

# Waste Minimisation & Management Plan

University of Waikato

2019-2022



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## Introduction

The Waste Minimisation and Management Programme (WMMP), reflects goals 3&4 of the University Strategy (2017-2021); *'Make our campuses exemplars of good environmental practice, and solving environmental and social problems.* It also aligns with the University Charter *our commitment to sustainable and inclusive social, economic and environmental development.*

The programme also delivers on the University Environmental Policy, especially in regards to: *implementing sustainable practices on campuses, which include: efficient resource use, and managing and minimising output of solid wastes, and discharges of liquid wastes and airborne contaminants.*

The WMMP has been developed to provide a basis for good practice, environmental responsibility, and methods for waste reduction and diversion. The programme supports a holistic and integrated management approach, for which reduction of waste generation and its environmental impacts are key.

The WMMP refers to solid, liquid and gaseous waste.

This WMMP identifies the prioritising and monitoring of waste streams, and sets goals and targets to guide better waste management and outcomes. This is relevant in terms of our waste generation, with approximately 10,500 students and 1,400 staff on campus; including 1000 students living on campus in the Halls of Residence.

An estimated 500 tonnes of waste is disposed of each year to landfill (80-100 tonnes of which is organic waste). Seven comprehensive waste audits on campus (2011-2018) have collectively highlighted that 69% of waste to landfill is recyclable or compostable. The cost of waste disposal and recycling at the University exceeds \$185,000 per annum.

Waste minimisation refers to any practice which can be used to minimise the generation of waste by modifying or improving existing processes and behaviours. An extended definition of terms can be found in Appendix 1& 2.

Additional background information for this programme is provided in Appendices 1-5 which includes: The New Zealand Waste Strategy 2010; definitions; and information about waste in New Zealand.

## 1.0 Waste in New Zealand

There are 1000 landfills in New Zealand, 52 are legal and operational. In the Waikato there are 5 legal operational landfills and 13 cleanfill sites.

The majority of the University's waste goes to Hampton Downs and Tirohia landfills, both over 60km from the University.

Over 700,000 tonnes of waste is estimated to go to Waikato Landfills annually. In Hamilton, waste to landfill increased 33% from 2012-2016 (HCC Waste Minimisation Plan, 2018-2024).

Landfills have the potential for a broad range of environmental effects. The impacts come in the form of a toxic liquid called leachate, which is produced from the break-down of landfill content (such as; batteries, paint, plastics, chemicals, tyres, metal, faecal matter and dead animals).

Modern landfills are usually lined with high density polyethylene (HDPE) plastic and clay to contain the leachate, however liners ultimately fail. A life of 15-106 years for high density polyethylene liners has been predicted at 35<sup>0</sup>c (Geosynthetic Institute 2011).

For many older landfills built near waterways, there is the potential for leachate to enter. Some modern landfills recycle and treat leachate, such as Hampton Downs Landfill, which sends its leachate to Auckland's sewage system.

Landfills also produce greenhouse gases; methane and carbon dioxide, which are a by-product of bacterial respiration and decomposition of waste in the landfill. These greenhouse gases can be emitted for thirty to fifty years, and are often released into the atmosphere.

On closure of a landfill in New Zealand, on-going monitoring and remediation is required for up to thirty years via the Resource Management Act.

### **Costs:**

Landfills are expensive to operate and monitor. Hamilton City Council spends over \$600,000 a year managing four closed landfills (2018).

Waikato Regional Council estimates, if Hampton Downs Landfill was abandoned they would have to pay:

- \$3.3 million to cap it
- \$2.8 million to deal with leachate for 30 years
- \$1.5 million to maintain landfill for 30 years
- \$0.7 million to treat landfill gas
- \$0.5 million to monitor ground water and air quality

The New Zealand Government currently charges a \$10 per tonne waste levy fee for every tonne of waste to landfill. This is highly likely to increase in 2019. As a comparison, the Waste Levy in Australia is \$133 per tonne, in the UK \$160 per tonne.

## 2.0 Waste Minimisation & Management Programme

As a responsible and environmentally aware organization, The University of Waikato will endeavour to ensure that all aspects of its operation have the least harmful effect on the environment, by adopting and implementing environmentally appropriate practices in its operations.

Waste reduction is important to the University environmentally, socially, culturally and economically. The University is committed to minimising waste on campus through prevention, reduction, reuse and recycling. We recognise that prevention of the generation of waste is the preferred and most effective option. Where that is not possible, we will seek to reduce waste, reuse resources and finally recycle.

### 2.1 Goals

- To reduce the University's waste.
- To deliver advanced waste minimisation and management practices on our campuses.
- To contribute to research and development in waste management.
- To provide innovative solutions to waste management.
- To work with our communities to achieve effective waste management across the region.

### 2.2 Actions

The overall aim of the programme is the prevention and reduction of the generation of waste to landfill.

**Action 1.** Establish and maintain robust systems for managing, minimising and measuring our waste streams.

**Action 2.** Establish systems and programmes for preventing, diverting and reducing waste on site, using best practice.

**Action 3.** Manage responsibly and within legal requirements, any hazardous and electronic waste, and where feasible utilise substances that lead to waste that is less hazardous.

**Action 4.** Model waste management and minimisation for sustainability, and raise awareness of waste minimisation within the campus and in the community.

### 2.3 Performance and Monitoring

- a) Annually assess and audit to identify waste streams and recyclables volumes/weights.
- b) Annually review and report on the targets associated with this plan.
- c) Review the Waste Minimisation & Management Programme in 2022.

## 2.4 Waste Minimisation Commitment



### The University of Waikato Waste Minimisation Commitment

Waste reduction is important to the University, environmentally, socially, culturally and economically.

As a responsible and environmentally aware organization, The University of Waikato will endeavour to ensure that all aspects of its operation have the least harmful effect on the environment, by adopting and implementing environmentally appropriate practices in its operations.

The University of Waikato is committed to a Waste Minimisation Programme to help reduce the volume of waste generated by its operation.

In accordance with our Environmental & Sustainability Policy, we will manage and use resources in an environmentally responsible manner. In addition we will:

- a) Implement and promote waste minimisation options, systems and practices on site.
- b) Promote sustainable and waste minimisation behaviour amongst the University and wider community.
- c) Reduce waste on campus, by prevention, recycling, reduction and reuse, and seeking alternatives.
- d) Manage and minimise the output of solid wastes, discharges of liquid wastes and airborne contaminants.
- e) Encourage suppliers, contractors and vendors to act in accordance with our waste minimisation standards and programme.
- f) Work with suppliers to provide products that have the least environmental impact.
- g) Set targets for the reduction of both the volume and toxicity of waste streams.
- h) Encourage the development of innovative waste systems and support research focused on waste minimisation.
- i) Encourage staff to notify the Environmental & Sustainability Manager of any issues or ideas for improvement.
- j) Monitor the implementation of the programme by carrying out periodic audits and, when appropriate, introduce remedial measures.

**Neil Quigley**  
**Vice-Chancellor**  
**Date**

2/7/15

**Anna Bounds**  
**Assistant Vice-Chancellor Operations**  
**Date**

2/7/15

## 3.0 ACTIONS & TARGETS

**Action 1: Establish and maintain robust systems for managing, minimising and measuring waste streams.**

Establish and maintain robust systems to assess and measure solid, gaseous and liquid waste streams, in order to inform waste management decisions, to manage responsibly, and within legal requirements, including where possible, the minimisation of such waste.

To achieve this we will:

- a) Enhance systems to track and measure both recyclables and solid waste to landfill.
- b) Implement a system for tracking the donation and redeployment of usable items, including the diversion and capture of construction waste.
- c) Monitor, and minimise liquid trade waste disposed to storm water and gaseous waste to the environment, within legal requirements.
- d) Set up a system to track, safely collect and measure small batteries for recycling.
- e) Assess and track fluorescent tubes and light bulbs for recycling.
- f) Annually and accurately report on all computers and ICT products donated to schools or the community, or recycled via Hewlett Packard, South Waikato Achievement Trust and any other certified recyclers etc.
- g) Assess and report annually on greenhouse gas emissions from waste and onsite/offsite composting.

### Targets and monitoring

1. Establish and maintain systems to track recyclables, batteries, E waste, ICT waste, construction waste, solid waste, metal, liquid and gaseous waste by mid-2019.
2. Establish Warpit, a furniture recycling and redeployment tool in 2019.
3. Maintain up to date Excel sheet and carbon calculator to assess carbon emissions.
4. Map out waste and recycling on campus in order to monitor skips more efficiently by 2019.
5. Develop a centralized database or system for capturing ICT recycled products by mid-2019.

**Action 2: Establish programmes and systems for preventing, diverting and reducing waste to landfill.**

Establish and maintain robust systems and programmes to prevent, divert, and reduce waste on campus, and from entering campus and landfill.

