion of garden wastes from landfill to beneficial use will have exceeded 95 percent. 3. By December 2007, an analysis of residential, commercial and rural wastes will have been carried out by the Taranaki Regional Council in association with the district councils, and a clear quantitative understanding of organic waste streams will have been achieved. 4. The local authorities in Taranaki will continue to divert sewage sludge from landfill other than in the case of emergency or following desludging of oxidation ponds where high heavy metal levels make the sludge unsuitable for composting. However, if factors such as the local market for compost or treatment processes change and landfilling becomes the most appropriate means of disposal this policy will be reviewed. 5. By December 2007, Taranaki Regional Council along with the district councils will aim to reduce commercial organic waste going to landfill to 50 percent of 2002 levels. The Regional Waste Minimisation Officer working in association with the commercial sector will aim to achieve this target.
Construction and demolition 1. By December 2008, 95 percent of cleanfill will have been diverted from landfill and there will have been a reduction of other construction and demolition waste to landfills of 50 percent of December 2005 levels measured by weight. 2. By December 2005, through the resource consents process the Taranaki Regional Council will determine an estimate of the quantities of construction and demolition waste going to cleanfill. 3. Taranaki Regional Council will continue compliance monitoring of all cleanfills in Taranaki and will ensure, through the consent process, that only inert cleanfill material is being deposited at cleanfills and that the volume of waste being deposited is appropriate for each particular site.

[4] This target is for the Taranaki region. The large area and small, dispersed population of the Stratford district make the target of 95% of the district's population having "access" to facilities an unrealistic target. However, the Stratford district transfer station is open 7 days a week.

Special wastes

1. Taranaki Regional Council will conduct or participate in research into the dairy and petrochemical industry waste streams in Taranaki to obtain and make available information on volume and types of wastes arising and the disposal methods used. The Council will work alongside these sectors to encourage appropriate management of their wastes, with particular emphasis on special wastes.

Added November 2006

2. Local authorities in Taranaki will monitor the number of businesses and organisations in the region (excluding disposal points such as transfer stations, scrap metal dealers, and landfills) that take back waste electrical and electronic equipment.

3. By December 2007, local authorities in Taranaki will publicly promote businesses and organisations in the region (excluding disposal points such as transfer stations, scrap metal dealers, and landfills) that take back waste electrical and electronic equipment.

4. By December 2007, local authorities in Taranaki will publicly promote businesses and organisations that process end-of-life tyres for further alternative use.

5. By September 2007, local authorities in Taranaki will assess and consider possible drop off points for waste household batteries.

Hazardous wastes

1. Local authorities in Taranaki will, in a manner consistent with their statutory functions, be consistent with the national hazardous waste management policy and assist the government in meeting its targets in relation to hazardous waste.

2. District councils in Taranaki will continue to enforce the policy of non-acceptance of hazardous waste at landfills. They will continue to provide and maintain a dedicated hazardous waste collection area for drop-off of hazardous waste at major transfer stations and ensure that this waste is treated and disposed of appropriately.

3. Following clarification of the basis for the national target for recovery and recycling for priority waste streams, Taranaki Regional Council and the three district councils will, in a manner consistent with their statutory functions, endeavour to assist central government in reaching its target by December 2012.

4. All three district councils will maintain at least one facility within their district for the collection of non-industrial/domestic hazardous waste. These facilities will include a designated area for the drop-off of organochlorine pesticides and PCB-containing waste.

Table 3 Estimated current status and future outlook for recovery of waste types - summary

Category	Level of recovery/recycling currently	Opportunity for increasing volumes or proportion
Paper	low	good
Card	low	good
Agrichemical containers	low	good
Silage wrap	low	good
Other farm plastics	low	good
Shrink wrap	moderate	stable
Other industrial plastics	low	poor
Polystyrene	low	poor
Household plastics	low	good
Glass	low	good
Metals	high	stable
Electronic wastes-IT	low	good
Mobile phones	low	good
Timber, sawdust	high	stable

Category	Level of recovery/recycling currently	Opportunity for increasing volumes or proportion
Waste wood	moderate	good
Bark	high	stable
Green wastes-compost	low	good
Piggery manure - composted	moderate	stable
Other organic wastes	high	stable
Abattoir by-products	high	stable
Green wastes- mulched	moderate	good
Piggery manure-other	moderate	stable
Food wastes	low	good
Tyres	high	stable
Concrete and brick rubble	low	good
Roading	low	poor
Construction and demolition	low	poor
Engine oil	moderate	good
Oily slops	high	stable
Oil filters	low	good
Antifreeze	low	poor
Paints	moderate	good
Solvents	moderate	good
Vehicle batteries	moderate	stable
Farm effluent	moderate	good
Municipal wastewater sludges	moderate	stable
Drilling muds	high	stable
Hazardous including intractable	low	stable
Cooking oil	moderate	good
Grease traps	low	poor
Appliance batteries	low	poor

4. Paper and card

4.1 Paper

Approximately 1800 tonnes of paper is collected for recycling in the region. Paper is collected as part of mixed recycling (kerbside municipal, comingled bins at schools, and commercial) and in dedicated paper recycling bins, including bins for confidential paper.

Higher grade paper is exported, as is some mixed grade paper, and some mixed grade is recycled in New Zealand at Carter Holt Harvey's Penrose mill. One recycler commented that recovery of higher grade paper is increasing for the region. Mixed grade paper is expected to stay at about the same level as previous years, after recovering from a short term drop when prices were low last year. Another recycler stopped recycling paper altogether due to the price drop; quantities that used to be recycled by this business were not available.

The National Operations Manager of one of the larger recyclers commented that they could easily take double the amount of recycled paper from the region. New Zealand and overseas mills require recycled fibre, both paper and cardboard. Despite the recession, this recycler expects its New Zealand mills to need more fibre as the year progresses. The more pressing issue seems to be collecting sufficient paper and cardboard to supply the demand.

Recyclers were unable to estimate what proportion of the total paper being disposed of was being recovered for recycling. One suggested the only way to know would be to analyse what is going in the landfill, as circumstances vary so much from region to region that landfill analyses from other regions are not likely to be useful. Indications from the work the Waste Minimisation Officer was doing with businesses were that although more and more people are interested in recycling, there would still be only a minority of businesses actively recycling paper so therefore there is still considerable scope to increase recovery. The same comments probably apply to cardboard. See the following section for a comment on the amount of paper and cardboard being landfilled in 2005.

There can be a quality issue where paper is collected as part of a mixed recycling collection, especially where loads are compacted, as some of the glass breaks and splinters of glass contaminate the rest of the recycling, especially the paper. This reduces the quantity of both paper and glass able to be recycled. Several potential solutions were suggested, including sorting on the street, as happens in some recycling collections in other parts of the country, or installing expensive conveyor equipment. Lower compaction rates and/or separate or no collection of glass might also be part of the solution, but the first two options would add cost to the collection.

A further issue to be resolved is contamination of paper in municipal wheelie bin recycling collections in some parts of South Taranaki District by non-recyclable materials like garden hoses, computers, printer cartridges and old vacuum cleaners. This is currently being managed by contacting any identified offenders; an educational campaign is also being planned. One of the barriers to a more timely resolution of this problem appears to have been that there is no direct channel of communication between the people who sort the recyclables, and the district council officers who have the responsibility for educating householders about what is acceptable.

4.2 Card

Approximately 4500 tonnes of cardboard are recycled from the region each year, from four recyclers. The majority of cardboard for recycling is collected from businesses in dedicated cardboard cages, and in some cases is baled at the site where it is generated. In addition some waste operators extract cardboard from rubbish loads, for example, the New Plymouth Transfer Station (see Appendix I). The presence of a new recycling business in the region in the last few years is likely to have increased the overall amount of material collected as they have been actively pursuing new customers, some of whom were not already recycling.

Although one operator noted that volumes went down last year when commodity prices dropped, they appear to be recovering to previous levels.

Cardboard is recycled within New Zealand (Carter Holt Harvey mills) or overseas. As for paper, New Zealand and overseas mills require recycled cardboard, and within New Zealand at least, the amount needed is expected to increase this year. There does not seem to be any issue of this industry not being economically sustainable.

As noted in the paper section, one of the major collectors could accept double what they already receive from the region. Again, recyclers were unable to estimate what proportion of the total cardboard being disposed of was being recovered for recycling, although one commented that he believes there is more able to be recovered. For the reasons given in the paper section, the only way to know would be to analyse what is going into the landfill; see below for an indication of this.

About one-third of the wastes entering Colson Road landfill are from kerbside collections. From an analysis of kerbside wastes entering the landfill in 2005, 20% was paper and cardboard (i.e. excluding paper and cardboard separated by householders). Using this data, around 4,200 tonnes of paper and cardboard will still be entering the landfill as un-separated paper and cardboard from households. This excludes any consideration of waste composition of transfer station and commercial waste loads. Even on this rudimentary analysis, there is scope for enhanced recovery of paper and cardboard.

5. Plastic

5.1 Agrichemical containers

There are likely to be tens of thousands of these being disposed of annually in the region (estimate by Bruce Emerson, 3R), covering substances such as dairy shed sanitizers, agrichemicals (weedkillers), and animal remedies. At present the sole route for commercial recycling of these is 3R's Agrecovery Containers scheme, which has collected approximately 2000 in its first 18 months of operation at Waitara and 6 months at Hawera.[5] The containers are being recycled through Astron Plastics, a company with factories in Auckland, Christchurch and Australia.[6] There does not seem to be any issue with the recycler absorbing an increased supply of containers. In addition, farmers probably re-use a few containers around their farms.

One of the major barriers to increased collection is farmer participation; another is the cost of accepting containers from non-participating companies. Membership by producer companies is voluntary. Containers from member companies are accepted for no charge, but containers from non-member companies attract a fee of $4.50 per 20L (container size). (See Appendix II for a list of member companies as at July 2009). Changing attitudes to disposal of on-farm waste takes time, however the programme is seeing substantial growth in participation across the country as programme recognition grows, the collection network improves, and more brand owners join, increasing the number of containers eligible for free take back.[7]

The dairy hygiene sector in particular has been slow to engage with Agrecovery, with the first exclusive dairy hygiene company only joining on 1 July. A key supplier of animal health remedies distributing solely through veterinary clinics has also recently joined the Agrecovery programme. These two companies should make a difference to collections in Taranaki as these products will be a major source of containers needing disposal in the region. Both are also influential in their respective fields and so rival companies may follow their lead and join the programme.[8]

A rural spray contractor who supports the scheme recently decided to 'vote with his feet' by not purchasing products from one of his chemical suppliers until they join the scheme.

A second collection service is being planned by a different company, Agpac, which already offers farmers a silage wrap recycling service (see below). This will use the same liners as the silage wrap, with the only cost being the purchase of the liner ($15). About 200 containers of varying sizes will fit in a liner if they are squashed first, e.g. by running over with a tractor. Agpac operate a similar collection in the UK.

There is no indication that the accumulation of these containers is causing a problem as yet, although comments about wanting some sort of disposal option have been voiced from time to time.

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[5] This is a nationwide rural recycling programme for the recovery of agrichemical plastic containers, www.agrecovery.co.nz , www.trc.govt.nz/environment/waste/plastics.htm#plastics. More sites are being planned.

[6] The plastic is supplied chipped to Astron, which granulates and extrudes it for use in making other products. www.astronplastics.co.nz/index_nz.html . Accessed 22 April 2009.

[7] T. Bye, 3R Group, pers. comm., 27 July, 2009

[8] See previous

5.2 Silage wrap

There are currently three avenues now in existence for farmers to recycle silage wrap. (Until recently there were none). One is the scheme set up and run by Agpac, one of the main wrap producers. Four agricultural contractors are agents for the scheme, which provides coverage for much of the region.[9] Farmers need to purchase a liner ($15), which holds 150 to 200 wraps; and there is a collection charge of $40 per liner. The use of a bin (a one off cost of $530) maximizes the number of wraps which can be fitted in a liner. Another service is provided by a South Taranaki recycling business. Farmers can drop off wraps at a small cost, currently $5 per bag of wraps (woolsack sized). The third service, Agrecovery: Wrap, was launched in April this year by 3R. It is more expensive per wrap than Agpac, but might suit farmers with small numbers of wraps (a pack of 5 bags is $60, holding 60 wraps in total). There is no need for a bin. Bags can be purchased either via their website or from local farm suppliers. Full bags will be collected, with the timing of collection events being dependent on volumes ready for collection in the region. There may also be a drop off site in Taranaki. Given the recent start up of this scheme it is not possible to comment on how successful it will be.[10]

The estimated weight of wrap used annually in New Zealand is about 4000 tonnes, although annual and regional totals vary depending on grass production, which has been good this year for all the major wrap using regions except Canterbury. Taranaki has 19% of New Zealand's dairy cows, so a reasonable assumption is that we use the same percentage of wrap, i.e. around 760 tonnes.

Approximately 50 tonnes of wrap was collected over the last season by the existing providers in the region. Although this is still only 7% of the total, it is a big increase on the first 2 seasons when only about 10 tonnes was collected.

Photograph 1 Sharemilker Greg Topless storing silage wrap for recycling. Photo credit: Rob Tucker

Contamination with net wrap[11] is an issue for the success or otherwise of silage wrap recycling, and promotional material needs to emphasize that this cannot be recycled.

[9] agpac.co.nz/products.php?cid=14&type=P ; www.trc.govt.nz/environment/waste/plastics.htm#agpac

[10] www.agrecovery.co.nz/index.php?option=com_content&view=article&id=107&Itemid=28 ; www.trc.govt.nz/environment/waste/plastics.htm#agpac ; and B. Emerson, Director 3R Group Ltd, pers. comm. 30 April 2009

[11] Technically net wrap is recyclable but it is too closely associated with the wrapped material, e.g. hay, to currently be feasible.

Closing the loop: One of the agricultural contractors involved in Agpac's silage wrap recycling scheme has a bin for his truck which is lined with a New Zealand made recycled plastic, a substitute for plywood. Although made from milk bottles at present, in future it could be made from silage wrap, so is an example of what closing the recycling loop could look like. Wrap collected by Agpac is recycled overseas.

5.3 Other farm plastics

Other plastics like bulk polypropylene feed bags can also be collected by Agpac for recycling, and this is promoted by them. [12]

5.4 Shrink wrap and other plastic film

Shrink wrap is used to stabilise pallet loads of materials. Several businesses offer a recycling collection for this in the region, with recent annual totals being around 100 tonnes. As for the comments above under 'cardboard', the presence of a new recycling business in the region in the last few years is likely to have increased the overall amount of material collected, as it has been actively pursuing new customers, some of whom were not already recycling.

Some of this is processed overseas where it is made into pellets for the manufacture of other plastic items, and some is recycled within New Zealand.

A significant amount of a plastic film known as 'rubbish plastic' is also being collected by one recycler, and is baled with another compatible plastic. Amounts are confidential.

Again, it is impossible to know how much of this material is being landfilled, without doing a landfill analysis, but in general this material tends to be generated in large quantities by relatively few businesses so is easy for recyclers to target.

A sawmilling company contacted for this report recycles plastic wrap. They bale and freight it at their own expense to the nearest transfer station (Hawera). This business would like to see Council provide a recycling service for materials like this as part of the services provided by rates.

5.5 Industrial plastics other than shrink wrap

Several of the larger businesses contacted recycle other plastics. One recycles some through its head office in Auckland, and is looking into other plastic waste being recycled (these are rigid plastic items which might be chipped for recycling). A large manufacturing business surveyed recycles about 300m^3 a year of various plastics generated as part of their processes. Previously these were landfilled. They are sent to a New Zealand plastics recycler which makes a range of domestic and industrial products, e.g. buckets, electrical conduits, cable covers.

A common plastic waste which does not seem to have an avenue for recycling is polypropylene strapping. In the course of gathering information for the report, one business commented that plastic strapping is an issue for them and they have not

[12] agpac.co.nz/products.php?cid=14&type=P . Accessed 22 April 2009

been able to find an avenue to recycle it. This is also an issue that has been raised previously with the Waste Minimisation Officer. Quantities are not known.

One large Taranaki business has plastic containers to be disposed of, some of which are suitable for reuse. It is understood these are being chipped, or are to be chipped, for recycling, although a staff member is also endeavouring to find avenues for them to be reused instead, and contacted the Waste Exchange about this.[13] (See Appendix III on the Waste Exchange)

5.6 Polystyrene

An unknown amount of polystyrene is being accepted for recycling by two collection providers in the region. It is understood that one of these is stockpiling material collected pending further developments.

This material is often mentioned as a problem to the Waste Minimisation Officer. Although it is technically feasible to recycle it, the low weight to volume ratio creates issues for transporting it to recycling facilities, and very little is known to be recycled from the region.

5.7 "Household" plastic containers

Plastic containers types 1 and 2 (for example soft drink and milk bottles), are collected for recycling through a number of routes: municipal kerbside collections, school recycling bins, commercial recycling collections, and drop off centres at council transfer stations and a private recycler.

Annual amounts are estimated to be 130 tonnes of type 1 and 190 tonnes of type 2, although some weights are not known. Recycling of these appears to be economically sustainable. Amounts landfilled are not known.

In addition, types 3 – 7 are also accepted at the New Plymouth Transfer Station, but weights are not known, and the economics of this might soon no longer be viable.

[13] M. Tyler, Environment Waikato/ Waste Exchange, pers. comm., 5 May, 2009

6. Glass

About 1140 tonnes of glass a year is recycled through O-I, which is both the only glass manufacturing company in New Zealand and the only outlet for glass recycling from Taranaki. O-I makes glass from raw materials and also adds recycled glass to the virgin material in its furnaces. It recently gained resource consent to open a third furnace, and has since removed the quotas which had been used for many years to control the amount of glass accepted from various parts of the country. The quotas were a result of there being more glass available than could be used. Prior to sending to O-I glass has to be separated into different colours, which in the past attracted different prices; and broken glass below a certain size is not accepted.[14] Since removing the quotas, the same price is paid for all colours. It is unclear what difference if any these changes will make to the volumes of glass from Taranaki.

The price paid currently only covers the freight costs; in the recent past, one grade was even being shipped at a loss. While this is not ideal economically, the business has a contractual obligation to recycle glass collected in municipal recycling.

About 30% of the glass collected for recycling is rejected at the sorting stage by the recyclers and sent to landfill. This is due to breakages caused both by handling (the more times it is handled, the more breakages will occur); and compaction in the collection trucks.[15] Broken glass is a quality issue, as pieces below a certain size are rejected by O-I, and a safety hazard. In addition, glass shards cross-contaminate other recyclables. This is a particular issue for paper and is covered in that section of this report; some of the possible solutions to improve paper quality would also increase the amount of glass able to be recycled by reducing breakages, i.e. sorting on the street, or lower compaction rates, or separate collection.

Glass collected at the New Plymouth Transfer Station recycling station is being used as aggregate on landfill roads; quantities collected are not recorded.

Glass is not being accepted by private recyclers in South Taranaki as it is not economic for them to freight it to Auckland at the price they were getting, and they are not permitted to take it to the Council Transfer Station. Any they do receive is sent to landfill.

No information is available on total quantities landfilled; again, the only way to know would be to analyse what is going in the landfill. One recycling operator commented that when the price for glass was subsidized by the government for a limited time about 4 years ago (recyclers received $95 a tonne, higher than they now receive), much more was being recycled. Some of this could have been coming from outside the region, but no information was available on how much.

[14] For a summary of pretreatment of glass collected for recycling see www.recycleglass.co.nz/glassmaking.htm. Accessed 25 April 2009

[15] A lower compaction rate reduces the problem, but this would increase the collection costs as less can be carted in each load

There are two identified potential local uses for glass collected for recycling: crushing for use in roading aggregate, and crushing for sandblasting. These are both 'downcycling' rather than true recycling as the glass is crushed and used for purposes other than making more glass.

This keeps it out of the landfill, and replaces other materials that therefore do not need to be extracted, processed and transported, so is more acceptable environmentally than landfilling, but a full life cycle analysis would be need to be done to properly assess the environmental costs and benefits.

Crushing for roading aggregate requires fairly basic systems using standard aggregate crushers. This is being done in several places in New Zealand: Palmerston North, where it is added at 5%, and Marlborough, where it is added at 2%. The lower percentage is used in a process that requires reduced handling. Handling and transport are the main factors influencing whether either of these are economic. There is minimal if any transport involved in some cases as the aggregate sites are adjacent to two of the recycling centres; in one case glass is transported across town, but this is still economic as the combined cost of transport and acceptance fees is less than landfilling costs.

Producing glass for sandblasting is more involved, requiring sand of particular grades. Meta NZ in Christchurch has been doing this for some years. A local sandblaster has expressed interest in pursuing this. The sand he currently uses is imported from India. The equipment needed is a hammer mill crusher fitted with appropriate screens. Waste Management has purchased a crusher but this is not yet operational. Taranaki Recyclers are keen to trial either or both of these options.

7. Metals

In general, responses from this industry to the survey were positive in terms of likely growth in demand to accept material, capacity to handle it, and demand for the product. The main impact of the recent economic downturn seems to have been on the price of steel. For example, heavy gauge steel had reached record high prices before the downturn, and is now back to where it was before those high prices. When the price was high there was an increase in the volume of steel being recovered for recycling, with one operator commenting that farmers had been digging it out of farm pits and bringing it in.

It still appears to be worthwhile for scrap metal dealers to collect all the types of metal they were collecting, but to pay less for them, or in some cases e.g. light grade steel, to collect it but not pay for it.

The scrap metal industry in Taranaki is dominated by two big dealers. The majority of scrap metal is collected by these two companies, either directly or through buying it from smaller dealers and waste operators who separate some metal from rubbish skips. Approximately 17,000 tonnes of ferrous steel are recycled from Taranaki annually through these two businesses. Of this, the heavy gauge steel is exported to South Korea, and light gauge (e.g. cars, washing machines, fridges) either exported or recycled within New Zealand at the Sims Pacific smelter in Auckland. Sims shred the cars, and some materials are separated automatically for recycling, e.g. some plastics.

Photograph 2 Cars about to be crushed for recycling. Photo credit: Rob Tucker

The quantity of non-ferrous metals (stainless steel, copper, aluminium etc) is far smaller, probably under 1000 tonnes,[16] and is sold wherever the price is best, sometimes within New Zealand, sometimes overseas.

[16] It is difficult to be more precise despite the majority again going to the 2 big local dealers, as these metals are also often sold by smaller dealers to other dealers out of the region

Metal working companies and plumbers were also surveyed, with the majority disposing of all scrap metal to scrap metal dealers, although they are not paid for steel and in one case drop this off instead of the dealer coming to them. One of the plumbers had been sending steel to landfill as the scrap dealer was no longer collecting it, but was interested to find out they might be able to drop it off at a scrap dealer instead and will be following this up.

Some of the other businesses contacted for this report such as sawmills also commented that they recycled steel (e.g. old machinery, steel strapping, paint drums).

The New Plymouth Transfer Station, the Stratford Transfer Station and some other waste businesses are extracting scrap metals, including whiteware, from uncompacted rubbish loads. The scope of this activity is limited by the availability of staff time, the volume of waste being handled, and the fact that some waste goes directly to landfill. (See Appendix I)

No information was available for the quantities of scrap metals being landfilled. As previously noted, the only way to know this would be to analyse what is going into the landfill. Given the increase in activity noted by one of the scrap dealers when prices were higher, it seems a reasonable assumption that recovery rates as a proportion of the amount available went up over that period. Now that quantities recycled have dropped back to more 'normal' levels, the reverse is likely to be occurring, i.e. recovery rates have dropped, and more is being landfilled.

One of the metalworking companies in the region produces furnace ash containing aluminium and is able to sell this overseas.

Various 'problem' wastes are also produced by some companies working with metals, and these are dealt with under a separate heading.

8. Electronic wastes

8.1 Computers, televisions and related equipment

Globally, electronic waste (e-waste) is recognised as the fastest growing waste stream, driven by the downward pressure on pricing and increasingly rapid product innovation. It is also known to be hazardous, containing substances such as mercury, cadmium and lead. E-waste is an issue for New Zealand as no suitable recycling plants are available. Some computer and television suppliers are developing product stewardship schemes, although unless all suppliers are included such schemes are unlikely to be very successful. It is possible that e-waste could be made a priority product under the Waste Minimisation Act, although the Ministry for the Environment's recent 'Discussion Document' on the Act does not recommend this. Even if this changes, it is still likely that any such scheme will take some years to be fully implemented.

The reasons for e-waste being made a priority product for a product stewardship scheme include

- "The move to high definition digital TV, flat panel monitors and laptops, including the new category of netbooks, will continue to drive the growth in e-waste.

…

- At least 95% of the materials used in computers and related products can be recovered for reuse with proper recycling processes.
- Computers contain both hazardous materials and scarce precious metals, both of which should be recovered for either safe disposal or for reuse. Inappropriate computer recycling processes endanger people's health as well as the environment.
- Supplies of some of the materials used in the production of computers are limited and are projected to be fully depleted within just a few decades; it makes no sense to landfill these scarce materials.

…

- eDay is a practical short-term solution for awareness-raising in dealing with computer waste, but currently addresses less than 10% of the annual quantity of imported computer equipment; it should not be advanced as a reason for giving less priority to e-waste.
- eDay has demonstrated that the New Zealand public is seeking to 'do the right thing' by recycling their e-waste responsibly, but have limited current opportunities."[17, 18]

[17] Computer Access NZ. (2009). p 2
[18] www.eday.org.nz/about-eday.asp . Accessed 27 April 2009

In the interim, eDay provides a way for households and community groups to safely recycle computers and mobile phones. Equipment collected on the day is exported under the Basel Convention to accredited international recyclers who are able to recover as much as 95% of the materials from the computer equipment.[19, 20] In Taranaki 856 cars dropped off an estimated 39 tonnes during the 2008 event.

Photograph 2 Cars queuing for eDay 2008 in New Plymouth

Businesses needing to dispose of e-waste are directed to a list of recommended computer recyclers on the eDay website. In these cases, the combination of acceptance costs and freight from Taranaki is likely to be a significant barrier. Some suppliers advertise that they have take-back schemes, but these are generally limited to the main metropolitan areas.

Some of the reasons why eDay is only an interim measure are that it relies on volunteers and on local and national sponsorship support to cover the costs of national promotion, e-waste transport and recycling; and because of this it can only deal with a small proportion of total e-waste. Some costs can be recovered from the sale of recycled materials but these are not sufficient to cover all eDay costs. The total cost of eDay 2008, including in-kind and voluntary effort, was just over $1 million, to collect approximately 946 tonnes of material. Based on the volume of e-waste collected in Taranaki, running an event such as this without voluntary and national eDay support would have cost the region approximately $44,000.[21]

An unknown quantity of computer equipment is disposed of to landfill in the region. For example, two computer sales and repair businesses contacted estimated that they would dispose of 14 m^3 of computer equipment a year. One resells any working monitors that they can; one was aware of eDay and recommends to people making enquiries about disposal that they could keep their items until then, although many people are reluctant to do this. One of the scrap metal companies accepts computers for disposal, but not monitors due to lead in the glass. This business shreds computers and sells the shredded material to China for recycling.