To achieve this we will:

- a) Follow the waste minimisation hierarchy of; prevention, reduce, reuse and recycle.
- b) Increase recycling rates by; providing sufficient internal & external recycling facilities on campus.
- c) All recyclables should be separated and diverted to bins, receptacles and cages on site. These include; cans, glass, plastics 1&2, cardboard, paper, batteries, fluorescent lights and metal.
- d) Reduce the use of non-recyclable packaging and single use plastic on campus, including working with suppliers, contractors and tenants.
- e) Replace plastic at university events and conferences with biodegradable plates, cutlery and cups where possible.
- f) Phase out polystyrene packaging on campus.
- g) Support and encourage reducing paper use on campus and set printers to double side.
- h) Encourage the expansion of online systems and online marking, course work and reading.
- i) Ensure that all retired computers are donated to schools or recycled via Hewlett Packard- HP Planet Partners Recycling Programme, South Waikato Achievement Trust, or equivalent.
- j) Include clauses in contracts/tenders, specifying that construction/demolition and metal waste must be minimised or recycled.
- k) Divert and recover E waste and batteries from going to landfill.
- l) Divert furniture, carpet and equipment from going to landfill.
- m) Divert organic waste on site from landfill when systems are available.
- n) Audit recycling bins and reduce recycling contamination rates annually.
- o) Work with local and regional councils on any waste issues connected with the university and students.
- p) Fleet car oil and tyres taken for recycling will be measured and documented.
- q) Carbon dioxide emissions from waste to landfill will be reported on annually.
- r) Key sites audited annually on campus, and waste audit reports produced with recommendations for reducing and managing waste.
- s) Annually audit systems and procedures for improvement.
- t) Seek and investigate innovative and improved ways to manage waste and reduce costs.



- u) Work with Comms and suppliers to reduce packaging on merchandise and branded products, and sustainability of products being purchased.

### Targets and monitoring

1. Waste contractors will provide accurate tonnage on waste to landfill and recycling by 2019.
2. Continue to collate and report on data/tonnage on recycling and waste weights.
3. Contract documents will include waste minimisation clauses by 2019.
4. Document and assess construction waste being disposed on site by end 2019.
5. Continue to expand internal recycling and systems.

#### Reduce Waste to Landfill

2019	2020	2021	2022
5%	10%	12%	15%

#### Increase recycling on campus:

2019	2020	2021	2022
5%	10%	15%	20%

#### Reduce organic waste via composting, or other systems on site:

2019	2020	2021	2022
5%	10%	15%	20%

#### Computer paper use decrease

2019	2020	2021	2022
5%	10%	15%	20%

**Action 3:** Manage responsibly and within legal requirements, any hazardous and Ewaste, and where feasible utilise substances that lead to waste that is less hazardous.

The University is committed to the responsible management of hazardous waste.

We will recover hazardous waste (batteries, fluorescent tubes, photographic chemicals, oils, solvents, acids, alkaline solutions, pesticides and computer monitors, ICT equipment, televisions, paint), or dispose of safely and legally. The University will also seek to utilise less toxic alternatives where feasible.

To achieve this we will:

- a) Ensure that hazardous and E waste is minimised, measured, monitored, and dealt with appropriately and legally.
- b) Ensure our E waste is separated for recycling and recovery, and is dealt with responsibly and legally via certified recyclers.
- c) Ensure that no hazardous wastes or paint are disposed of through the general waste or recycling streams or to drains.
- d) Recover all hazardous waste (batteries, fluorescent tubes, photographic chemicals, oils, solvents, acids, alkaline solutions, pesticides and computer monitors, televisions, paint), for recycling or disposal of safely and legally.
- e) Ensure that all chemical waste and sharps are collected by a legal provider and weights are reported on annually.
- f) Ensure that relevant suppliers provide HazChem sheets and provide information on use and storage.
- g) Ensure that all chemicals and batteries are stored safely and dealt with appropriately, and discharges and spills are minimised.
- h) Seek to utilise less toxic alternatives where feasible; for cleaners, pesticides and other chemical items.
- i) Comply with Health and Safety procedures and legislation on campus.

### **Targets and monitoring**

1. Continue to document, measure and manage all hazardous waste on site.
2. Continue to recover and deal responsibly with all hazardous waste as outlined in c) and d).
3. All hazardous chemicals will continue to be stored legally and safely.
4. Less toxic chemicals will be considered for use where possible, maintaining a preference for non-toxic cleaners.
5. FSEN to report annually on cost and weights of hazard material collected for disposal.

## Action 4. Promote waste minimisation behaviour amongst the University and community.

The University is committed to assisting staff, students, and the wider community to learn about waste and its environmental, social, cultural and economic implications, and to encourage and support waste minimisation behaviour.

We strive to model best practice with waste management and minimisation systems and processes that support sustainability and environmental objectives, and align with the University Environmental Policy. Waste minimisation research, programmes and initiatives on campus are encouraged and supported where possible and the community is engaged.

We will achieve this goal by:

- a) Raising awareness of waste and recycling via; CommUnity, the University Sustainability website, student newsletters, Greenbites, articles and wider media.
- b) Providing access to advice and education on waste, including guest lectures, resources, events and presentations on waste minimisation and the University Sustainability webpage.
- c) Encouraging innovative waste systems, procedures, programmes and initiatives and supporting research focused on waste.
- d) Collaborating where possible with councils, businesses, the community and other agencies to reduce waste.
- e) Showcasing and promoting research on waste, and providing working examples of waste minimisation on campus.
- f) Encouraging and promoting the prevention, reduction and reuse of waste when purchasing.
- g) Suppliers and contractors that provide products, services and procedures, will contribute to reducing waste and providing products that have the least environmental impact.
- h) Suppliers should develop a waste minimisation plan and submit it with relevant contracts.
- i) Engaging with the community, businesses and agencies by providing presentations annually, and by providing assistance to councils and other agencies on waste and planning.
- j) Results from waste audits on campus will be published and recommendations made for waste reduction options, annually.
- k) Working with stakeholders on campus, including Clubs, WSU and other key groups to promote waste reduction.
- l) Caretakers/cleaners/porters separate recyclables and reduce waste where possible.

### Targets & Monitoring

1. Awareness of waste and recycling is increased 20% by 2020 (as identified in environmental sustainability survey).
2. Recommend mock bills to faculties and divisions on waste amounts and costs.
3. Continue to increase visibility and branding of waste.

## 4.0 Responsibility for Actions

ACTIONS	RESPONSIBILITY
<b>Action I:</b> <b>Establish and maintain robust systems for managing, minimising and measuring waste streams.</b>	Sustainability & Environment Manager Sustainability Coordinator Science and Engineering technicians ITS Procurement Services Support Manager
Enhance systems to track and measure both recyclables and solid waste to landfill.	Sustainability & Environment Manager Sustainability Coordinator
Further develop the system for tracking the donation of usable items, including the diversion and capture of construction waste.	Sustainability & Environment Manager Sustainability Coordinator FMD Workshop Supervisor Team Leader Logistics
Monitor, and minimise liquid trade waste disposed to storm water and gaseous waste to the environment, within legal requirements.	Maintenance Supervisor FMD Sustainability & Environment Manager Science and Engineering technicians
Set up a system to track, collect and measure small batteries for recycling.	Sustainability & Environment Manager Team Leader Logistics
Assess and track fluorescent tubes and light bulbs for recycling.	Electricians FMD
Annually and accurately report on all computers and ICT products donated to schools or the community, or recycled via Hewlett Packard, South Waikato Achievement Trust and any other certified recyclers etc.	ITS Procurement
Assess and report annually on greenhouse gas emissions from waste, fleet cars and air travel.	Sustainability & Environment Manager. Data to be provide from; Fleet Manager, Orbit Travel, Services Support Manager, Grounds Manager, FSEN technicians and ITS Procurement.
<b>Action II:</b> <b>Establish and maintain robust systems and programmes to prevent, divert, and reduce waste on campus, and from entering campus and landfill.</b>	Sustainability & Environment Manager
Increase recycling rates by; providing sufficient internal & external recycling facilities on campus.	Sustainability & Environment Manager Services Support Manager.
Reduce single use and non-recyclable plastic packaging on campus	Sustainability & Environment Manager

Replace plastic at university events and conferences with biodegradable plates, cutlery and cups where possible	Sustainability & Environment Manager Events Team
Phase out polystyrene cups and plates on campus	Sustainability & Environment Manager Tenants Shops and Food Outlets Contracts Manager, Procurement Manager
Work with suppliers to reduce plastic and non-recyclable packaging	Sustainability & Environment Manager Procurement Manager. Contracts & Leases Manager
Support and encourage reducing paper use on campus by setting printers to double side	Sustainability & Environment Manager ITS Deans/PVCs
Encourage the expansion of online systems and online marking, course work and reading	Sustainability & Environment Manager ITS Dean/PVC's
Ensure that all retired computers are donated to schools or recycled via Hewlett Packard- HP Planet Partners Recycling Programme, or equivalent.	ITS
Recycle and divert construction and metal waste where feasible.	FMD Supervisor
Divert and recover E waste and batteries from going to landfill	Sustainability & Environment Manager. Team Leader Logistics
Divert furniture, carpet and equipment from going to landfill.	Sustainability & Environment Manager Sustainability Coordinator Team Leader Logistics Space Asset Manager
Divert organic waste on site from landfill.	Sustainability & Environment Manager Sustainability Coordinator.
Audit recycling bins and reduce recycling contamination rates annually	Sustainability & Environment Manager Sustainability Coordinator.
Work with local and regional councils, other industry partners on any waste issues connected with the university and students.	Sustainability & Environment Manager
Fleet car oil and tyres taken for recycling will be measured and documented.	Fleet Manager
Key sites audited annually on campus, and waste audit reports produced with recommendations for reducing and managing waste.	Sustainability & Environment Manager
Seek and investigate innovative ways to manage waste and reduce costs.	Sustainability & Environment Manager Senior Leaders.