[19] www.mfe.govt.nz/laws/meas/basel.html. Accessed 27 April 2009
[20] L. Zwimpfer, eDay National Organiser, Computer Access New Zealand (CANZ). Letter to Chief Executives of councils which participated in 2008 (in Taranaki this was all three district councils, New Plymouth, Stratford and South Taranaki), 14 April 2009.
[21] Refer previous footnote

Larger businesses sometimes make arrangements with IT providers to remove their old IT equipment during upgrades. Sometimes this will be recycled, sometimes not. For example, both of the companies referred to previously sell small numbers of second hand, ex-corporate computers sourced from an Auckland supplier. No information was available on what proportion of redundant equipment is recycled.

An informal route in the region for diverting unwanted computer equipment for reuse is Freecycle, a web-based resources exchange which aims to 'keep good stuff out of landfills'.[22] The Taranaki Regional Council has made use of this to successfully divert surplus to requirement (but still working) computers and monitors.

Televisions are another large component of e-waste. They are not included in eDay collections for various reasons, including that eDay is intended to provide a conduit with environmental integrity to dispose of obsolete computer equipment. Accepting televisions may meet a need but it moves beyond the focus of eDay. Televisions also tend to be larger and more difficult to handle than computer monitors.

The imminent switch off of analogue TV broadcasts, expected to be no later than 2012, is only going to exacerbate the problem of televisions needing disposal.[23] Although current disposal figures are not available, an indication of the scale of the problem is that New Zealand already imports an estimated 300,000 TVs every year, twice as many as computer monitors. It is not known how many of these are the older cathode ray tube (CRT) models, but in 2006, there were an estimated 10 million CRTs in New Zealand homes and businesses in both TVs and computer monitors. The great majority of these CRTs have not yet entered the waste stream.[24] It is predicted there will soon be a large increase in the number being disposed of, due to both the analogue switch off and continuing price reductions for space-saving flat screen TVs and monitors. Flat screen models will also be entering the waste stream as a result of continuing innovations. These also contain toxic materials, for example mercury, and scarce metals like indium.

There is no established avenue for recycling televisions, but major retailers and producers have proposed a levy of about $30 on imported televisions as a mechanism to pay for the cost of recycling. The next step is for the Government to identify TVs as a priority product under the Product Stewardship provisions of the Waste Minimisation Act. If this is done, a period of consultation will then follow before finalising the payment and collection system, and implementing it by regulation. Without regulation any such scheme would be voluntary, and as such is highly unlikely to succeed. Currently the Ministry of the Environment is in the process of assessing submissions on the Discussion Document on the Act. Decisions on priority products will come out of this. Even if TVs are identified as a priority product, it is likely to be at least a year after this before any scheme is in place.[25, 26]

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[22] au.groups.yahoo.com/group/newplymouthfreecycle/ The group covers the whole of Taranaki
[23] Ministry of Culture and Heritage. (n. d.)
[24] Refer footnote 17. CRTs present the most serious problem. The estimated lead content in NZ's CRT stock in 2006 was 20,000 tonnes.
[25] Product Stewardship Foundation. (n. d.). Summarizes the position of TV retailers just before the Waste Minimisation Act came into place
[26] O. Cox, Ministry for the Environment, pers. comm., 23 June, 2009

8.2 Mobile phones

Although the two main suppliers of mobile phone services each have a take-back system[27] in place for handsets, chargers and batteries, with stores which supply these also accepting returns for recycling, this is not well used. Some indication of the success of take back schemes is provided by a survey conducted by UMR Research for the Ministry for the Environment. In answer to the question "What did you do with the old mobile phone?" for those who had replaced their phone, only 7 percent said that they returned it to a shop for disposal. Fourteen percent had dumped it. [28] Estimates of annual returns to several local outlets support this indication of limited returns, with one reporting only about 200 items a year, the other about 400.

In a relatively new venture, Starship Children's Hospital is also collecting mobile phones as a fundraiser. The hospital gets a dividend from a company refurbishing old phones for use in developing countries. Phones from the Telecom take-back scheme are given to Starship, and Telecom stores also have Starship envelopes so customers can send their own phones directly to Starship. The number of phones collected under this scheme is not known.

What is known is that there is a large turnover of this equipment, for example industry analysis suggests the 18-25 year old age group change their phones every 12-18 months. In addition, Telecom's recent launch of its new network is expected to result in an estimated 300,000 phones being discontinued; and the growing use of mobile broadband with associated new equipment for increased broadband speeds will result in yet more redundant consumer equipment. This suggests a significant opportunity and a lot of unused phones in storage, with perhaps their small size being the only reason they have not been discarded.

One of the reasons mobile phone equipment should be recycled is to recover the metal content:

> *"A mobile phone for example can contain over 40 elements including base metals (e.g. copper, tin), special metals (e.g. cobalt, indium, antimony), and precious metals (e.g. silver, gold, palladium). The majority metal is copper (9 g), while the precious metal content is in the order of milligrams only: 250 mg silver, 24 mg gold and 9 mg palladium. Furthermore the Li-Ion battery contains about 3.5 grams of cobalt. This appears to be very little, but with 1.2 billion mobile phones sold globally (2007) this leads to a significant metal demand."*[29]

An issue raised by the industry regarding low recycling rates was the complexity caused by having large numbers of suppliers. For example, Telecom phones are sold through at least five outlets in New Plymouth alone. It was suggested that centralised undercover collection and storage points at transfer stations for e-waste might help with the problem of getting equipment returned and also provide an aggregation point for recycling.

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[27] Some equipment is sent to California for recycling; some is refurbished for use in the developing world
[28] UMR Research Limited. (2006)
[29] Refer footnote 17, pp 7-8

9. Untreated timber, sawdust, wood shavings, bark, chip, waste wood

9.1 Sawmills and other timber processors

Almost 50% by weight of raw logs processed at sawmills becomes waste as sawdust, chip, bark and shavings; when undressed timber is further processed by defecting and profiling, 30% becomes waste, as rippings and shavings.[30]

Some of these materials are sold for other uses, including paper making, animal bedding and firewood. The amount known to be recycled in these ways is 12,700 tonnes a year. This is a minimum only as some information was not available (for example, amounts used to fire boilers for wood drying kilns) and excludes bark sold to specialist bark companies as this is covered in that section of this report. It also includes material from logs sourced from outside Taranaki. An unknown amount of wood shavings used for animal bedding is potentially double counted in Section 10.3 (after use as bedding they are then applied to land with or without prior composting.)

In some cases sawdust, bark and shavings are cleanfilled; some is also burnt in waste pits. A small amount of waste is landfilled, for example rippings from one business which until recently burnt these in a waste pit, and treated shavings. Cleanfilled and landfilled amounts are estimated to be about 4800 tonnes a year. Distance from markets is one reason for cleanfilling materials instead of diversion to reuse, as is the capital cost of installing solid fuel burners for sawmills which do not already have this. [31]

Ideally materials currently cleanfilled would fuel a solid fuel boiler for wood drying kilns, as this would reduce running expenses for the facility as well as reducing waste volumes.

Wood chip produced as a waste in the process is either used to fire the boilers if the business has solid fuel burners, or sold for paper making.

Waste can be reduced by investing in new technology, e.g. one sawmill has reduced waste timber to firewood by 8% with new cutting technology, and is always ready to investigate new technology to improve efficiencies and reduce waste.

One timber processor commented that they have no trouble selling shavings for animal sheds, and that there is a shortage of shavings in the upper part of the North Island. This is probably due to other sawmills now burning them as fuel for their kilns. The high cost of fossil fuels appears to be driving this.

Firewood is also a by-product from two of the three businesses which provided information for this section, with offcuts of untreated timber being used, either directly by staff or by firewood retailers.

[30] Based on information supplied by three of the four sawmills and timber processing companies contacted

[31] Solid fuel burners reduce running expenses, but the capital cost is too great a barrier in the current economic climate.

The three businesses also recycled other materials and this is noted in the relevant sections of the report.

None of these businesses indicated that the disposal of wood wastes was causing them a problem or was likely to cause a problem over the next five years.

9.2 Other waste timber

Taranaki has one significant pallet manufacturing and refurbishing business. This generates a large volume of waste wood, estimated at about 1000 tonnes a year, most of which until recently has been burnt off site. A small amount, perhaps 25 tonnes a year, had been taken by staff or the public for firewood, mostly over the winter. The manager recently began a trial to divert more waste wood to firewood. Nailed sections are cut out and the remainder is cut into firewood lengths for sale to the public. Not only has this cut waste to on-site burning by 85%, he has also had people thanking him for doing this. The trial will be evaluated at the end of June, and will take into account avoided disposal costs.

The level of generation of waste wood is expected to stay about the same over the next few years, although this depends on the economy. The only issue foreseen with the current arrangement i.e. burning waste wood, is the cost to the business in a tighter economic environment.

Various other options to reduce the amount of waste wood have been investigated including mulching for use as cleanfill cover (not allowed under the conditions of the relevant resource consent), wood pellet manufacture for pellet fires (the plant that does this would be a large capital outlay), and denailing and mulch for use as garden mulch (similar to the process used by an Auckland company, Reharvest). Freight costs to transport waste wood to Reharvest mean taking it there is uneconomic.

Waste timber from a cable manufacturer has recently reduced considerably due to employing someone to repair cable drums, and also utilizing another company to repair pallets. This respondent also commented that their parent company in Europe has high environmental standards and that they expected some changes to management in this area after an audit due in the near future.

It is thought that by far the majority of products transported into Taranaki on pallets use reusable pallets, with an estimate of one-way pallets coming into the region being less than 100 a week. Some of these are cut up for firewood but possibly less than 10%. [32]An unknown quantity of pallets is landfilled or cleanfilled.

Some rubbish contractors and transfer stations separate wood from rubbish loads or collect it separately from other waste. This has a variety of end uses, from firewood to small scale carpentry projects; and untreated timber can be cleanfilled.

The New Plymouth Transfer Station for example, sells denailed reusable timber salvaged from the dumping pit. Salvaging and denailing are dependent on staff having the time available.

Demand for this timber is greater than the supply, with the racks typically being

[32] M. Holdin, Manager, Timpack , pers. comm., 2 June, 2009

emptied by mid-morning on a Saturday. No information was available about what proportion of timber dumped at the transfer station is salvaged. Salvaging from loads going directly to the landfill is not possible for safety and site management reasons; the amount of reusable timber in these loads is not known.

The manager of the Stratford Transfer Station also diverts wood for firewood or building or other purposes. Again, quantities are not available, but total quantities of all materials diverted are around 100m3 a week.[33] (Refer Appendix I)

9.3 Bark

Two bark processors were identified and contacted, along with two retail outlets. About 4000 tonnes are known to be processed annually, 2800 tonnes of which are sourced from within the region.

Products include graded barks for landscaping and playgrounds, potting mixes, including specialty orchid mixes, and compost.

There appear to be no issues with either processing capacity or demand for the products if more bark becomes available. One business commented that it was very hard to know what the next five years would bring in terms of demand but that they expected to be able to meet any increase.

For some types of product, demand is higher than supply, with one processor and one retailer commenting that bark is in short supply. Reasons given were that more sawmills are now burning bark in solid fuel burners and more logs are peeled on site. The cost of transport to bring bark in from out of the region was also cited as a constraint as was the tendency of sawmills to deal only with the transport firms that hauled their logs.

Product is supplied both in bulk and bagged, to a variety of end users (landscapers, nurseries, retail outlets, home gardeners and orchid growers).

[33] Taranaki Regional Council (2009); and C. Holgate, pers. comm., 29 May, 2009

10. Organic wastes

10.1 Composted green waste

Commercial composting of green waste is carried out by four operations in the region. Two of these only compost green waste, one composts approximately 50:50 green waste and animal shed manures, and the fourth composts a combination of materials of which green waste and wood shavings together are about 25% of the total.

In total, about 7000 tonnes of green waste and wood shavings are composted in commercial operations in the region annually. (Animal shed manures and other materials are covered later in the report). A further 360 tonnes of green waste is used annually for dune stabilization, a form of passive composting.

An unknown amount is also composted in non-commercial settings, for example Taranaki Regional Council is estimated to make 11 tonnes of compost a year from green waste generated within its regional gardens at Tupare and Hollard Gardens. This is all used at the sites where it is made.

Green waste is supplied to composters by garden and tree contractors, householders and businesses delivering green waste to transfer stations, and through the relatively recent kerbside collection offered to residents in South Taranaki collection areas.[34] In addition, one waste contractor is separating green waste from other material in privately contracted skips, having it mulched[35] and supplying it to one of the compost operators, and another diverts it from landfill to dune stabilization.

It is not known how much green waste is landfilled.

Photograph 3 View of Return2Earth's composting operation

[34] This uses an 'opt-in' system. It has been very successful, both in terms of uptake and in terms of capture of material, some of which would previously have been landfilled. Overseas research indicates that green waste collections generally also capture material that householders would otherwise manage themselves, e.g. on their own properties.

[35] By a mobile mulching operation which travels around the North Island; this is also used by some of the composters

Deliveries of 'pure' green waste to sites that accept both rubbish and green waste are generally encouraged by lower charges for green waste.

For example the New Plymouth Transfer Station charges $19 for a trailer load of green waste compared to $30 for rubbish or mixed loads, about 63% of the cost for rubbish.[36] This is further encouraged by giving householders who arrive with mixed loads the opportunity to separate the green waste and pay less for that. Some people take up this offer, some do not. Green waste that is not separated from rubbish before dumping in the pit is landfilled. No information was available on what quantity or proportion of the total this might be. As previously noted, the only way to know this would be to analyse what is going into the landfill; this would also establish how much green waste is in loads which go directly to landfill. For example, anecdotally it is known that some householders with MGB collections will fill them up with green waste if space is available, so as not to 'waste the space'; the same occurs with black rubbish bags but probably to a more limited extent due to the smaller receptacle size.

The composter operating on the landfill site is accepting green waste for no charge, and is even paying a small amount for mulched material. These direct deliveries are limited to customers not already using the transfer station.

There appears to be no shortage of demand for the end product, indeed all four commented that they were either experiencing 'good' or 'increasing' demand. There are also no major constraints to these businesses growing (in one case, the raw material might need to be mulched as the texture of the end product is possibly inhibiting demand), although market recognition and supply were mentioned as issues.

There are some issues with weedy material not being accepted by some composters due to quality issues, and with fibrous material (e.g. flax, ponga, and cabbage trees) not being accepted because it requires a type of mulching equipment which is not available in the region. No information was available on quantities landfilled as a result of these problems.

The products are largely sold in bulk, with the larger operations mostly selling directly to farmers for arable cropping and other agriculture, and the smaller ones selling the majority of their product to domestic gardeners. One operator uses a significant proportion of their total for their own use.

A wider environmental issue associated with the landfilling of green waste and other organic materials is the generation of methane, a highly potent greenhouse gas produced when organic materials decompose anaerobically, as they do in landfills. No or little methane is produced when green wastes are composted under properly controlled conditions. Further to this is the potential financial impact an emissions trading scheme might have, if capturing such methane generation.

[36] The differential is greater in some places, e.g. the cost for green waste delivered by householders to Hastings district transfer stations is less than half that for rubbish, providing even more of an incentive to deliver separated green waste. Initially there was a problem with rubbish being hidden in the vegetation, but after a 3 month campaign of checking green waste loads this was resolved. R. How, pers. comm., 26 May 2009

While the current national scheme is far from settled, it is possible that allowance might be made for landfills which are able to demonstrate low acceptance rates for organic materials.

Comments made in response to a question about how composting businesses might be able to further assist waste minimisation in the region included:

- composting of household kitchen waste (commented on later in the report)
- better green waste collection systems
- growing the awareness of the composting facilities available
- ban green waste and lawn clippings from kerbside municipal rubbish collections (except for invasive weeds), to encourage or force property owners to seek alternatives

10.2 Composted piggery wastes

Two piggeries contacted compost effluent solids. In addition, effluent solids from one of these are applied to land directly. Total annual amounts of effluent solids diverted are estimated to be 330 tonnes. Of this total, 140 tonnes of uncomposted solids are applied directly to land, with the remainder being composted.

In one case, the solids are mixed with sawdust then composted under cover; in the other solids are composted without any additions, initially in windrows, then heaped up and put under cover. The demand for the composted product is good, and could be grown if necessary, e.g. by advertising. A total of approximately 370 tonnes of compost is produced annually.

One piggery has also started selling compost worms as a by-product of the composting process.

Composted product and worms are sold at the gate only. Compost is sold both bagged and bulk, with the majority going to domestic gardeners.

One of the piggeries uses a considerable amount of waste material from food industry as a food source (covered later in Section 10.7.1, Diversion for animal feed).

It is difficult to predict what might happen over the next five years as the competition from imported pork is placing serious constraints on the local pig industry. Concerns were also expressed about the biosecurity risk from importing uncooked pig meat, as it is impossible to monitor whether the many backyard pig owners are properly treating food wastes collected from supermarkets and restaurants. As mentioned later in Section 10.7.1, Diversion for animal feed, feeding untreated meat to pigs poses a real risk of introducing livestock diseases that are not yet in New Zealand.

Comments made in response to a question about how these businesses might be able to further assist waste minimisation in the region included:

- "Encourage more people to eat New Zealand pork so the pork production side of the business is more profitable allowing more time to be put into composting"

10.3 Other organic materials composted or otherwise applied to land

About 29,000 tonnes of animal shed manures (which include a large proportion of wood shavings), paunch grass from abattoirs, fish processing wastes, and poultry farming wastes are composted annually. In some cases the compost is made with the addition of green waste and wood shavings as already mentioned above. By far the majority of the composted product is applied directly to land or otherwise sold in bulk. Another 10,000 tonnes of animal shed manure are applied directly to land without composting. The demand for these products is far larger than the supply.

One comment received was that the product became more popular with farmers when fertiliser prices went up, and also that demand is likely to stay high even if fertiliser prices drop as interest is growing in this type of product.

Again, demand for the product is growing and this is expected to continue.

In one case, consent conditions on odour are currently a constraint on composting further organic material, as the cost of meeting these conditions is a barrier to expansion. Another comment was that both supply and market recognition are constraints to growth.

A further 1000 tonnes a year of paunch grass is managed by passive composting. The end quantity will be less as the material dewaters as it ages. The composted material is largely unused (a small amount gets taken by staff for home gardens). The site has enough capacity to take a further 10 to 15 years of material at the current rate, which is not expected to increase as the plant is operating at capacity. This is a resource which the Plant Manager is willing to make available if requested.

10.4 Meat processing by-products

Blood, offal, feathers, fallen stock, bone, bone gel and other renderable material from farms, abattoirs, poultry meat production, pet food companies, supermarkets, butchers and home kill operations are processed by several Taranaki operations. These are processed into a variety of products including meat, bone and blood meal, tallow, edible (food grade) tallow, and beef extracts. Some of these are sold for further processing, some are finished products. Much is sold overseas.

A considerable amount of material comes from out of the region, up to 50% in some cases.

Average annual amounts are unable to be reported due to commercial sensitivity, but they are significant, and in 2004 were around 77,000 tonnes from two of the three operations.[37] (How much, if any, of this was generated from outside the region is not known, but the total volume currently generated from within the region is likely to be in the order of this figure, alongside a considerable volume from outside the region). Amounts generated from within Taranaki currently are likely to equal or be greater than annual amounts of waste to landfill. Quantities also vary widely from year to year and are partly dependent on economic and environmental conditions (for example, tonnages given by one business were on a +/- 30% basis).

[37] Taranaki Regional Council. (2004).

Seasonal peaks occur in July and August (fallen stock), and January to May (meat works wastes).

Constraints on these businesses vary from processing capacity (i.e. already at maximum), to availability of raw materials, which depends on factors such as weather and economic conditions. There appears to be no issue regionally with capacity should raw materials increase, as they constantly deal with large fluctuations in supply. One plant has a consent to bury material, e.g. because of equipment failures, but increased plant capacity has reduced the frequency of this.

Hides are processed at other sites, for example Wanganui.

In addition, paunch grass from animals killed at abattoirs is composted, either through a commercial composter, or by passive composting on the site where it is generated, as covered in Section 10.3 of this report.

10.5 Mulched green waste/ wood chip (not composted)

A sample of six potential producers of this material was surveyed, including Taranaki Regional Council's gardens section. The other five were garden and tree contractors. One of those contacted did not mulch green waste themselves but provided it to a composter. Of interest is that while there are many smaller operators in this sector and a few medium sized ones, it is dominated by one large business, which generates more than ten times as much as the next biggest business surveyed.

At least 3400 tonnes of mulch not diverted to composting operations is generated in the region annually (another 300 tonnes is composted and is included in the totals in Section 10.1). This is a minimum as not all operators were contacted. Mulched material is often left with the customer, and if not, is taken back to the yard and sold. One contractor supplies a significant amount at no charge to schools, and for playground surfacing. TRC Gardens staff make use of any material generated on the site which produces it.

The demand for this product is larger than the supply, with one of the larger tree contractors commenting that they get frequent enquiries for wood chip from home gardeners but do not supply this to non-customers, and another commented that they run out of product in the spring.

There also seems to be no problem with meeting any increase in demand for mulching services. One operator commented that they were expecting an increase in demand due to increasing growth rates being observed in trees, and also the economic situation, as it was expected that people would move house less and spend money on their existing garden instead.

10.6 Piggery effluent not composted

Apart from the two piggeries which compost their effluent, all other consented piggeries contacted (eight of the eleven) discharge effluent to land or ponds, and are not planning any changes to their effluent system or any major changes to current pig numbers.

10.7 Food waste

10.7.1 Diversion for animal feed

Three of the consented piggeries feed a significant amount (1600 tonnes a year) of food waste and food industry waste to their pigs. This includes fruit, vegetables, bread and other bakery items from supermarkets, the hospital, hostels and bakeries, culled birds from the poultry industry, and ex-factory cheese. Strawberries and milk from farmers are also fed to pigs (amounts vary according to supply).

People keeping a small number of pigs in small-scale operations are also recovering significant volumes of food waste from commercial premises (e.g. restaurants and bakeries), and in some cases from domestic households through friendship networks. For example, one person with 6 pigs collects 400L a week, or 20m^3 a year; another person who usually has 2 pigs would collect 6m^3 a year. The number of people doing this is unknown, but based on previous information collected by the Waste Minimisation Officer (WMO), could easily be twenty.

It is important to note that meat and food waste that has come into contact with meat must be treated before it is fed to pigs. In practice this means it must be boiled at 100 degrees Celsius for one hour, stirring frequently, to destroy any disease causing bacteria and viruses that may be present.[38] Such requirements limit the extent to which food wastes can be recovered as animal feed.

One instance of café food waste being collected for feeding poultry is also known.

It is not known how many commercial kitchens or other suitable sources do not have food waste collections. From earlier work among such premise by the Regional waste Minimisation Officer, this is likely to be a significant minority, some of which could be large generators of suitable material (some food waste is not suitable, e.g. fatty wastes). For example, it appears that food waste from one large hotel that was collected for pigs is now going to landfill.

One piggery owner commented that councils could help reduce waste to landfill by providing some sort of environmental credits for materials diverted from landfill.

10.7.2 Potential for further diversion of food waste

The volumes of food waste being landfilled in the region are likely to be significant. Forty-five percent of the average domestic rubbish bag could be composted (green waste and food waste combined).[39] For New Plymouth District for example this translates to a minimum of approximately 5300 tonnes a year.[40] Food waste alone could be 3900 tonnes a year (based on 3kg per household per week).[41] These statistics will be conservative as they exclude the amount collected in kerbside MGBs (wheelie bins) which residents contract directly with waste providers.
This is not insignificant as it is estimated that 20-25% of households have privately

[38] Ministry of Agriculture and Forestry (2009)
[39] From www.reducerubbish.govt.nz/compost/index.html , accessed 25 April 2009.
[40] Based on weight of kerbside rubbish bags, current year to date figures (9 months, 8768 tonnes) extrapolated to a full year (11,691 tonnes).
[41] D. Hogg, Director, Eunomia Research and Consulting in the UK, stated that this is a reasonable average during a presentation on household organic waste collections, *Organics: Upping the Ante*, at the 2008 WasteMINZ conference.

contracted wheelie bin collections.[42] Households with wheelie bins also tend to dispose of more material to landfill than those with smaller containers like rubbish bags.

Many local authorities in New Zealand actively encourage home composting, e.g. the Create Your Own Eden programme initiated by North Shore City Council and now used by eight local authorities;[43] and Tauranga City offers courses on worm composting which has extended to the concept of 'master composters' who promote composting in their local area.[44] More could be done to actively promote home composting in Taranaki, and other local authorities' experience is available to be drawn on.

Three local authorities in New Zealand have systems for kerbside collection and composting of household food waste. Mackenzie District has had a separate organic waste collection since 2002, and composts the material in a vertical composting unit.[45] Christchurch City has recently started collecting and composting of household food waste, a first on this scale for New Zealand. The collected food waste is composted together with green waste. [46] Timaru District also collects and composts organic materials from the kerbside, a system that has been in place for three years.[47]

There is potential for similar systems in Taranaki urban areas to divert food waste from landfill, in addition to further promotion of home composting.[48]

South Taranaki District, the only council currently offering residents a green waste collection, could potentially build on this by also offering a food waste collection. The Council has trialled a benchtop kitchen caddy with a biodegradable liner which could be a suitable container for initial collection.[49] One of the issues with combined composting of food waste and green waste is that treatment costs might have to be as for food waste, despite this being by far the smaller volume. Food waste treatment tends to be more expensive than green waste, as it usually involves meeting higher standards in terms of health and environmental concerns. By comparison, green waste can be processed in outdoor windrows for a relatively modest outlay. Location of any facility processing food waste is also likely to be a factor in terms of costs and benefits (closer to the collection area keeps transport costs down, but on the other hand, greater distance away from urban areas is likely to mean less restrictive conditions on aspects of resource consents).

One composting business has commented that a 'huge amount' of food waste comes off ships (no statistics were available on quantity) and that this could also be composted. Their investigations with the Ministry of Agriculture and Forestry indicated that it is likely this would need to be treated using in-vessel composting. This would require a substantial capital investment.

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[42] M. Baker, New Plymouth District Council Solid Waste Officer, pers. comm., 29 April 2009
[43] www.createyourowneden.org.nz/
[44] Pettersen and Masters (2008)
[45] Ministry for the Environment (2005)
[46] Christchurch City Council (2009)
[47] R. Clarke, Senior Waste Management Officer, Timaru District Council, pers. comm., 27 April, 2009
[48] Much information is available on the practicalities of such collections. See for example, Ministry for the Environment (2005); and Wilson (2007)
[49] Taranaki Regional Council (2009)

11. Tyres

It is likely that there are between 104,000 and 156,000 used tyres needing disposal each year in Taranaki[50], although extrapolations from data provided by 5 specialist tyre companies (of 28 identified) and 11 garages (of 78 identified) which dispose of tyres themselves resulted in a larger total of 250,000. A detailed survey by the Council in November 2004 questioned 21 tyre dealers and garages. The survey found that the numbers of used tyres were increasing (more vehicles in the region, and fuel consumption figures for Taranaki show an increasing trend for diesel fuel in particular i.e. Taranaki residents are steadily increasing their mobility). The 2004 survey calculated that there were 70,000 used tyres generated in the region each year.