<b>Action III: Manage responsibly and within legal requirements, any hazardous and Ewaste, and where feasible utilise substances that lead to waste that is less hazardous.</b>	ITS FSEN Technicians Laboratory users
Ensure that hazardous and E waste is measured, monitored, minimised and dealt with appropriately and legally. Weights and costs reported on.	ITS FSEN Technicians Laboratory users
Ensure that no hazardous wastes are disposed of through the general waste or recycling streams or to drains.	FSEN Technicians Laboratory users
Recover all hazardous waste (batteries, fluorescent tubes, photographic chemicals, oils, solvents, acids, alkaline solutions, pesticides and computer monitors, televisions, paint) wherever possible, for disposing of safely and legally.	ITS FSEN Technicians Laboratory users FMD Electricians FMD Carpenters
Ensure that all suppliers will provide HazChem sheets and provide information on use and storage.	FSEN Technicians FMD Supervisor
Ensure that all chemicals are stored safely and dealt with appropriately, and discharges and spills are minimised.	FSEN Technicians FMD Supervisor
Seek to utilise less toxic alternatives where feasible; for cleaners, pesticides and other chemical items.	Services Support Manager Grounds Manager
Ensure our E waste is separated for recycling and recovery and is dealt with responsibly and legally via certified recyclers.	ITS
<b>Action IV: Promote waste minimisation behaviour amongst the University and community.</b>	Sustainability & Environment Manager Sustainability Coordinator
Providing access to advice and education on waste, including guest lectures, resources and presentations on waste minimisation and the University Sustainability webpage.	Sustainability & Environment Manager Sustainability Coordinator
Encouraging innovative waste systems, programmes and initiatives and supporting research focused on waste.	Sustainability & Environment Manager Sustainability Coordinator
Showcasing and promoting research on waste, and provide working examples of waste minimisation on campus.	Comms Sustainability & Environment Manager.
Encouraging and promoting the prevention, reduction and reuse of waste when purchasing.	Procurement Manager Services Support Manager All Staff
Suppliers and contractors provide products, services and procedures that will contribute to reducing waste and providing products that have the least environmental impact.	Procurement Manager Project Managers Account Managers

Where relevant suppliers to develop a waste minimisation plan and submit it with contracts.	Procurement Manager Project Managers Account Managers
Caretakers/cleaners separate recyclables and reduce waste where possible.	Services Support Manager

## 5.0 University Waste

Waikato University waste (470-520 tonnes per year) is transported to Hampton Downs Landfill, a distance of 65km, and Tirohia Landfill, 61km.

Waste costs the University over \$160 a tonne to transport and dispose of to landfill. This will shortly rise when the waste levy is increased by the Government and the waste contractor increases prices in 2019.

There are 19 skips on campus managed by Waste Management.

The University's waste is transported by Transpacific Waste Management. 4 trucks service the University several times a week, or fortnightly. Carbon emissions from 1 rubbish truck are estimated at over 2 tonnes of CO<sub>2</sub>e a year. Four rubbish trucks would produce between 8-12 tonnes of CO<sub>2</sub>e a year. Additional impacts stem from: carbon monoxide, particulate matter, volatile organic compounds and nitrous oxides. Waste Management are looking to convert their diesel fleet to electric over the next few years.

### 5.1 Recycling

There are 11 external recycling stations on campus. Generally these are utilised well with minimal contamination, except in the food courts where organic waste is mixed with landfill waste.

Internal recycling (for cans, glass and plastic) was established in 2014 and now includes 120 bins (34 stations) in; FEDU, WMS, L Block, S Block, LAW, TEMS, FASS, FSEN, FMIS, R Block, C Block, Pathways, SUB, B Block, N Block, Food Court and the Student Centre. Further indoor recycling stations will be rolled out as resourcing allows.

Toner cartridges are collected within faculties and divisions.

Plastic types 1 & 2, aluminium and tin cans, glass, paper, cardboard, batteries and fluorescent tubes are collected on campus for recycling. Some soft plastics are collected independently inside the Student Centre.

Computers and ICT equipment is collected for recycling. Small battery recycling was established in 2013, and usable furniture, equipment and carpet are gifted occasionally.

Light bulbs/ fluorescent tubes and batteries are collected by FMD porters.

Office furniture and carpet is offered to schools and non-profit organisations, and computers are refurbished for schools.

University Cleaners, contract cleaners and FMD porters collect recyclables and temporarily store them in the Grounds Department. Furniture, carpet and equipment is stored in Ruakura Stores.

Our recycling weights versus waste to landfill are 21% vs 79%.

## 5.2 Organic waste

A 2m x 1.5m worm farm was established in December 2011, and diverts approximately a tonne of organic waste annually. This is located in Orchard Park

Smaller worm farms and compost bins are located in FMD, SUB, Grounds, SMPD, the Community Garden, and B Block.

OSCA, an onsite industrial composter was purchased and installed outside Bryant Hall in 2018. Trials have shown the compost to be usable and pathogen free. However, modifications are required to enlarge the entrance for easier access. The unit has been moved to College Hall and will be operational in July 2019.

We pay in the vicinity of \$15,000 a year for organic waste to go to landfill. However, this figure will rise with transport costs, waste levies and projected carbon emission taxes.



## 5.3 Waste audits

Waste audits are conducted annually, to gauge the amount of waste to landfill, and recyclables disposed of in the waste. Waste audits in: FASS, LAW, ITS, the Village Green, Halls kitchens, Student Centre and WMS have collectively highlighted that 69% of waste to landfill is recyclable or compostable.





## 5.4 Waste & Recycling Collection

Waste Management (WM) collects the university's waste, which is taken to Tirohia and Hampton Downs Landfills for disposal. Recycling is also collected by WM and is taken for sorting in Tauranga for baling for overseas markets.

### Glass

Glass goes to OI in Auckland, Metal goes to Simms Pacific. OJI Fibre collects paper and cardboard.

### Hazardous waste

Approximately 150kg of Sharps and medical waste is produced each year and collected by Haztech. The Faculty of Science and Engineering manages this waste.

### Batteries

Lead, Nicad, Lithium and rechargeable batteries are collected for recycling in Korea, under certified Basel Convention guidelines. Alkaline batteries are encapsulated in concrete in New Zealand. A, AA, AAA, C or D batteries are collected. These are taken by McGregor's Haztech.

### Computers/Toners

Computers and ICT products are sent to HGH Services and South Waikato Achievement Trust for recycling. Computers are also gifted to schools. HP and Minolta take toners and cartridges back.

### Furniture

Is collected by FMD porters and gifted to schools, marae, and other community groups. The University has also joined [Freecycle](#), a waste exchange website, where unwanted furniture equipment and carpet is offered. An estimated 8 tonnes is redeployed and gifted each year. We are currently trialling Warpit (FurniCycle) an online tool for managing and tracking furniture.

### Metal

FMD porters uplift scrap metal for recycling. There is a containment drum in FMD and skip at Stores. Scrap metal goes to Scrap Palace and South Waikato Achievement Trust which takes metals. 12-20 tonnes per year is collected.

### Fluorescent tubes

These are collected at a cost of \$2 a tube. We send approximately 1200 tubes a year to JA Russell.

### Paint

Some paint is sent to Resene for recycling, or contractors on site are responsible.

### Oil

Waste Oil and petrol is sent to Waikato Petroleum.

### Liquid waste

There are 12 grease traps which collect waste and food scraps from commercial kitchens on site. These are pumped out every 2 months and taken for disposal.

### Tyres

140-150 Tyres per annum sent to Bridgestone / Firestone NZ for recycling.