It may be that the more recent sample was not representative, or the estimates provided in either survey were not accurate, or there has been some change in the market e.g. recent imported used vehicles with tyres reaching the end of their lives.

The quantity of tyres landfilled is not known, but informal feedback from the regional landfill is that quantities are very small, and certainly nothing like the quantities requiring disposal. Illegal dumping is not known to be a problem in the region.

In both surveys, the sector has confirmed that disposal of tyres is not an issue for the region.

A large proportion (89%) of end of life tyres from the garages surveyed are used by farmers, mainly to secure covers on silage pits and maize being grown on-farm, with some used to retain banks; a further 6% are landfilled and 5% are stored. Of the specialist tyre companies surveyed, 63% of end of life tyres were used by farmers, and 37% were taken to Meredith Scrap Metals, which charges the same disposal fees as landfill fees for uncut tyres ($2.50 for car tyres, $5 for truck tyres, and $10 for tractor tyres.)

Tyres sent to landfill have to be quartered or have their sidewalls cut off, to prevent issues of tyres floating to the surface. Even when quartered or cut, tyres still take up valuable landfill space if landfilled, and still represent a loss of resources.

There is some evidence that demand from farmers may reduce over time. One garage owner commented that tyres are currently going to farmers needing to hold down covers over supplementary feed (e.g. maize, palm kernel and triticale), a relatively recent demand and one related to the high prices farmers have been receiving for their milk (thus warranting the extra cost of supplementary feed). He believes that this additional need will be met at some point. The owner of a specialist tyre business commented that there is a return to using silage pits instead of wrapped silage, which is creating more demand in the short to medium term. There is also the issue of the final disposal of tyres used on farms. In the long term, this may create a multitude of unregulated cleanfills dispersed throughout the region.

[50] URS (2006): "There is an anecdotal assumption that one Equivalent Passenger Unit (EPU), or typical passenger tyre, is disposed of per person per year. Our study in Australia (URS Australia 2005) showed that this assumption was low – on account of the number of large earthmoving tyres – and a more accurate assumption may be in the order of 1.5 EPUs per person per year."

Photograph 4 End of life tyres used to secure silage cover

From the specialist tyre companies surveyed, 74% of heavy truck tyres are sent for retreading (4670 from the three businesses which provided this information, 16% of their overall tyre numbers).

Tyre Track was a national system intended to ensure that old tyres are managed responsibly. It had limited coverage in the region, with only 17 supplier members and one collector member (Meredith Scrap Metals). Most of these did not report tyre movements to Tyre Track, with only 17,000 tyre movements recorded for Taranaki over the 5 years of operation.[51] This confirmed earlier findings about limited coverage in non-metropolitan areas.[52] It is understood that New Zealand-wide, the system tracked about a quarter of the country's waste tyres. With effect from 17 July 2009, the Ministry for the Environment and the Motor Trade Association, partners in the scheme, agreed to terminate the scheme because of its lack of effectiveness and to seek to develop an industry-led product stewardship scheme as a replacement. No details of any replacement are yet available.

Improving the diversion of end of life tyres from landfill is likely to need greater government intervention, which is beyond the scope of this report.[53] Commercially viable options for reuse of tyres have been developed overseas. In 2003, more than 80% of waste tyres were diverted from landfill in the US, and 75% in the European Union.[54] One of the major barriers to this happening in New Zealand is the relatively low cost of landfilling.

A Taranaki company, Meredith Scrap Metals, is in the process of developing a tyre granulator. When this is operational it is expected to be able to process four tonnes an hour (potentially all the tyres generated in the North Island) with the main products being rubber crumb, steel, zinc, nylon and sulphur. The business has a stockpile of tyres, which is likely to take several months to process once the system is operational.

The main barrier to completion is the owner's time, which has been fully occupied

[51] K. Karakias, Administrator, Tyre Track, pers. comm.,10 February 2009
[52] URS (2006); and www.tyretrack.co.nz
[53] URS (2006): "In the majority of developed countries, governments have implemented some form of financial or regulatory measure to intervene in the used-tyre market and ensure that EoL tyres are diverted from landfills and reused."
[54] URS (2006)

with other aspects of his business over the past 18 months. No problem is foreseen with demand for the product. For example rubber crumb could be sold overseas for manufacturing into products like gumboots and O-rings etc; or for various end uses within New Zealand. There is also the potential to develop markets for products new to New Zealand that are already in production and use overseas.

Two other options for used tyres are being developed by companies out of the region. Neither of these is operational as yet, but each has the potential to handle large numbers of tyres.

An Auckland company, Tyregone, is developing a commercial scale pyrolysis system for tyres in conjunction with a tyre shredding business. The pilot plant is operating on a batch basis, thermally decomposing tyres in the absence of air to separate the oils and gases from the dry carbon and steel. All the recovered products have immediate commercial industrial uses in New Zealand. The plan is to convert this to a continuous system in the very near future, contingent on obtaining funding.[55]

Another company, Carbon Recovery, is proposing to use tyres as fuel, e.g. for cement kilns. (Holcim cement makers have previously investigated this and considered there was not sufficient volume for this to be worthwhile in New Zealand.)

[55] J. Knight, Zero Waste New Zealand Ltd, pers. comm., 11 May 2009; C. Newman, Tyregone Processors Ltd, pers. comm., 18 May 2009 and 8 June 2009

12. Photocopy and printer cartridges

The current situation regarding the recovery of these for recycling or refilling was not assessed. Several commercial services are known to operate in the region, either as part of photocopying servicing contractual arrangements or as commercial or public retail operations.

13. Concrete, roading, demolition and rubble

13.1 Concrete, rubble and bricks

One business in Taranaki, sited between New Plymouth and Waitara, accepts used concrete for crushing for resale.[56] This is a new development for the region and has been available since the last quarter of 2008. The operation can process 200m^3 of unreinforced concrete in 2 hours; reinforced concrete takes longer and the steel is removed with magnets after crushing. They are not yet sure of the total volume they will be able to handle. They are also accepting used bricks which will be kept separate and sold for reuse.

Concrete is being accepted from a variety of sources, as long as it is clean: footpath contractors, builders, homeowners, and concrete suppliers (who are bringing in leftover material which was previously taken back to the yard and was a problem to deal with). There is no charge at present. The number of drop offs is increasing as more people become aware of the service.

The main end use is likely to be for roading, blended with metal suitable for non-State Highway urban and rural roads. Lower grade material can be used for base course.

Photograph 5 Concrete being crushed at Jones Quarry. Photo credit: Nelle Rose

Due to the cost of transport, only concrete from relatively nearby locations is likely to be taken to this site. A quarry in South Taranaki was also contacted but is unlikely to start offering concrete crushing, although they commented they could easily process non-reinforced concrete along with existing rock. Processing reinforced concrete would need additional equipment, i.e. magnets. They also noted that while cleanfilling was as cheap as it is they thought most concrete would be cleanfilled even if recycling was available.

[56] Jones Quarry, Mahoetahi Road, New Plymouth (between New Plymouth and Waitara). Contact Gavin Jones, 0272 762 498

One of the major demolition companies has its own cleanfills so is unlikely to use a concrete recycling service; another disposes of some concrete to landfill where it is attached to or mixed with treated timber or steel.

Bricks will most likely be used by home gardeners for landscaping. Bricks are also diverted from rubbish loads by at least one other business, the New Plymouth Transfer Station, which sells them through the Recycle Shop on site. In both cases no quantities are available, and nor is there any information on what proportion this will be of the total being disposed of.

Several rubbish contractors sort rubbish from skip bins, and divert concrete, rubble and bricks from landfill. Most of this material is cleanfilled. Some is used in landscaping projects. Again, no volume information on this specific type of material was available.

A landfill analysis would be necessary to assess how much potentially recyclable concrete is landfilled.

13.2 Roading maintenance and construction wastes

Roading falls into three main categories: urban street cleaning and sumps; carriageway and footpath reseals; and road repairs and reconstructions. The types of materials needing disposal are specific to each category so will be discussed separately below.

One of the major companies involved in roading is very keen to see greater recycling of roading materials in the region. For this to be workable there would need to be a mechanism which would apply this as a requirement to all contractors e.g. all tenders would need to incorporate this.

13.2.1 Street cleaning and sumps

Materials collected are a mix of road materials, organic material like leaf litter, and human litter like glass and plastic bottles. Collection is mostly done by suction trucks. About 960 tonnes a year is landfilled from the region's urban roads (900 tonnes New Plymouth district, 50 tonnes South Taranaki district, 10 tonnes Stratford district), plus 200 tonnes from rural sumps. Because of high levels of heavy metals in sump material (from vehicles), this material is unsuitable for unrestricted re-use, and landfilling is an environmentally sound method of disposal.

Autumn leaf litter from Stratford urban roads is collected manually and is composted. This is an ideal disposal solution, and is only possible because any glass contamination can be removed by hand during collection. When leaf litter is collected by suction trucks, glass litter is picked up at the same time, preventing it from being safely composted due to contamination with broken glass.[57] For example, about 90 tonnes of leaf litter is estimated to be collected from New Plymouth urban streets annually, and is landfilled.

[57] G. Blackstock, Blackstock Roadsweeping, pers. comm., 16 April 2009: As well as picking up broken glass, whole glass bottles also break as they are picked up by the suction truck.

Leaf fall in the New Plymouth district is seasonal, with pohutakawa leaves being produced over the summer, and deciduous tree leaves from autumn to early winter. Composting could be investigated.[58]

13.2.2 Carriageway and footpath reseals

Resealing is generally done annually. Loose chip from this is mostly reused for other purposes, for example for drainage (and is sold for this purpose). Contractors aim for minimal chip needing to be removed following application. It is generally not recycled for roading because it would need to be kept clean, for example, unless it is swept up within 48 hours of laying it needs cleaning. In addition, most suppliers have their own quarries so it is cheaper for them to dig more rock than it is to clean used chip. Contractors would also have to stockpile the chip as resealing is only done annually. There are also issues with stockpiling: because contracts tend to only be let year by year, the stockpiles could need to be kept clean for several years, e.g. under cover.

One contractor recycles chip, which involves washing and rescreening. In this case, they do not have their own quarry and recycling is economic for them.

13.2.3 Road repairs and reconstructions

As a matter of interest, because local rock is not hard enough, chip for some roads in the region (e.g. State Highways and New Plymouth urban roads) is brought in from out of the region. Soft base course rock can also affect the amount of waste created in repairs.

According to one contractor, Taranaki roads have very flexible pavement due to the flexibility of the underlying volcanic clay. This means either using sufficient depth of metal to stabilise the pavement, or cement stabilising, a process that mills and reuses the existing material laid down. Cement stabilising is unable to be used on urban roads because of the need to preserve access to underlying services like sewers and water.

The contract manager for all rural and urban roads except State Highways, estimates that overall only 2-3% of existing pavement gets recycled.

13.2.3.1 Pavement repairs

The pavement is milled and reused where possible. This tends to be done more in urban areas rather than rural, as the subgrade rock in rural areas is usually softer and of insufficient depth. Rural repairs often have to be dug out to seepage level, e.g. where the sub grade rock is too soft for reusing the existing pavement by milling and cement stabilising. The old metal is reused where possible, if not, it is taken to a nearby cleanfill or quarry (where it is probably cleanfilled) or to a local farmer for use on their farm.

For larger areas needing repairs, known as area wide pavement treatment, the technique used depends on the depth of the existing pavement, and also other factors such as increase in traffic flows. In South Taranaki and Stratford districts

[58] Removal of glass shards might be possible using mechanical screening. The cost and efficacy of this has not been assessed.

overlays are generally used as the existing pavement is quite thin. This involves ripping the existing pavement and reusing it with added material. This creates almost no waste.

In the New Plymouth district the existing pavement is milled and reused where possible, with extra base course added as needed. This is not possible where there is insufficient depth to start with (e.g. if it needs to be dug out to 300mm, but metal depth is only to 100-150mm), or where the base course rock is too soft. In this case the waste material is cleanfilled.

The contractor for rural road repairs for Taranaki estimates that this generates approximately 7500 tonnes (5000 m^3) of waste annually. This is all cleanfilled.

13.2.3.2 Major reconstructions

These are let on a project by project basis. Volume information was not available, partly because this work is so variable over time, but in general the amounts are far larger than for repairs.

Major works are generally designed to cut and fill as far as possible to minimise material needing disposal. Base course is also salvaged for reuse where possible. Vegetation can be a big volume, and is all disposed of. One contractor estimated that this type of work results in 20-30% of the material removed during the work being disposed of to cleanfill, with the rest used on site, e.g. as fill.

For vegetation to be composted instead, it would need to be removed prior to roading contractors starting work, ideally by a specialist business. One contractor commented that it was bulky and frustrating to deal with.

Chip is swept as for reseals.

13.3 Construction and demolition wastes

Construction and demolition are often closely related, with many construction projects requiring demolition of existing buildings. Together they account for a very high proportion of New Zealand's waste stream, up to 50%, although this varies area by area.[59]

Two businesses that advertise demolition services were contacted. They specialise in different aspects of this, and will work co-operatively on jobs where possible. One demolishes mainly for recycling, extracting roofing iron and valuable timbers like matai flooring and rimu. Concrete is broken and reused on site if possible, otherwise is cleanfilled if suitable. Some material is landfilled, but amounts were not available. The other business will demolish what is left, with some cleanfilled, some landfilled and clean concrete taken to Jones Quarry. Amounts are not known, but the owner estimated that 80-85% of the concrete is taken for recycling.

Given the large number of construction businesses in this industry and the variety of materials they work with, a comprehensive survey was not attempted. Instead two construction businesses were contacted, one larger and one small to medium, to get

[59] Ministry for the Environment. (n. d.)

an indication of how waste is managed; and a site clearing business was also contacted (this business also does demolitions and was one of the two contacted above).

The smaller business recycles untreated timber for firewood, and other timber is kept for reuse. They have a storage shed for useable materials left over from jobs. They were unable to provide specific information on actual construction waste by job as they clear this from several sites at once. The majority of waste from their jobs appears to be from the site clearing done before construction starts; they did not have information on quantities and where material goes from this. Some general information was available from the business contracted by the builder to do site clearing. Materials include vegetation. Anything less than 300mm diameter is mulched and taken to the New Plymouth Transfer Station. It was unclear if this is diverted to composting as the same price was being paid for this as for rubbish. The owner will be following this up. Larger branches are sometimes taken for firewood. The site clearing business will divert clean concrete for recycling if this is feasible, and either landfill or cleanfill the remainder, as noted in the demolition section earlier.

For the larger business, waste minimisation is one of their regular staff meeting topics. They commented that normal practice is to order to requirements to prevent waste from the beginning. In general they try to segregate materials needing disposal as much as possible; untreated wood is separated and taken by staff for firewood, useable treated wood taken by staff for reuse or is stored by the company for reuse. Information on quantities of waste generated was not readily available.

At present they are constructing Taranaki's first building to be rated under the Green Star rating system, the new office building for Port Taranaki.[60] They were surprised how difficult it was to access information about the requirements for this project. Some help came from companies which had constructed Green Star rated buildings in other centres, and some from the project consultants. At the six month mark, which was the stage of the project at the time of receiving the information, it was meeting its target of recycling 70% of construction waste. The contractor managing waste and recycling is recycling concrete, plaster board, timber, plastic wrap, paper, cardboard and polystyrene from the building site. Timber is being made into survey pegs; no information was available on how plaster board was being recycled.

[60] New Zealand green Building Council: "Green Star is a comprehensive, national, voluntary environmental rating scheme that evaluates the environmental attributes and performance of New Zealand's buildings using a suit of rating tool kits developed to be applicable to each building type and function." From www.nzgbc.org.nz/main/greenstar accessed 3 June 2009

14. Special wastes

14.1 Used engine oil

Sources of used engine oil in the region include motor vehicle workshops, public drop-offs at transfer stations (New Plymouth and Hawera), heavy machinery servicing workshops, and one service station which accepts oil from the public. Twelve workshops (a sample of the approximately 80 identified through the Yellow Pages), the service station, and the transfer stations were surveyed. All but one had their oil collected for recycling. The exception, a small garage in a rural area, was in the process of changing from dropping off his used oil at a depot to having it collected. One of the larger workshops affiliated with a particular brand of vehicles commented that the brand owner ensures they have environmental management systems, and also charge customers a small environmental services fee.

Three of the garages contacted supplied used oil in response to requests from the public. Requests were usually from farmers, for varied uses including heating, wood preserving and oiling machinery. The quantities were small in relation to overall amounts (430 litres per annum). Extrapolating that to the 80 garages, 2900 litres a year is potentially diverted to these non-consented uses.

There is some consented use of used oil in the region for suppression of dust, e.g. in 2008, 21,000 litres was applied to a sawmill site.[61] No other consented used oil use is known over the last 2 years.[62]

Two collectors of used oil in the region were identified: Thurline (owned by Transpacific Industries) and Petroleum Services. The estimated annual total collected is 434,000 litres.

The total volume of lubrication oil used in New Zealand was estimated by Ministry for the Environment (MfE) in 2007 to be 33-40 million litres. Assuming this is reasonable and has not increased significantly, and that volumes used correlate to population, Taranaki could be generating 846,000 – 1,030,000 litres of used oil annually,[63] in which case only 42-51% is known to be being collected, i.e. 410,000 to 590,000 litres is unaccounted for. Other information provided by the Ministry suggests that 7 million litres of the total used is not able to be accounted for, i.e. 18-21% of the total; based on the same population assumptions this equates to 179,000 litres unaccounted for. Wherever the actual figures lie, it seems likely that a considerable volume of used oil remains unaccounted for in the region. (See Appendix IV for more information).

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[61] This activity is one that requires and is covered by a resource consent under TRC Rule 44 covering oil spreading under the Regional Fresh Water Plan. This rule is discretionary and covers disposal of waste oil to land at sites other than where it was generated. The Council can place any conditions deemed necessary on the consent, or choose not to permit the activity at all.

[62] Under Rule 29 of the Regional Fresh Water Plan used oil ('waste') generated at an industrial or trade premises is permitted to be disposed of to land at the same site providing it meets the conditions listed.

[63] Based on total New Zealand population of 4,184,600 and Taranaki population 107,300 as at 30 June 2006. From www.stats.govt.nz/NR/rdonlyres/62873D45-5BFF-46EF-9DFF-19C8800B04F6/32636/SPPalltables.xls accessed 6 May 2009

Thurline collect for the Used Oil Recovery Plan (UORP),[64] Mobil and others. Most of the oil they collect is supplied to Holcim to be burned in their cement kilns in Westport as a fuel, replacing virgin oil or coal. The rest is treated in Tauranga, and the cleaned oil is supplied to consented uses including Perry Lime and Carters. Diesel is also recovered in this process. Petroleum Services collect from vehicle and heavy machinery workshops and supply processed used oil to industrial fuel users as an alternate fuel source for burners. Typical examples are lime works, glass house growers, home and workshop heating, swimming pool heating, drycleaners, asphalt plants (Fulton Hogan) and timber kilns. End users are all consented where local authorities require this (consents are not required for some small volume uses).

Only seven sites were identified that accept used oil from the public. Five of these are petrol stations or garages, which do not charge to accept used oil, and the other two are the New Plymouth Transfer Station and the Hawera Transfer Station, both of which charge 50c a litre. Three of these sites are part of the UORP. The low number of these facilities indicates there could be an issue with access to used oil disposal facilities for members of the public, e.g. people who change their own engine oil.

A considerable volume of various types of waste oils is also managed by the petrochemical industry. Amounts were not sought, given the highly dynamic nature of the industry, the known adherence to good practice, and also that the majority of this appears to be handled internally by the industry.

Taranaki is also the location of a company which regenerates specialist transformer oil at its Rawhitiroa factory and through a mobile unit which travels around the country. Large volumes of oil are processed.[65] They can deal with any oils except engine oil, and are receiving increasing requests to treat specialist oils. There are no capacity issues or problems with demand for treated oils. The process generates almost no wastes.

14.2 Oily sludges ('black slops')

Several of the companies collecting waste oil also deal with 'black slops', essentially oily water. The bulk of this is ships' bilge water, contaminated by oil and sometimes diesel from leaks. This is generally 10-20% oil, which is separated in ponds or tanks, then taken to Tauranga for treatment and sold for the uses listed in the previous section. Volumes are significant, around 500,000 litres a year, but the total is very dynamic as it depends on oil industry activity e.g. servicing of marine platforms, and also the quality of the ships in use, which depends on availability in a world market.

[64] The UORP is a partnership between Holcim, Shell, Caltex, BP/Castrol, DR Britton/Valvoline and Ministry for the Environment. It has 100 active sites in the region. The majority of these are for the specific use of the particular oil company sponsoring the site and do not accept used oil from the public. Several years ago, oil companies often allowed the public to put their used oil into used oil storage tanks at some service stations. More recently, due to liability concerns and the fact that oil companies were probably paying for the recovery of competitors' used oil, this practice has virtually ceased.

[65] For example, a scrapped transformer commonly contains 50-70,000 litres of oil.

14.3 Oil filters

A few garages pay for a collection service for these. It appears the majority simply drain the oil and dispose of the filters in their rubbish, although the option of collection was raised only towards the end of the survey so the question was asked only of the last four garages contacted.

Two companies have been identified as offering a service to motor vehicle workshops, ERS and EcoCrush, but are only collecting from a small proportion of garages and other vehicle workshops (9 of approximately 100).

Another company, TPI, also collects oil filters from heavy machinery workshops, some of which service oilfields.

Retained oil and aluminium are recovered in the recycling process (even after draining, a filter retains about 100ml of oil; on average 0.67kg of aluminium is recovered per filter[66]).

It is estimated that there are 4.5 million used oil filters needing disposal annually in New Zealand, i.e. approximately one per person per year.[67] If the number of filters directly correlates to population, Taranaki will have about 107,000 filters needing disposal each year.

Currently, about 7000 are known to be collected for recycling from the region annually (less than 7%), which suggests 100,000 are being landfilled. At 100ml of oil per drained filter, landfilled filters could be contributing 10,000 litres of oil to landfill a year, along with 67 tonnes of aluminium which could be being recycled.

14.4 Antifreeze

The possibility of collecting this (ethylene glycol) for treatment was only raised towards the end of the survey, and so was only discussed with 2 garages: one diverts it to the sewer system, the other collects it and it is taken by the same company that takes his used oil. One of the companies collecting oil filters also takes antifreeze for recycling. Volumes are unknown.

14.5 Used paint

There are currently several avenues in the region for paint to be reused or recycled.

Under a scheme is operated by Enviropaints, an Otaki based company, Placemakers stores in New Plymouth, Stratford and Hawera accept certain kinds of unwanted paints and related products (liquid acrylic paint, liquid oil-based paint, oil-based stains, tung oil, turpentine, methylated spirits, raw or boiled linseed oil, and Enviropaint cartons; products must still be in original containers). An interesting anecdotal observation is that 40% of product collected has never been opened, i.e. is completely unused. There is no charge for returned material. Collected material is re-manufactured into a paint product suitable for exterior and interior uses: walls,

[66] D. Holt, ERS, pers. comm., 10 Feb 2009
[67] D. Holt, ERS, pers. comm., 10 Feb 2009

fences, concrete, covering graffiti, pallet or log marking etc. It is estimated that 26 tonnes of materials is now collected from Taranaki annually.

Future collection volumes are hard to predict as this depends on factors such as the response of shop managers, but amounts are still increasing overall. For this scheme there could be an issue in future with demand for the recycled product being insufficient to match supply.

One issue identified is that some people do not know what to do with products which they bring to the stores hoping to recycle it but which is unsuitable, for example partially dried out paint. In this case, the person who manages this section of the store advises them how to deal with it (i.e. take the lid off, let it dry completely then put it out in the rubbish).

The New Plymouth Transfer Station also accepts paint. This is charged for at the general refuse rate. Some product is not able to be reused (this is dried out and landfilled), and some is not actually paint (e.g. used oil 'hidden' in paint tins). Suitable product is sold through the Recycle Shop. Annual volumes are small, estimated by the manager at 500L a year.

The manager of the Stratford Transfer Station puts useable paint aside if she knows of a demand for it.

At least one rubbish contractor also diverts used paint from landfill; they make use of this in their business.

PaintWise (a scheme initiated by Resene, and operated for them by 3R) is expected to begin in Taranaki later in 2009, initially at the New Plymouth Resene Colorshop. It is possible other brands of paint and paint outlets will become part of the scheme in future, and this is being actively pursued by Resene. End uses should easily match supply.

PaintWise accepts any brand of decorative paint, but not automotive and marine paints, and is more comprehensive than Enviropaints. A small charge applies to non-Resene branded product and trade returns to help offset the costs of the PaintWise programme.[68] Rusty and empty tins are also accepted. The collected paint has a mix of end uses including community donation (paint as is), community donation for anti-graffiti work (blended waterborne grey paint) and other uses such as manufacture into PaintCrete.[69] "The projected PaintCrete volumes would easily soak up the paint returns once PaintWise is fully up and running. We have committed though to always making a proportion of the paint available to community groups and this will not change regardless of more 'commercial uses'."[70]

Containers collected through PaintWise will also be recycled.

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[68] $1 per 4L can or smaller, $2.50 per 10L pail or larger

[69] PaintCrete is a recent development. Adding waste waterborne acrylic and latex paint to concrete "at the prescribed dose rates allows the cement content to be reduced, lowering both the carbon footprint and the embodied energy of the concrete. It makes a very user-friendly concrete that is easier to place and finish and most importantly it does not noticeably affect the final colour" (PaintCrete leaflet). The initial use has been in blockfill for reinforced concrete masonry. Currently this market matches the volume of available waterborne waste paint.

[70] K. Warman, Marketing Manager, Resene Paints, pers. comm., 20 January 2009

In addition to informal avenues for exchanging paint, the web-based exchange system, FreeCycle, could be used.[71]

There does not appear to be a problem with disposal of paint from vehicle painters. Two were contacted. Excess paint is not usually an issue as not much stock is carried due to it being expensive and having a short shelf life. Unused paint can also be returned to the supplier.

14.6 Solvents

There are currently several routes available for recycling solvents (which include thinners and gun-washes from car painters). One is a national company which collects for a fee; another is a solvent supplier which collects for no charge, from their own customers only (they do not have the capacity to take more) and processes the collected material out of the region; and the third is a local company who have recently purchased the necessary equipment. At present they are dealing with their own backlog, and in addition are taking materials from a few other businesses. They plan to increase this as they are able to process it. There is a small charge, but this includes the return of the recycled solvents, which overall constitutes a cost saving.