## 5.5 Waste Costs (2018)

Waste/recycling costs per annum are currently over \$190,000 including \$25,000 for recycling and almost \$38k for hazardous waste. There may be additional costings which may have not been captured.

Waste Type	Description	Approx. Weight	Cost	Area
<b>Landfill</b>	Mixed waste collected by WM for landfill.	512 tonnes	\$108,000	Lorraine Geary Mark Thompson Brett McEwan
<b>Recycling</b>	WM		\$18,000	Lorraine Geary Mark Thompson
<b>Recycling</b>	OJI (paper/cardboard) JA Russell (fluro tubes ICT		\$3,354 \$3,240 \$ 0	Lorraine FMD ITS
<b>Green Waste</b>	Landcycle	Approx. 210 Tonnes	\$19,000	Mark Thompson
<b>Hazardous</b>	Chemicals and sharps Batteries- recovered		\$37,858	Science Helen McKinnon
<b>Tyres</b>	Recycle We pay \$3 service fee for tyres to be taken.	142 #	\$426	John Ireland
<b>Approx. total</b>			<b>\$189,878</b>	

Table 1 Waste costs and tonnage

# Map of 11 outdoor recycling stations



## RECYCLING STATIONS

## 5.6 Indoor recycling stations

A series of recycling stations were first put in place in 2014 in; WMS, L Block, S Block, FSEN, TEMS, LAW, Pathways, and the Student Centre. Within 6 months the stations diverted 1 tonne of recyclables from landfill. Recycling stations are now in most faculties and buildings and will be continued to rolled out in 2019-2020.



## 5.7 Waste Disposal Methods: Issues & Options

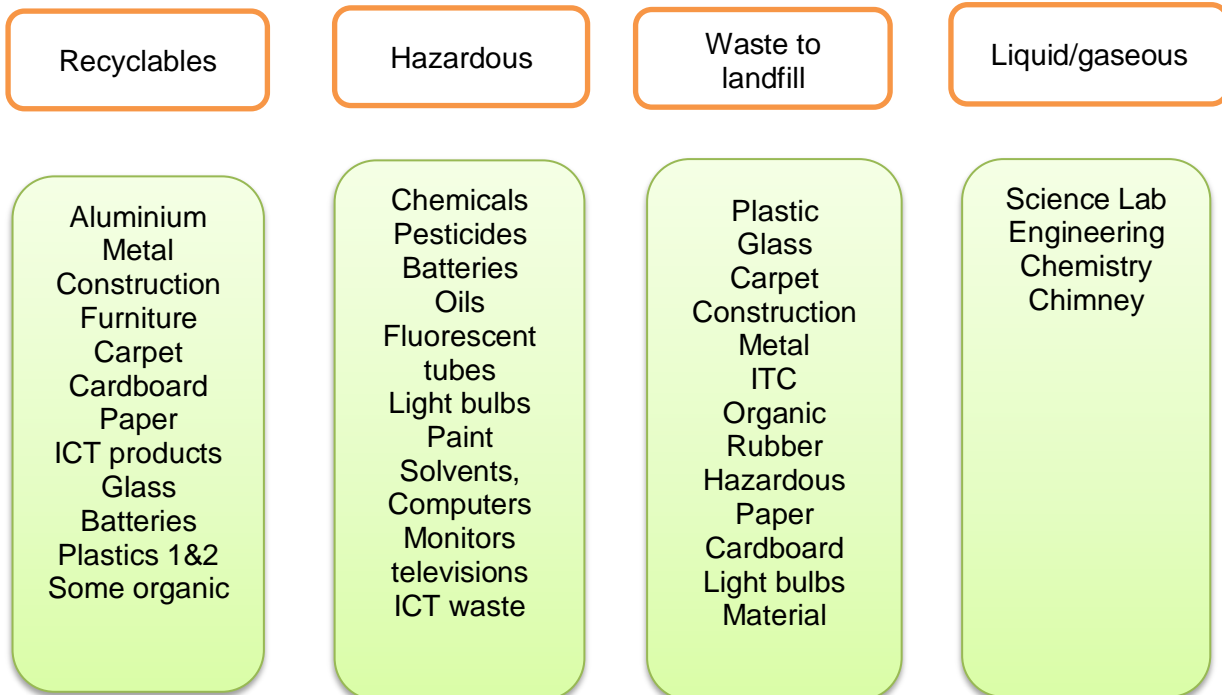
- Recycling bins- landfill waste is placed in the recycling stations, and recyclables are being contaminated with other recyclables.
- A large amount of waste to landfill is recyclable or compostable (69%)
- Further internal recycling systems are required for plastic, glass and aluminium cans.
- Lack of understanding, and possibly apathy around recycling and waste disposal.
- A perception that recycling bins are rubbish bins.
- Non-recyclable plastic packaging on campus (namely polystyrene).

Waste Type	Method	Responsibility	Issues	Options
<b>Paper &amp; cardboard</b>	Recycle	FMD	Co-mingled with landfill waste  Cardboard recycling boxes not utilized	Education Accessible bin locations Ensure staff have recycling paper boxes in offices KPI's need to be set at high level
<b>Aluminium cans</b>	Recycle	FMD	Co-mingled with landfill waste	Education Bin locations Twin the bins Expand internal recycling KPI's need to be set at high level
<b>Glass</b>	Recycle	FMD	Co-mingled with landfill waste	Education Bin locations Twin the bins Internal recycling KPI's need to be set at high level

<b>Plastic types 1 &amp; 2</b>	Recycle	FMD	Co-mingled with landfill waste	Education Bin locations Twin the bins Internal recycling KPI's need to be set at high level
<b>Plastics 3,4,5,6,7</b>	Landfill	FMD	Not recyclable	Reduction Phase out polystyrene KPI's need to be set at high level
<b>Batteries</b>	Landfill and recovery	FMD	Awareness of service Cost \$3.95-\$5.95kg	Haztech for recovery Education Promote KPI's need to be set at high level
<b>Cell phone batteries/computers</b>	Recovered	ITS	Awareness of service.	Promote KPI's need to be set at high level
<b>Toners/cartridges</b>	Recovered/ recycled	ITS	Capture	Promote KPI's need to be set at high level
<b>Organic</b>	Landfill	FMD	Greenhouse gases Leachate	Diversion-on site or compostable offsite KPI's need to be set at high level
<b>Hazardous</b>	Secure collection	FSEN	Cost	Use and monitoring KPI's need to be set at high level
<b>Construction</b>	Recycle Disposal	FMD Contractors	Some waste to skip. No amounts audited	Contract requirements to recycle and monitoring KPI's need to be set at high level
<b>Green Waste</b>	Recycle	FMD	Costs to transport off site	Investigate on site chipping? KPI's need to be set at high level

Table 2. Waste type and disposal

## 5.8 Key waste streams



## 5.9 Main Waste Streams at UoW

The two top waste streams on campus, are currently not that well recycled (except for 2.5 tonnes of organic waste in the Village Green, and a small number of worm farms and compost bins). Most furniture and carpet is removed and recycled and some wood.

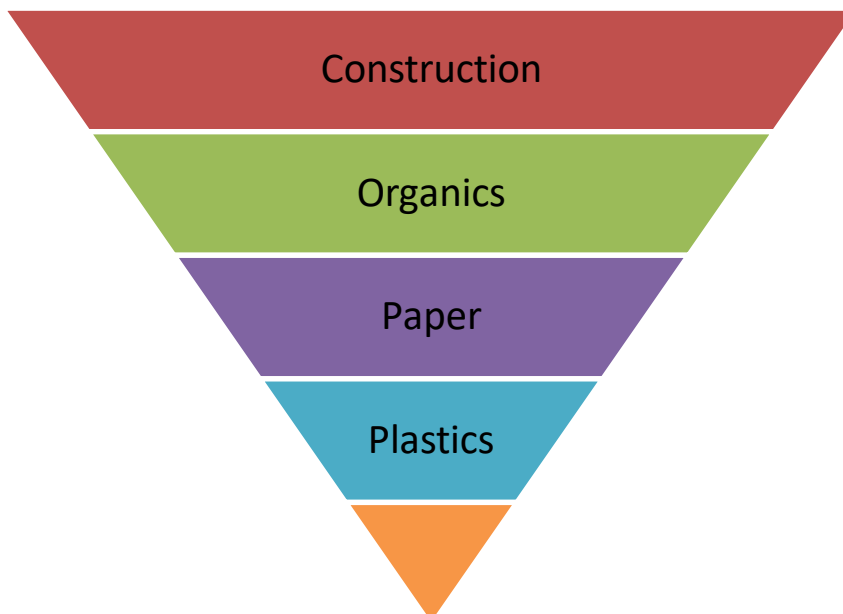


Figure 4: Main waste components UoW.

## 5.10 Typical waste composition

Five comprehensive waste audits across the university have highlighted that almost 70% of our waste to landfill is recyclable.