The two established collections are estimated to be handling 17,000 litres a year.

The capacity of the third recycler, the local business, is 12,500 litres a year, with a batch size of 25 litres.

Anecdotally, disposal of solvents is an issue for some users, with some users reportedly spraying it on weeds or disposing of it inappropriately in other ways.

Potential sources in addition to car painters include metalworking businesses, fibreglass users and housepainters. To some extent the latest option might displace collections through the existing routes (one of the other options is reported to be unreliable as well as expensive), but it is also expected that with adequate promotion materials currently stored or disposed of inappropriately will be captured, thus increasing the level of recovery overall.

14.7 Vehicle batteries

There do not appear to be any major issues with access to environmentally sound disposal of vehicle batteries in the region, although from comments received during the survey it seems likely that some members of the public are still not aware that old batteries can be dropped off freely for recycling.

A sample of three auto electrical companies (of 14 identified) and twelve garages (of 78 identified) were surveyed, and further information was obtained from scrap metal dealers, Repco, Dominion Trading, and Exide Technologies (head office and their New Plymouth agent).

The total weight of batteries collected in New Zealand for recycling is estimated to be about 15,000 t a year. The most recent national survey known estimated 94% of

[71] See footnote 17

batteries are recycled.[72] No specific information on recycling percentages is available for Taranaki. On a population basis, around 450 t of batteries might be recovered from Taranaki each year.

All the auto electrical companies and garages either have their batteries collected by a scrap dealer (or drop them off at one), or by Dominion Trading. Scrap dealers either sell to larger dealers (sometimes out of the region), Exide Technologies, or Dominion Trading. Repco offers a free drop off service for the public; these batteries are collected by Dominion Trading.

Dominion Trading operate a nationwide collection service, and export batteries under the Basel Convention. Larger scrap metal dealers out of the region export directly under the Basel Convention, or sell to other businesses.

Exide Technologies operate a smelter in Petone,[73] and take batteries from both New Zealand and Australia. The proportion coming from each country varies according to the lead price: if this is high, more New Zealand batteries get exported, if low, more are supplied to Exide. The factory can process 24,000 tonnes a year, and Exide aims to collect 12,000 tonnes a year of this from within New Zealand. Any shortfall from New Zealand is made up from Australia. Exide's Recycling Manager would like New Zealand to have similar requirements to Australia, where batteries can only be exported if there is insufficient capacity to deal with them internally. New Zealand has no such controls on exports, which impacts on the smelter's ability to run efficiently.[74]

Ninety eight percent of a battery is recyclable. The products are lead[75] and plastic, with most of the lead from Exide's smelter going overseas to Exide's battery plants in Australia and India. The plastics from the smelter go to Australia to be recycled and are used for making new batteries. The acid is neutralised and then enters the trade waste system. The only part of the battery that goes to landfill is plate separator, which is a thin plastic for which no market has yet been found.

14.8 Farm effluent and organic solid wastes

Effluent ponds to provide treatment of effluent from dairy shed yards have long been a feature of dairy farming in Taranaki. Originally the purpose of these ponds was to reduce pollution loadings on streams receiving the discharge, and the ponds were emptied out every few years to maintain their treatment capacity, but farmers now increasingly recognise the nutrient value of the solids/sludges that collect within the ponds.

There is also an increase in the number of farmers who discharge to land from their pond systems, rather than to surface water. This is again a combination of reducing environmental effects upon streams, and of gaining the value of the pond contents for irrigation and nutrient purposes.

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[72] Ibid

[73] In recent times there has been some bad publicity regarding emissions from this plant. According to the Recycling Manager, emission controls for the smelter are high, for example, they are more stringent than those applying in the US. C. Stevens, Recycling Manager, Exide Technology, pers. comm., 1 April 2009

[74] C. Stevens, Recycling Manager, Exide Technology, pers. comm., 1 April 2009

[75] Including lead smelted on-site from the lead oxide

For the purpose of calculating the significance of this activity from the waste minimisation and recycling perspective, the following assumptions were made:

- no account taken of animal dung deposited in paddocks;
- no account taken of liquid effluent volumes pumped to land, or its values;
- 90 gms solids per cow per day deposited in the yard of the milking shed, thus requiring disposal;
- milking season 200 days long;
- 60% of dairy farms discharge effluent and settled pond sludges to land;
- 40% of dairy farms discharge to water, but discharge settled pond sludges to land- for these systems it is assumed that 75% of the 90 gms solids per cow per day is captured in the pond system, the rest being carried in the pond effluent to the receiving stream;
- 475,000 dairy cows in the region.

On this basis, the total quantity of solids from dairy farm effluent pond systems returned to land is around 7700 t. The actual volume will be much greater, because of its high liquid content. The value of this material is as a source of nutrients and for its soil conditioning value (including its organic content).

14.9 Effluent sludge and other waste water treatment wastes

14.9.1 South Taranaki district

South Taranaki district has eleven water treatment ponds, nine of which are oxidation ponds, and two are anaerobic lagoons (which precede oxidation ponds within the treatment process). The oxidation ponds are at Hawera (two ponds), Opunake, Kaponga, Manaia, Eltham, Patea and Waverley; the lagoons are at Hawera and Eltham. Sludge is removed from the ponds about every thirty years.

Three ponds have been dewatered, i.e. had sludge removed, in the last two years. The total removed was 1432 tonnes of dried solids (tDS). A small proportion of this was disposed of at Patea landfill, and the rest is being stored at the three sites pending other uses: some will form the base of a wetland, some may be buried onsite, and some disposed of to land. The land disposal option is not yet finalised. Another seven ponds are due for dewatering in the near future, with the intention of land disposal. The estimated total will be 2770 tDS. The final pond is not due for dewatering for another 30 years.

Mechanical screening prior to the waste water entering the ponds occurs at Hawera, Eltham and Patea. Screening is due to start at Manaia early in 2009, but this is not expected to alter the overall amount needing disposal. The screenings are disposed of at Colson Road Landfill. Current annual amounts are 21.35 tonnes and should remain stable over the next 5 years. This includes mechanical screenings, floating material scraped off the surface of the ponds and sand and grit from septic tankers removed from the pavement. The content of the screenings is estimated to be 80-85% biodegradable, but because of its highly putrescible nature, quantity of non-degradable matter, and high bacterial content, would not be suitable for unrestricted recycling.

14.9.2 Stratford district

Stratford district's two oxidation ponds were last dewatered in 2004, with 240 tonnes total weight taken to Stratford landfill (water content 15-20%). They are not expected to need dewatering again until 2025, with an estimated amount of 180 tonnes. This is less than the previous amount due to the installation of a new screen in late 2006. This removes some solids prior to the waste water entering the ponds.

The annual quantity of screenings is estimated at 8.5 tonnes, and should remain stable over the next five years. Screenings are disposed of at Colson Road Landfill. They are estimated to be 90% biodegradable. Because of its highly putrescible nature, quantity of non-degradable matter, and high bacterial content, this material would not be suitable for unrestricted recycling.

14.9.3 New Plymouth district

New Plymouth district's waste water treatment plant produces 1270 tonnes of thermally dried solids (TDS) a year, with expectations for the next 5 years being 1340-1500 tonnes. This will include the effects of treating waste water from Oakura and Waitara as these come online to the New Plymouth plant.

TDS is an organic, slow release granular fertiliser, sold in bags and bulk under the name Bioboost to local gardeners, farmers and commercial gardens and nurseries. There is sufficient demand for this product to absorb any increase. Bioboost is now being sold through a variety of outlets from garden centres to farm supply companies, making it more readily available to a larger range of customers than previously.

There is also the possibility that 1800m^3 of lagooned wastewater sludge will be dewatered and landfilled over the years 2009-2011. This is budget dependent.

Current waste water treatment plant screenings for the New Plymouth District including Waitara and Inglewood are 275 tonnes, with no increase expected over the next 5 years. These are disposed of at Colson Road Landfill, and are estimated to be 90% biodegradable. Because of its highly putrescible nature, quantity of non-degradable matter, and high bacterial content, this material would not be suitable for unrestricted recycling.

14.9.4 Summary for the region as a whole

Total screenings for the region: 305 tonnes. These are all landfilled. Given that the biodegradable content is 80-90%, there is potential for diversion from landfill. However, because of pathological nature of these screenings, the options for treatment and end use would be generally highly restricted.

14.10 Drilling muds

Exploration companies were unable to provide detailed information on amounts needing disposal over the next five years. Exploration activity is very sensitive to the price of oil, which has recently been highly unpredictable. Indications are however that sufficient capacity is available for land farming and other treatments including composting to continue to meet the demand.

Coastal sites for land farming can be desirable, according to one industry source, as drilling mud contaminants are primarily salts, high in chloride and sodium, and coastal groundwater is already likely to contain these. In addition, drilling mud can have a positive impact by giving structure to sandy soils, and because of its nitrogen content. Another prime consideration is having the disposal site convenient to the well site to reduce transport impacts and costs. Disposal sites have almost invariably been coastal sand country, and site reinstatement at a disposal site after disposal leaves land owners with more productive pasture (contoured and more productive soil).

14.11 Hazardous wastes

There are several routes for the safe collection of hazardous wastes in the region.

Two of the District Councils operate hazardous waste drop-off facilities, South Taranaki at the Hawera Transfer Station, and New Plymouth at the New Plymouth Transfer Station. Domestic hazardous waste is accepted for no charge at both transfer stations; commercial hazardous waste (including waste from farms) is accepted for $10 per kg or litre at New Plymouth; Hawera refers anyone with commercial quantities to New Plymouth. Stratford Transfer Station also accepts small quantities of domestic hazardous waste and this is taken by the site manager to Hawera for collection.[76] Collections of accumulated material at the facilities are arranged as needed. These are done by Haz-Tech, a company operating nation-wide with years of experience in this work.[77]

Materials collected include pesticides and weedkillers and other commercial and household hazardous materials, including solvents, lead based paints, acids, household cleaners, isocyanates and tributyl tin. The collector estimates that approximately 40% of the total collected is pesticides, and 60% are other commercial and household hazardous materials. He stressed that this was very much an estimate as amounts can vary enormously, e.g. one collection might have one or two large quantities of pesticides.

The only records available for quantities are for pesticides, and these are separated into intractables,[78] which are sent overseas for destruction, and pesticides for local

[76] Stratford used to have its own hazardous waste collection but the last one was in December 2006; and the lack of a hazardous waste shed at the Transfer Station is a constant issue for the on-site manager

[77] "Haz-Tech has provided hazardous waste collection and disposal services throughout New Zealand since 1992… They have provided their expert support and advice through small jobs such as removing old pesticides from a single farm shed to being the main contractor on large projects such as the repackaging of large stockpile of waste agricultural chemicals to make it safe for transport." From www.haztech.co.nz/Haz-Tech/Home.html accessed 7 May 2009

[78] These include DDT, 245T, 24D and paraquat

disposal, which are treated in New Zealand. Legacy pesticides are still being collected.[79, 80]

Over the last 3 years 1376kg of pesticides have been collected from the region, of which 934kg was intractable, with the remaining 442kg being for local disposal. There is no pattern to amounts collected, with occasional large spikes, for example in April this year 184kg of DDT and 25kg of paraquat were collected from Hawera. (For comparison purposes, there was only 3.4kg of DDT in the previous collection and no paraquat). This indicates there is still an unknown quantity of legacy chemicals in the region.

Haz-Tech gets about one query a month from farmers in the region for private collection and disposal. These queries have never resulted in a collection in Taranaki, which is attributed to the cost, usually about $13 a kilogram plus travel costs. What happens to these pesticides is not known. It is possible they stay in storage or are disposed of inappropriately perhaps in farm pits or by burning. This operator thinks the only way to ensure environmentally sound disposal of agrichemicals is for collections to be free to those needing to dispose of them. The Regional Council has already run four well-publicised region-wide collections, between 1993 and 2004, offering free collection. Quantities of the intractable and hazardous wastes collected on each occasion have steadily reduced, with paint and waste oil by far the largest proportion in the most recent collection.

The variability in both quantities and types of materials being received makes it difficult to predict what might happen over the next five years.

In addition to the Haz-Tech collections, hazardous materials in the region are also handled directly by two other companies, Transpacific Industries and Waste Management. These are then sent to Transpacific Technical Services, either in Wellington or Auckland, for final treatment and disposal. There appear to be no threats to the current arrangements, although no information was available from one of these companies.

An unknown factor is the recently launched nationwide collection programme for agrichemicals, Agrecovery Chemicals. This is an industry stewardship initiative aiming to provide a simple and cost effective national collection and disposal system for unwanted chemicals in agriculture. It is supported by funds contributed by participating brand owners under the existing Agrecovery Container levy and through a contribution from national government and user charges.

Some chemicals will be collected for no charge, but there are significant exclusions for which a disposal fee may apply: products whose registration has expired more than two years ago, including organochlorine and arsenical insecticides; products from brands and companies that are not part of the Agrecovery Programme; and unknown, unlabelled or mixed agrichemicals.

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[79] Chemicals that are no longer used in New Zealand; DDT for example was deregistered (no longer allowed to be sold) in 1989, but MAF had required its use on agricultural land to be stopped around 1970. MAF ran collections in the early 1970s.

[80] For example, 2 years ago 7.5 tonnes of DDT was collected from one farm and 5 years ago 6.5 tonnes of 24D dust from another farm. Neither of these was in Taranaki. R. McGregor, pers. comm., 11 March 2009

14.12 'Problem' wastes

These include a wide range of materials produced both by metal working industries and the energy industry. Materials include neutralised sludges, caustic wastes, high copper sludges, heavy metal liquid waste, interceptor sludges and cleaning agents from welding. They are sent to specialist companies in Auckland or Wellington for assessment. Chemical analyses are used to determine appropriate treatment and disposal. Where possible, one waste is used to treat another, e.g. acids are used to neutralise alkalis. In some cases overseas destruction is necessary. Types and quantities are erratic, making it very difficult to predict future trends, or sensibly determine current annual quantities. No problem is foreseen in the ability to handle these materials over the next five years.

The comment was made that Taranaki has very good procedures for this type of waste, probably due to the good environmental practices of the petroleum industry combined with the length of time it has been in the region.

14.13 Waste cooking oils

Approximately 120 tonnes of waste cooking oil is collected from the region annually by the one established collector, the Tallowman. They estimate that only 80% of suitable sites have a collection, and that this would directly relate to volume. It was suggested the rest would dispose of used oil in the rubbish or down the drain.[81]

A small amount of waste cooking oil is also diverted by individuals and used as vehicle fuel, either directly, for example the McVege car,[82] or by conversion to biodiesel.

Apart from accessing the 20% of sites estimated to be without a collection there do not appear to be any issues with the current arrangements. There are no capacity issues in terms of taking more material if this was available.

14.14 Grease traps

Three operators who deal with these wastes were contacted, including one which handles by far the largest proportion. In total, grease trap wastes containing an estimated 200 – 230 tonnes of fats and food scraps are collected annually. A small amount of this, about 12 tonnes, is treated in oxidation ponds; the rest is landfilled.

The materials now landfilled were once taken to composting sites in Waitara and Uruti, but Waitara is no longer available, and the transport cost to Uruti is prohibitive. One operator investigated taking them to the waste water treatment plant in New Plymouth, but this was not possible.

There do not appear to be any threats to the current arrangements, but alternatives to landfilling might be able to be explored for these materials as they have potential to be beneficially reused. For example, a plant to recover the fats from grease trap wastes is being trialled in Palmerston North; it might be possible to establish something similar in this region.

[81] Territorial authorities in some areas help by promoting the service, for example with advertisements at movies and putting signs up in restaurants
[82] Taranaki Regional Council. (2009)

14.15 Small batteries

These were excluded from the survey given their small volume. Previous investigative work indicates some jewellers collect silver oxide batteries and send them to a company which recovers the silver; the only cost to the jeweller is freight. Another company charges a fee to accept batteries. NiCad, metal hydride, lithium ion and silver oxide batteries are exported for recycling and alkaline ones encased in concrete for secure landfilling.

15. Cleanfills

There are 23 consented cleanfills in the Taranaki area. These are largely operated by local earthworks and construction companies to dispose of cleanfill arising from their activities. Several other sites accept fill for quarry reinstatement purposes. The annual tonnage of material accepted to Taranaki cleanfills is currently estimated to be between 110,000 and 140,000 tonnes, with individual cleanfills ranging from 2000 to 40,000 tonnes annually.

There is insufficient information available to accurate quantify the overall capacity of the cleanfills currently operating in the region. However as the only potential barriers to new sites being developed are either regulatory or cost, there is no reason that capacity will be scarce in the future. There will always be gullies and quarries that owners want filled and providing the activity qualifies for resource consent or as a permitted activity, and the operation is cost effective, cleanfilling will likely continue at least at its present rate. Future diversion and re-use or reprocessing of materials that are currently being disposed of at cleanfill may stabilize demand, especially if government levies make diversion more financially attractive.

Photograph 6 A typical cleanfill face showing the types of materials disposed of

Currently the bulk of the materials accepted at the region's cleanfills (as assessed by tri-annual inspection) consists of clay, concrete, soil, gravel and mature bitumen. Lesser amounts of plastics, some tree stumps and untreated timber are also often seen. The most common unacceptable wastes observed are green waste and galvanised iron; however these for the most part appear in cleanfills incidentally as part of a load of acceptable materials rather than being a systematic attempt to dispose of prohibited wastes on an ongoing basis.

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Wilson, D. (2007). *Optimising kitchen waste collection*, WasteMINZ Conference 2007

Websites

Agricultural chemicals container recycling
www.agrecovery.co.nz
www.astronplastics.co.nz/index_nz.html
www.trc.govt.nz/environment/waste/plastics.htm#plastics

Silage wrap recycling
agpac.co.nz/products.php?cid=14&type=P , wrap recycling
agpac.co.nz/products.php?cid=25&type=P , plywood replacement product made from recycled plastic
www.agrecovery.co.nz
www.trc.govt.nz/environment/waste/plastics.htm#agpac

Glass recycling
www.recycleglass.co.nz/glassmaking.htm

eDay
www.eday.org.nz/about-eday.asp

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)
www.mfe.govt.nz/laws/meas/basel.html

Green building
www.nzgbc.org.nz/main/greenstar

Composting
www.return2earth.co.nz
www.revitalfertilisers.co.nz

Promotion of home composting
www.createyourowneden.org.nz

Agricultural chemical disposal
www.agrecovery.co.nz

Paint recycling
www.enviropaints.co.nz/
www.resene.co.nz/paintwise.htm
www.resene.co.nz/pdf/Paintcrete.pdf

Appendix I

General comment on diversion of materials by waste contractors and at transfer stations

Several waste contractors sort material from rubbish collected in gantry type skip bins, the type generally used for house and business clean outs. Bin contents are emptied on to a hard stand and recyclable and in some cases compostable materials are extracted, along with any material that can be cleanfilled. This achieves a diversion rate from landfill of between 15-25% by volume (up to 50% by weight), for two of the three operators this information was available for. This type of bin only makes up part of their total rubbish (between 40% and 75% by volume), with the remainder comprising front loader bins, which tend to be used for regular commercial rubbish. Although these undoubtedly contain recyclable material like office paper, they are not economic to sort. These loads are also usually compacted.

The New Plymouth Transfer Station also removes materials from rubbish loads. The operator estimates about 6% by weight of the total that comes in is diverted. Metals are removed for recycling via scrap metal dealers; this is covered elsewhere in the report. In addition, about 50 tonnes a year is recovered for the Recycle Shop. This includes items like lawnmowers, household goods, bricks and timber; the latter two categories are further commented on elsewhere in the report.

The amount diverted can be affected by the decisions of other waste operators, for example, as above, pre-sorting loads and then taking the remainder directly to the landfill without using the Transfer Station. This is currently the case with one of the largest waste operators. Information on types and weights of materials being diverted by this business was not available, but it is unlikely to include as wide a range of items diverted by the Transfer Station as they are not likely to have access to a facility like the Recycle Shop.

Quantities removed for sale through the New Plymouth Transfer Station Recycle Shop are highly variable, and are not known for individual materials. The shop has been upgraded in recent times and now operates from an all weather facility, meaning more items are able to be diverted, and also that it is more attractive for buyers to spend time there. Many people visit the transfer station just to look through the shop, with 25% of visits on the weekend being solely for this purpose, indicating a substantial interest.

The Stratford Transfer Station manager estimates that she diverts about one third by volume of material brought in, around 100m^3 a week. Some items are for reuse, for example furniture, kitchen items and timber, and some are recycled like old whiteware and other metal. This site is a model 'resource recovery centre', and demonstrates what can be done by one person passionate about the environment and her community. A large part of her success is that she believes in the value of relationships; knowing what is going on in the community means she is able to easily divert household items to those who need them. By doing what she can to ensure materials coming in are reused or recycled, the manager also demonstrates that 'rubbish' is actually a resource which still has value, especially if it can be diverted before too much mixing or compaction occurs.

Appendix II

AgRecovery Programme Member Companies

AGRECOVERY
Rural Recycling Programme

Supporting Brand Owners

adria	Agronica	BASF	BAYER	Bell Booth
BioAg	biostart.	BOTRYZEN	DeLaval	DowAgroSciences
DUPONT The miracles of science	ELANCO	ELISIO	Elliott Technologies	Fruitfed Supplies
GREEN FORCE	Gro-Chem	Non-residual Pesticides	Horti centre	Intervet Schering-Plough Animal Health
KI KEY INDUSTRIES LTD	MANTISSA	Maxicrop TRIPLE	MERIAL Ancare	
Nitrosol	Nufarm	omnia primaxa	ORION	pacificag
Pacific Biofert	PHLOLIME	Pfizer	Ravensdown	SST
syngenta	Terranova SEEDS	Virbac ANIMAL HEALTH	YARA	elam

June 2009

Appendix III

The Waste Exchange

The Waste Exchange has existed for some time, and was originally administered by 3R; only some parts of the country are members. See www.nothrow.co.nz/index.html (the map shows Taranaki but we are not a member). Environment Waikato currently takes all the 0800 calls for the North Island apart from Auckland; the total volume of calls is not high, one or two a day. The site itself is apparently quite active with individuals and businesses listing independently on the website and contacting each other. The Exchange is about to undergo a revamp, to make it more decentralized. The cost to be part of this would be $400 a year for web hosting. Each area would have its own directories under two headings, Residential/Community; and Business/Industry, and 0800 calls would be directed to the appropriate area. This link is a sample of the type of listings: www.nothrow.co.nz/wastex/materials.jsp?Category=Food+and+Vegetation&Status=Available

Appendix IV

Used Oil Recovery

Ministry for the Environment (2009). *Waste Minimisation in New Zealand: A Discussion Document*, p6. Retrieved 24 March 2009, from www.mfe.govt.nz/publications/waste/waste-minimisation-discussion-documnet/html/page6.html.

"**Current situation**
It is estimated that 33–40 million litres of used lubricating oil are generated each year (MfE, 2007a). During use, oil becomes contaminated with substances that are hazardous to human health and the environment, including heavy metals and polycyclic aromatic hydrocarbons. Some of these contaminants are potential carcinogens. Good management of used oil is required to prevent harm to people, the environment and the economy.

Used lubricating oil can be refined for reuse or used as a fuel source in high-temperature industrial processes. International best practice encourages these two options. Used oil is also used as a fuel source in low-temperature burners and heaters, or sprayed on roads to reduce dust. There are environmental problems with these two uses, in particular harmful air emissions.

A producer-based used oil recovery programme involving Holcim, oil collectors and major oil companies, has been in place for some years. This voluntary programme collects an estimated 13 million litres of used oil a year for use as a fuel substitute for Holcim's cement kiln in Westport. Consented facilities, asphalt plants, lime kilns and other industrial plants use another 6.4 million litres. It is estimated that another 8 million litres of used oil is collected and used in small low temperature burners (which often do not require resource consent) and as a dust suppressant on some roads. Some 7 million litres are not able to be accounted for.

Proposal for managing used oil
A product stewardship scheme would ensure that all used oil is managed and directed to high value uses with minimum harm to the environment. These uses could be as fuel (similar to the Holcim scheme) or involve processing of the used oil to produce new lubricating oils. To be effective, the scheme must have good coverage of New Zealand and recover a high percentage of used oil. If the current voluntary schemes cannot achieve this, a declaration of used oil as a priority product, or other regulation, may be needed."

Appendix V

Sample Covering Email and Questionnaire

Organic Materials Processing

Hi xxxx

Thanks for taking the time to look at this. We are collecting this information to help with regional waste planning. Under the Waste Minimisation Act, we need to assess current collection, recycling, recovery, treatment and disposal services available; forecast future demands for these services; and determine what options are available to meet these forecast demands. Organic materials are clearly a large proportion of materials disposed of in the region, with much of it currently being processed for beneficial reuse.

The information you provide will be treated as confidential, and anything produced for use outside council will have the data aggregated by sector to protect commercial interests.

Councils also need to 'promote effective and efficient waste management and minimisation', so any additional comments with respect to this and what role your company could see itself playing would also be appreciated.

Kind regards

Barbara

Barbara Hammonds
Waste Minimisation Officer

Company name:

Name of respondant(s):

Position of respondant(s):

Phone number:

Site address/es:

1	When did the facility commence operations?	
2	What type of processing system is used? *Eg windrow, vermicomposting, in-vessel digestion*	
3	What type of feedstock / materials does this facility accept?	
4	What types of activities generate these materials? Or, if easier, what type of facility do they come from?	
5	What is the approximate annual quantity of material accepted? *Preferably in tonnes/annum but m3 will suffice (both if possible)*	
6	What are the annual quantities of individual feedstocks (if known)? Or, if easier, how much of each main type of material comes from each of your sources?	
7	Quantity of materials coming from out of Taranaki if any	
8	Does the site have a weighbridge? if not, how is the quantity of incoming material measured? *Eg cubic metres based on truck sizes, loader scales*	
9	What is the maximum annual capacity of this facility? (raw material quantities)	
10	What are the estimated annual quantities of raw materials over the next 5 years? *If an increase or decrease is expected, what is the basis for this? Are you receving requests for you to increase your acceptance of raw materials?*	
11	Is there potential for growth in your markets? *If so, will this accommodate any expected increase in feedstock? Also, is there enough feedstock for you to take advantage of any increase in demand?*	
12	What is the end product(s)?	
13	Is the product in finished form for commercial / retail release when it leaves your site or does it go elsewhere for further processing?	
14	What are the annual quantities of end product(s)?	

15	What sector(s) are the top three buyers/users of the end product(s)? e.g horticulture, viticulture, arable crop, turf etc. and what % of sales do they each account for?	
16	How is product distributed? e.g. bag sales, bulk sales, land applied etc. What percentage of sales does each category account for?	
17	What are the main constraints upon your business growing?	
18	Is your business operating profitably?	
19	Do you see yourself staying in business for the next 5 years?	
20	Is there any possibility of double counting, eg between different sites you operate?	
21	Any comments on how your business might be able to further assist with effective and efficient waste management and minimisation in the region would be appreciated	