The largest components of waste (by weight) are generally food waste, glass bottles, paper and plastic packaging.

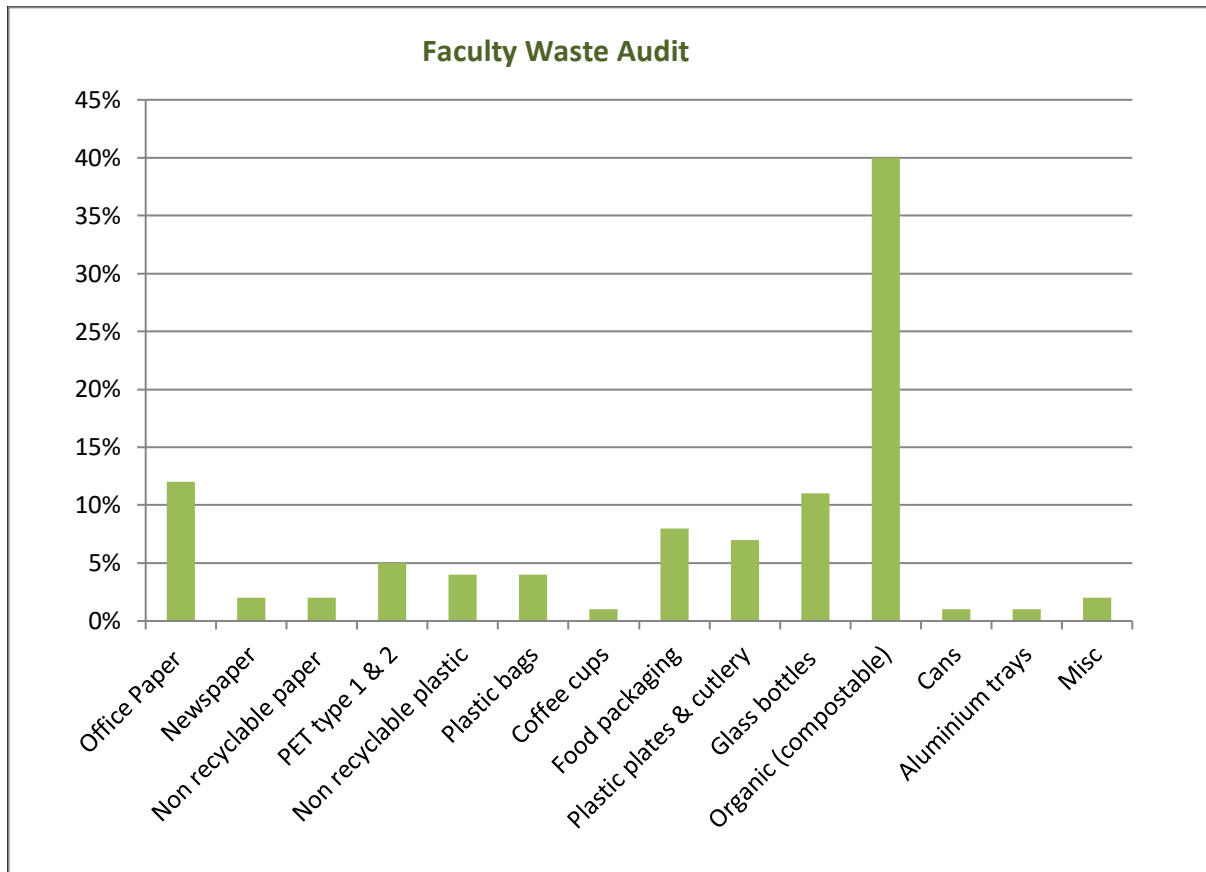


Figure 5 Waste Composition

Waste Audits are conducted at the university on an annual basis, usually in conjunction with student's course work. The rationale for auditing is to: identify how much waste is being disposed of to landfill, highlighting issues with recycling, and recommendations for further systems or education. It also allows benchmarking to assess whether waste has increased, stayed the same, or decreased. It is also a useful educational tool to highlight our waste generation and disposal options to students.

## **6.0 Other areas for consideration**

### **Printing**

Although paper use has decreased, due to online systems, a large volume of paper is still utilized for printing on campus. We spend \$65,000 on copier paper and \$35,000 on ink cartridges in a year.

We will investigate and encourage alternatives such as: electronic transfer of information, efficient use of paper when printing, and setting printers to double side and print black and white. Recycled paper could be promoted at the University if compatible with photocopiers. Recycled card for business cards should be an option when ordering online.

### **Use of low toxicity ink and toner products**

We will seek to use ink and toner products on campus that have low toxicity to human health and the environment where practicable. Toners and cartridges should have the ability to be reused. The efficacy of these collection programmes will be assessed.

### **ITS**

The University will explore ways to use IT to provide information and suggestions for actions that could enhance sustainable behaviour for staff and students on campus (take back, recycling, double siding, and computer shutdown). Purchases of hardware and software, and disposal of e-waste, should consider environmental, social and economic factors.

### **Campus businesses**

We encourage all independent and subsidiary businesses to adopt sustainable practices. This includes consideration of environmentally-friendly products and services, adoption of a waste minimisation plan, and engagement in ethical and fair trade practices. All campus businesses will be made aware of policies relating to sustainability on campus.

### **Twinning the Bins**

Rubbish bins should be co-located with recycling bins/stations. The Village Green is a priority area for this.

### **Charges**

Consider charging each faculty or school for its waste in the future.

### **KPI's**

Set targets high level.



## 7.0 Education

A range of education initiatives have been established around waste and awareness raising.

- 1) Lectures and workshops have been developed and delivered to staff and students.
- 2) A monthly environmental column in the University magazine 'CommUnity' features waste initiatives on campus, projects and facts and figures, and a biannual newsletter highlights waste issues and information.
- 3) Waste and recycling has been branded at the University to encourage and engage students to recycle correctly (WASTED).
- 4) A FASS student won the 'design an Enviro Mascot' for the University, which features a rat recycling super hero. Animated films have been made starring Ratty the Recycler.  
<http://www.youtube.com/watch?v=zt3Opb1rJlq>  
<https://www.youtube.com/watch?v=nQrAZSfhB5w>
- 5) Students have monitored recycling bins at lunchtime to reward students who use them correctly.
- 6) Annual waste audits with students highlight waste produced and composition.
- 7) We have created an Enviro Facebook page for students.
- 8) Sustainability webpage with waste and recycling information.
- 9) We have developed a campaign/programme for student engagement.
- 10) Waste Education films:  
<https://www.youtube.com/channel/UC4D0asNBTNoVFTfWAafP7Jg/videos>
- 11) Green Office- desk top waste cube and increased recycling rolled out 2019-2020.

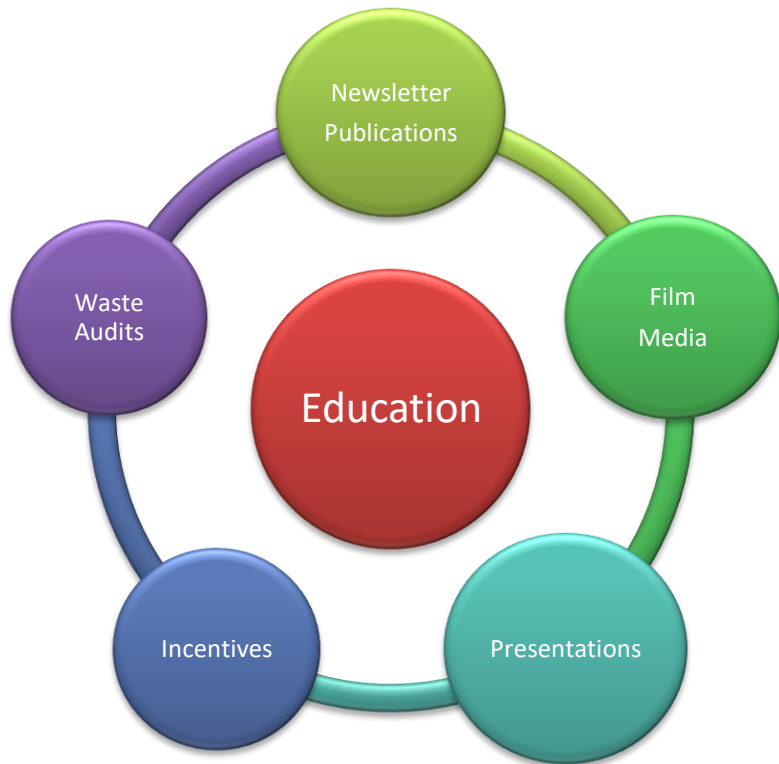


*Ratty the Recycler*



*Students from the Enviroclub*

Education is crucial for changing behaviour. Education arms people with the knowledge to make informed decisions. The key is making waste and education visible and accessible in order to change behaviour.



*Figure 6: Behaviour Change Components*

## 8.0 Key Waste Priorities

Waste	Priority	Issues	Solutions
<b>Waste Reduction</b>	1	Reduction of waste and costs High costs Environmental impact Waste levy increase	Set high level targets and KPI's Mock invoices to Deans/PVC's of faculties/divisions FMD staff to support
<b>Set up robust systems to track and measure waste</b>	2	Waste to landfill could be reduced significantly High costs Environmental impact Waste levy increase	Waste contractors to provide accurate weights Excel sheets or tools to track and manage waste and recycling Donations of equipment/furniture tracked
<b>Polystyrene packaging</b>	3	Potential environmental and health impacts Non-recyclable Highest landfill charge	Ask suppliers to take back polystyrene packaging and use an alternative. Audit packaging in ITS and Officemax
<b>Organic waste to landfill</b>	4	Organic waste causes greenhouse gases; methane and carbon dioxide, carbon miles	Diversion onsite- worm bins and compost bins Trial OSCA composter Research alternatives
<b>Recyclables mixed with waste to landfill</b>	5	Recyclable cans, bottles and glass are being deposited into the rubbish  Costs and landfill space/environmental impact	Education/posters and signs on what is recyclable Wasted Brand. Guest lecture and info in induction booklet and talks Students to educate bin users at lunchtimes Additional internal stations needed
<b>Plastics 3,4,5,6,7</b>	6	Non-recyclable	Reduce purchasing and use. Seek alternative packaging. Ask suppliers to take back polystyrene or use alternative
<b>Construction Waste</b>	7	More accurate figures required and usable material captured and diverted	Audit Contractors accountable for minimising, diverting and recycling and reporting amounts Clauses in contracts Waste Plans required by relevant contractors

<b>Hazardous Waste E Waste</b>	8		Liaise with science & engineering and ITS on current systems
<b>Café staff and customers not recycling</b>	9	Staff and students from main cafes on campus throw recyclables into the rubbish rather than recycle bins	Work with Cafes Students to educate other students Twin the bins (remove bin from outside café and place with recycling stations)

Table 3. Key Priorities

## 9.0 Partners & funding potential

The Ministry for the Environment has funding via the Waste Management Fund for waste initiatives. Funding for research and development has been provided by Waikato Regional and Hamilton City councils.

Collaboration and sharing expertise and research with regional stakeholders and councils is clearly beneficial for both parties by; enhancing the ability to achieve more, working more efficiently, sharing resources, and having common united goals in solving waste issues.

## 10.0 UoW ACTION PRIORITIES 2019-2022

### Key Priority.

What	How	Time frame	Who
<b>Waste Reduction</b>	Mock invoices KPI's to Deans, Directors and Faculty Managers/PVC's WMMP implemented and actioned Awareness raising	2020	Director FMD VC SEM
	Further recycling stations and Green Office Project rolled out  Budget required, or Support Services Manager budget  <b>\$10k</b>	2020	SEM SSM
Meets UoW WMMP objectives 1-4			

### Priority 1: Plastics and packaging

What	How	Time frame	Who
Polystyrene packaging	Phase out polystyrene packaging, especially on ICT products	2019	SEM ITS
Number 3-7 plastics	Reduce use on campus and replace with alternatives where possible	On-going	SEM U Leisure Procurement Suppliers
Plastic packaging	Phase out on food stuffs. Encourage and expect compostable packaging. Single use plastic phase out.	2019-2020	Shops Cafes SEM Lease and Contracts Manager
Meets UoW WMMP objectives 2&4			

## Priority 2: Reduce organic waste to landfill

What	How	Time frame	Who
Food waste	Continue trialing organic waste diversion systems.  <b>Budget required: \$35k</b>	2020	SEM
Green waste	Investigate green waste use on campus and diversion to compost unit	2019	SEM Grounds Manager
Meets UoW WMMP objectives 2&4			

## Priority 3: Recycling Systems

What	How	Timeframe	Who
Collect weights on plastics 1 & 2 recycled	Waste contractors to provide weights on individual recyclables: paper, cans, glass and plastics 1&2.  Internal recycling stations weights	2019	SEM Support Services Manager Waste Contractor
Establish further internal recycling	Recycling internally, currently caters for paper. Plastics, glass and cans are required. Audit to assess areas that require this. Work with cleaners and porters to collect.  <b>Budget required: \$3k.</b>	2019	SEM SC Support Services Manager
Twin the Bins	Move rubbish bins and recycling stations together	2019	Grounds Manager Services Support Manager
Annual waste audits to ascertain amounts and recyclables to landfill	Conduct in co-operation with faculties. Good student research	Ongoing	SEM SC
Meets UoW WMMP objectives 1,2,4			

## Priority 4: Construction and demolition waste

What	How	Time frame	Who
Divert and manage construction waste from landfill	Education and contract requirements in place Waste Plans required where relevant	2019-2020	Group Manager FMD SEM Project Managers

Improve system for measuring waste to landfill	Document weights and monitor	On going	SEM
Improve systems for diverting waste	Trial FurniCycle (Warpit) and Freecycle website and database.  <b>Budget required: \$5k annually</b>	On going	SEM SC
Meets UoW WMMP objectives 1,2,4			

#### Priority 5: Education and Awareness Raising

What	How	Timeframe	Who
Education/awareness raising around waste	Workshops, presentations, CommUnity column, UoW Enviro webpage, Enviro Facebook Page and monthly newsletter. Branding waste and engaging students with competitions, film and posters.	On going	SEM CME SC
Improving student recycling	Hire students to educate lunchtime users of bins	Ongoing	SC, SEM
Collaboration	Collaborate with the community, councils and business to deliver waste education and solutions	On going	SEM, SC
Meets UoW WMMP objective 4			

#### Priority 6: Business & Procurement

What	How	Timeframe	Who
Investigate an environmental purchasing policy or clauses	In line with the waste programme	2020	SEM Procurement Manger
Identify the top 10 suppliers for the university and investigate their impacts and options for them to improve sustainability performance	Access to supplier database	2021	Procurement Manager SEM
Meets UoW WMMP objectives 1&4			

**Priority 7: Hazardous and ICT Waste**

<b>What</b>	<b>How</b>	<b>Timeframe</b>	<b>Who</b>
Assess systems that measure and divert hazardous waste	Recover all hazardous waste (batteries, fluorescent tubes, photographic chemicals, oils, solvents, acids, alkaline solutions, pesticides and computer monitors, televisions, paint) wherever possible, or dispose of safely and legally.	Undergoing	SEM FSEN Manager Support Services
Decrease, or improve the quality of liquid trade waste disposed to storm water.	Ensure signage and contract information	2019	Group Manager FMD SEM
Battery Recycling	Set up safe treatment and recovery with contractor using Basel Convention Guidelines  <b>Budget required: \$1k</b>	On going	SEM Support Services Manager
Audit hazardous chemicals	Assess chemicals used on campus and suggest less toxic where possible	2020	SEM Support Services Manager FSEN
Meets UoW WMMP objective 3			



# Appendices

## Appendix 1: Waste Minimisation Strategies and Legislation

The New Zealand Waste Strategy 2010, sets out the Government's long-term priorities for waste minimisation and management. The Strategy provides direction to local government, businesses and communities on where to focus their efforts in order to deliver environmental, social and economic benefits to all New Zealanders. The key goals are:

- Reducing the harmful effects of waste
- Improving the efficiency of resource use

Several councils have included a third goal: Avoiding the Creation of Waste.

Waikato Regional Council's Waste and Resource Efficiency Strategy 2012-2015, states that over 700,000 tonnes of waste is estimated to be going to Waikato landfills annually, and that waste to landfill in the Waikato has increased 19% in the last 5 years.

The regional strategy outlines how regional council will work collaboratively with key stakeholders to achieve the following goals:

To protect our communities, land, water and air from harmful and hazardous wastes  
To encourage resource efficiency and beneficial reuse that creates sustainable, economic growth.

## Waste Minimisation Act

The Waste Minimisation Act 2008 aims to encourage waste minimisation and decrease the environmental harm of waste generated through the manufacturing of goods or by reducing the amount of waste disposed to landfill.

The Act:

- Puts a levy on all waste disposed of in landfills to generate funding to help support local government, communities and businesses invest in initiatives that reduce the amount of waste
- Helps and, when necessary makes, producers, brand owners, importers, retailers, consumers and other parties take responsibility for the environmental effects of their products through product stewardship schemes
- Allows for regulations to be made making it mandatory for certain groups (for example, landfill operators) to report on waste data to improve information on waste minimisation
- Clarifies the roles and responsibilities of territorial authorities with respect to waste minimisation
- Introduces a Board to give independent advice to the Minister for the Environment on waste minimisation issues.

## Waste Strategy

The New Zealand Waste Strategy 2010 (NZWS) sets out the Government's long-term priorities for waste management and minimisation in New Zealand. The Strategy provides direction to local government, businesses and communities on where to focus their efforts in order to deliver environmental, social and economic benefits to all New Zealanders. The goals are:

- Reducing the harmful effects of waste
- Improving the efficiency of resource use

As a leader, and a responsible organisation, the University will align its waste minimisation and management programme with the goals of these documents.

## Appendix 2: Waste Minimisation Hierarchy

The University will observe the following hierarchy as best practice. Preferred and most effective options for waste reduction are avoidance or prevention. In order to achieve this, procurement of products, their impacts and packaging need to be addressed. The life cycle of products should also be considered.



Figure 2: <http://www.greengc.com.au/get-informed/what-is-waste>

Prevention: “avoiding or halting the purchase of an item after considering its life cycle impacts”. Prevention/avoid is at the apex of the waste minimisation philosophy. It involves an understanding of the materials and energy inputs and outputs.

Reduction: *“means lessening waste generation”*. Minimising or reducing waste seeks increased efficiency of the use of raw materials; energy, water and other resources, or the protection of natural resources by conservation.

Reuse: *“means the further using of products in their existing form for their original purpose or a similar purpose”*. This includes establishing waste exchange registers; the second-hand market and opportunity shops as well as supporting reusable packaging systems.

Recycling: *“means the reprocessing of waste materials to produce new products”*. This aspect is the most practiced and measurable. Obvious methods include kerbside collections of recyclables; drop-off points for recyclables and facilities for the recovery of construction and demolition waste. Recycling is driven by economics and markets, and is often reliant on funding.

Recovery: *“means extraction of materials or energy from waste for further use or processing”*. The recovery option is most usually associated with recovering green-waste for composting, and also heat and energy from the same process. This aspect offers the single greatest waste reduction strategy and has considerable benefits in reducing the impact of greenhouse gas emissions; reducing the volume and biological impact of landfill leachate and providing benefit to the land through the use of the products.

Treatment: *“means, subjecting the waste to any physical, biological, or chemical process to change the volume or character of that waste so that it may be disposed of with no or reduced significant adverse effect on the environment”*. Options include incineration, pyrolysis and some high technology mechanical composting operations.

Disposal: *“means final deposit of waste on land set apart for the purpose”*. This relates to an appropriately consented landfill site.

## Appendix 3: Waste Care Standards

1. All waste produced must be stored, carried, kept, processed, treated or disposed of in accordance with regulations.
2. Waste must be securely stored in compliant and suitable containers and locations pending uplift and disposal. The material and construction of the container must be resistant to the nature of the waste (e.g. corrosive, sharps) and suitable for the storage environment. The container will be securely sealed to prevent accidental spillage/leakage.
3. Segregation of waste should take place to prevent mixing of incompatible materials and to allow for recycling.
4. Waste collections should not prevent safe access or egress of people.
5. Waste should not be stored in plant or electrical switch rooms, near to heat or ignition sources or hinder access to equipment.
6. The office or unit holding any waste prior to collection must ensure that the waste is suitably described, inventoried, packaged and available for uplift.
7. Waste and recycling removed from University premises must only be transported by persons or Service Providers who are authorised to do so.
8. Ensure all redundant IT equipment is reused or gifted where possible.
9. Hazardous Wastes: ensure that no hazardous wastes are disposed of through the general waste or recycling streams or to drains. Any discharge to sewer from University premises that may present a substantially greater risk than domestic sewage and must be assessed.
  - Ensure Duty of Care compliance including appropriate segregation, inventorying, recording, describing and storage of Hazardous Wastes.
  - Nomination of 'Responsible Person(s)' to coordinate Waste disposal for any radioactive, healthcare, animal by-product, chemical or otherwise Hazardous Wastes.
10. Ensure that Waste Management practices and procedures are audited regularly and that any changes that may be required as a result of these reviews are carried into effect.
11. Enable the investigation of any incidents or accidents relating to Waste Management.

## Appendix 4: Environmental Purchasing

*“Green procurement” or “sustainable procurement” is obtaining goods and services so that the business or organisation has a minimal impact on environment and society. To protect corporate reputation many businesses are adopting these practices and ensuring their suppliers do not have negative social or environmental practices. It also allows businesses to align themselves with suppliers who have similar ethics and practices.*

Most products purchased have some environmental impact. The University seeks to play its part in minimising this impact.

### **We will endeavour to:**

- Work with suppliers to provide products that have the least environmental impact.
- We will purchase low environmental impact cleaning products where possible.
- Ask for Eco efficiency and certification in relevant tenders.
- Purchase printing paper that adheres to recognised environmental standards.
- Work with suppliers to take back polystyrene packaging /and/or replace with alternative packaging.

### **Product Stewardship**

Product stewardship encourages the effective reduction, reuse, recycling or recovery of products, and to manage environmental harm arising from the product when it becomes waste. It also promotes the responsibility of designing products so that the material used in manufacture can be recovered and re-used, and the amount of packaging and energy used in production is minimised.

Choices that consumers make have the potential to influence producers in their responsibility towards more sustainable production and packaging. Moreover, consumers have a responsibility to purchase in line with this principle.

### **Life Cycle Analysis (LCA)**

LCA assesses environmental impacts associated with all the stages of a product's life from-cradle-to-grave (i.e., from raw material extraction and energy to materials processing, design, manufacture, distribution, use, repair and maintenance, and disposal or recycling). It may also include environmental impacts and health.

The assessment identifies changes at each stage of the cycle that can lead to environmental improvements and savings. In terms of suppliers to the University, this is a useful tool to check environmental credentials and origin of products, and to inform ethical purchasing.



Figure 1: Life Cycle (Solidworks.com)

## Kaitiakitanga- Guardians of the Environment

We are all responsible for looking after the environment, and for our purchases and resulting waste. Kaitiakitanga holds a holistic view of the environment and recognises the relationship between all things. It is also an obligation of current generations to maintain the life sustaining capacity of the environment for present and future generations.

The Resource Management Act 1991 shows the relationship between Maori and ancestral resources as a matter of national and cultural importance. The management and disposal of waste is of significance to Tainui.

## Appendix 5: Reduce and Recycle check list

### PREVENTION

- Is the item low toxicity, long lasting and locally made?*
- Do we really need the item?*

### REDUCE:

- Consider leasing/sharing rather than buying*
- Is upgrading, reconditioning, or extending the life of our current model a better option?*

### Buy items that are long lasting, even if they may cost more initially

- Rechargeable batteries*
- Rewritable cd/dvd's*
- Consider how long this product will last compared to another model?*

### Buy items that are energy-efficient

- Energy-saving light bulbs*
- Computers*
- Hybrid or other more fuel efficient vehicles*
- Configure the Power Management facilities within office PCs*

### When printing consider

- Print double-sided (set to default to all printers)*
- Only printing when necessary – otherwise read on the screen*
- Reduce the margins and adjust fonts to maximise paper use*
- Use email to communicate where possible*

### REUSE

#### Reuse everything we can:

- the back of used paper: keep used A4 paper flat in a box for scrap paper, or next to the photocopier for internal photocopying*
- disks, CDs, DVDs*
- food scraps – compost, feed to worm farm or use Bokashi*
- Use washable cups/mugs rather than plastic/polystyrene ones*

**Buy products that are packaged in reusable materials**

**Buy in bulk to reduce packaging**

*Avoid polystyrene packaging*

**Use No Throw- a waste exchange service to advertise items that could be reused by someone and to look for items that you could use.**

### RECYCLE

**Recycle as much as possible of what we cannot reuse: printer cartridges, paper, plastic containers, tins, cardboard, mobile phones etc.**

**Buy products that are recycled and/or recyclable:**

- unbleached, recycled printing/office paper*
- unbleached, recycled toilet paper*

**Buy products that are packaged minimally in recyclable materials, such as paper and Cardboard**

## **[ ] Source local and/or New Zealand made products**

### **REVISE**

[ ] Revise our practices to see if we are reducing waste as efficiently as we can. Record changes we make in purchasing and calculate the savings—both environmental and financial.

### **Office Paper**

Consider purchasing recycled paper or paper from sustainably managed forests. Impacts from paper are broad:

- Managing and harvesting of the forest
- Producing pulp and paper
- Processing the paper product as waste
- Processing production waste
- Post-consumer waste.

[ ] Ensure that energy conservation features (e.g. timing for sleep mode) are enabled. To maximise energy conservation, turn off the computer and monitor completely at the end of the working day. Or use the IT computer shutdown.

Maximise resource efficiency

[ ] Obtain maximum lifespan from equipment before replacing: where possible upgrade existing units rather than buying new.

[ ] Consider whether surplus equipment may be able to be reused through a computer recycling firm, sale to staff, auction, or donation to community groups.

[ ] Prefer suppliers who provide products in packaging which has recycled content and is recyclable.

### **Soaps & cleaning chemicals**

Cleaning products are typically washed down drains to treatment plants where biodegradable compounds may break down to safer chemicals, but non-biodegradable toxic chemicals will pass through untreated. Products used outdoors will make their way to storm water drainage systems (and to the campus lakes). Both routes will contribute to pollution of our natural environment. The manufacturing process and disposal of chemicals and packaging also present an avenue for toxic chemicals to pollute the environment. Choose eco- friendly products where possible.

### **Fairtrade products**

A quick and easy way to improve the sustainability on campus is to provide Fairtrade certified products as an alternative to the standard tea and coffee supplies. By choosing Fairtrade the workplace will be directly supporting producers in less developed countries and contributing to sustainable development. Fairtrade offers many social and economic benefits to producers. They receive a fair and stable price that reflects the cost of sustainable production and labour. Emphasis is put on healthy working conditions and the development of community projects whilst encouraging environmentally sound production methods. <http://fairtrade.org.nz/>



## Appendix 6: Reducing Packaging at UoW

### 1.0 Plastic Recycling

Of the 7 plastic packaging types, only types 1 & 2 (PET- drink bottles and HDPE milk bottles) are currently collected in Hamilton. A large percentage of plastic goes to landfill, especially polystyrene. Recycling of plastics is based primarily on economics. If it is economically viable to reform plastic into another product, it can be done. However, only approximately 23% of all plastics are recycled in NZ. The rest are shipped to China, Australia and Malaysia for recycling, and unfortunately a large percentage is also landfilled. In comparison, Europe recycles 51% of plastic. Over 155,000 tonnes of plastic packaging goes to landfill each year in NZ.

#### 1.1 Plastic Types

Plastics are made from petrochemical based polymers, and a raft of other additives. There are seven main types of plastics used in packaging. The recycling numbers in the triangles have caused some confusion as not all of them are collected for recycling. For example, type 1 drink bottles can be recycled, but type 1 trays cannot be mixed and recycled with them due to the different methods of extrusion and forming. ABS type 7 plastic (i.e. sauce bottles and butter containers) is not readily recycled.

Type 1 Polyethylene Terephthalate (PET)		
PET is a polyester made up of terephthalic acid and monoethylene glycol, and sometimes dimethyl terephthalate.	Soft drink bottles, biscuit trays and peanut butter jars are made from PET.	Most of our PET bottles are baled up and exported to Australia and China. Up to 45% of PET goes to landfill in NZ.
Type 2 High Density Polyethylene (HDPE)		
HDPE is made from oil and ethylene gas, and sometimes Titanium Dioxide.	Milk bottles, ice cream containers, juice bottles, shampoo, chemical and detergent bottles, buckets, rare made from this type of resin.	Most number 2 plastic is reprocessed in NZ, into recycling bins, compost bins, buckets, detergent containers, posts, pipes and fencing.
Type 3 Poly vinyl chloride (PVC)		
Chloride, dioctanoyl peroxide and dicetyl peroxydicarbonate, heat stabilizers, UV stabilizers, lubricants, plasticizers, processing aids, impact modifiers, thermal modifiers, fillers, flame retardants, biocides, blowing agents and smoke suppressors. PVC is controversial for the use of "plasticizers" which are added to make the final plastic more flexible, and the use of chlorine in the product. Chlorine can give rise to dioxins in both manufacture and also if it is burnt for disposal. PVC can release chemical gases. Some studies indicate that this outgassing of additives may contribute to health complications, and have resulted in a call for banning the use of DEHP on shower curtains, among other uses. Car companies Toyota, Nissan, and Honda	PVC is made into cables, packaging, guttering water pipes, shower curtains, children toys and mats.	Some PVC is recycled.

eliminated PVC in their car interiors in 2007.		
<b>Type 4 Low Density Polyethylene (LDPE).</b>		
LDPE contains benzoyl peroxide, ethylene gas, carbon and benzene.  In the marine environment plastic bag litter is lethal, killing at least 100,000 birds, whales, seals and turtles every year.	Plastic bags and bin liners.	LDPE can be recycled but is difficult due to contamination by food.  Most bags go to landfill in NZ.
<b>Type 5 Polypropylene (PP).</b>		
PP is made from oil, carbon, hydrogen, methyl and propylene. Some PP contains ammonium and Oleic fatty acids.	PP is made into pegs, pipes, trays. Our banknotes are also made from PP.	PP is recycled in NZ, but there can be issues with contamination such as food and labels.
<b>Type 6 Polystyrene (PS)</b>		
PS is a liquid hydrocarbon made from ethyl benzene, petrol and hydrofluorocarbons. It can also contain benzoyl peroxide. Styrene oligomers in polystyrene containers used for food packaging have been found to migrate into the food. Other studies found that styrene detected in heated polystyrene container-packed may increase thyroid hormone levels. No bacteria or microorganisms are able to break polystyrene down. Extruded polystyrene may emit a form of CFC (CFCs deplete the ozone layer).	PS is recycled into coat hangers, coffee cups and white ware components.	Polystyrene is not recycled readily in NZ, but it has to be in whole pieces and clean. There is a charge of \$20 a car load. No kerbside collection in NZ will take it. Landfill charges \$1,400 a cubic metre, as polystyrene is bulky and does not break down in landfill.
<b>Type 7 Acrylonitrile-butadiene-styrene (ABS)</b>		
ABS is made from acrylonitrile, butadiene, ethyl benzene, and styrene. Acrylonitrile is a synthetic monomer produced from propylene and ammonia; butadiene is a petroleum hydrocarbon.	Musical instruments, golf club heads, automotive trim components, automotive bumper bars, enclosures for electrical and electronic assemblies, protective headgear, whitewater canoes, joinery panels, luggage and protective carrying cases, small kitchen appliances, and toys, including Lego bricks.	ABS is not recycled in NZ. It is a difficult plastic to re-process due to its chemical composition.  China recycles some ABS into car parts, and a substantial amount of ABS goes into concrete overseas.

## 2.2 Toxic chemicals

There has been concern over Bisphenol A (a building block of plastics, and a type of phthalate) leaching from plastics. Bisphenol A is used in food packaging, and is known to leach (in small amounts) into food, and is absorbed into our bodies. When some plastics (such as PVC) are exposed to hot liquids or heated, bisphenol A leaches out 55 times faster than it does under normal conditions <http://www.scientificamerican.com/article/plastic-not-fantastic-with-bisphenol-a/>

Bisphenol A is a known endocrine disruptor and can mimic some human hormones. Some studies in animals suggest that Bisphenol A may also affect the reproductive system. Bisphenol A can be found in PVC type 3 plastics and type 7 plastics, such as children's toys and baby feeding bottles.

Phthalates are so ubiquitous we all have traces in our bodies. Recently the Environmental Protection Agency, EPA, put phthalates on a list of chemicals that "may present a risk" to the environment or human health, because they disrupt hormone activity, and some studies have shown that they are anti-androgens (causing the demasculinizing of males). <http://www.cbsnews.com/news/phthalates-are-they-safe/>

Phthalates are easily released into the environment because there is no covalent bond between the phthalates and plastics in which they are mixed.

## 2.3 Polystyrene

Polystyrene has one of the highest landfill charges as it is bulky and does not break down. An estimated **200** million polystyrene meat/vege trays go to landfill each year in NZ. The bulk of Polystyrene on campus in the past, came from computer packaging and coffee cups.

The US EPA has described styrene to be "a suspected toxin to the gastrointestinal tract, kidney, and respiratory system, among others". In June 2011, the US National Toxicology Programme described styrene as "reasonably anticipated to be a human carcinogen". The U.S. National Toxicology Program of the U.S. Department of Health and Human Services also currently is evaluating styrene's potential toxicity. To date, no regulatory body anywhere in the world has classified styrene as a known human carcinogen, although several refer to it in various contexts as a possible or potential human carcinogen. The International Agency for Research on Cancer considers styrene to be "possibly carcinogenic to humans." <http://en.wikipedia.org/wiki/Styrene>

## 3.0 Proposal

- Polystyrene Cups are phased out at the University and replaced with paper cups. Polystyrene cups are cheaper than paper cups. However, the health and environmental considerations out-weigh the economics in this instance.
- Suppliers should be responsible for taking back bulk polystyrene packaging such as that used for whiteware and computers.

### 3.1 Costings & Benefits

Type	Cost	-	+
Polystyrene cups	4 cents each	Non-recyclable	Removed polystyrene cups from campus: Less environmental impact Lower potential health impact Lower waste costs (polystyrene has the highest landfill charge)
Paper Cups	10 cents each	Compostable	If we changed to paper cups: Limited waste to landfill as cups can be composted on site and compost put on Uni gardens No toxic chemicals in paper end product

**Polystyrene Goal-** Polystyrene packaging on campus is phased out.