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ACT NoWaste REPORT Audit of incoming waste at transfer stations and landfill

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1 EXECUTIVE SUMMARY

To provide accurate and current data on waste disposed in the ACT, ACT NoWaste engaged A.Prince Consulting (APC) to conduct an audit of waste disposed at Mugga Lane Landfill(LF) , Mugga Lane Transfer Station (TS) and Mitchell Transfer Station. This audit was conducted over 13 days. This involved four days of audit each at the transfer stations that included two weekend days at each TS in May 2022. Disposal based audit at the landfill was conducted in July 2022.

During the audit period, the composition of 2,338 incoming loads was visually assessed, comprising a total of 5,091 m^3, and representing 982 tonnes of incoming waste. The auditors recorded vehicle entry times, the type of vehicles delivering waste, the business sector from which commercial loads originated, and the amount of waste recovered for recycling by transfer station staff.

Each load was visually assessed by volume and then at the analysis stage multiplied by specific material densities and matched to each loads specific weighbridge data and scaled to that weight to determine the estimated composition by weight. Plastic bags of garbage were sampled from random loads that contained more than 20% garbage bags, and the bag contents were manually sorted into agreed categories.

The audit revealed that the peak vehicle entry time at the ACT waste sites is between midday to 1pm although the peak entry time at the landfill continues longer until about 4pm. The most common vehicle type at the landfill is tipper trucks whereas transfer stations receive mainly utes, utes with trailers, and 4WD with trailers.

By volume, the main components of incoming waste, across all the sites, are garbage bags of rubbish (29%), wood and wood products (21%), textiles at 14% and recyclables at 10%. Other materials such as non-recyclable plastic, metal and glass are 8%.

By weight, the main individual categories of incoming waste, across all the sites, are garbage bags of rubbish (25%), wood and wood products (17%), non-recyclable plastic, metal and glass (8%), recyclables (6%, such as plastic containers, glass containers, metal containers, large electrical items and paper/cardboard) and textiles (5%).

The bags within loads contain non recyclable plastics, metal and glass at 25%, 21.5% recyclable materials followed by organic material at 18% and food waste at 15%. Interestingly, 14% of material in the bags was textiles which is highly different from the 2015 audit. With bag contents dispersed, the main categories of incoming waste seeing the biggest increase are building materials from 0.21% to 13.8%. This is followed by wood and wood products (17%), textiles at 12%, non-recyclable plastics, metal and glass (10%), recyclables (17%), other organics (9%), and food (5%).

Overall, the waste entering the sites is 69% C&I and 30% MSW and 0.3% C&D, by volume. By weight, the breakdown in 73% C&I, 25% MSW and 2% C&D. By volume C&D waste is dominated by the ‘’other’’ category, which comprised primarily clean fill and rock/dirt/soil. The C&I waste has a large proportion of garbage bags and wood products. Over half (51%) of domestic waste (MSW) comprises wood, wood products and textile products.

By weight, and when the contents of plastic bags are dispersed into their categories, C&I waste contains 11% food, and the proportion of recyclables is 13% in MSW and 17% in C&I.

Beverage containers that would be eligible under the NSW Container Deposit Scheme (CDS) were counted in the bagged waste that was audited. At Mugga Lane Landfill 436 containers were found, followed by 127 at Mugga Transfer Station and 77 at Mitchel Transfer Station. When scaled to annual inputs, this results in an estimate of 32.5 million CDS-eligible beverage containers entering the landfill each year. The Mitchell Transfer station (~900,00 per year) had significantly smaller number of containers as compared to Mugga lane (~7.5 million).

Overall, 5.3% of incoming waste is recovered for recycling. This includes materials that are dropped off at the transfer stations as well as the materials that are removed by staff at the transfer stations. No materials are recovered at the landfills. This is due to the size and nature of the loads and site conditions. Mugga Lane transfer station recovers an overall 6.5% of the waste destined for landfill, for recycling while at Mitchell transfer station 26.4% was recovered. The high recovery rate at Mitchell transfer station is a result of the recovery of metals that are dropped off at the metal drop-off which is heavy in nature. Most of the recovered material was metals, as well as smaller amounts of concrete, bricks and mattresses.

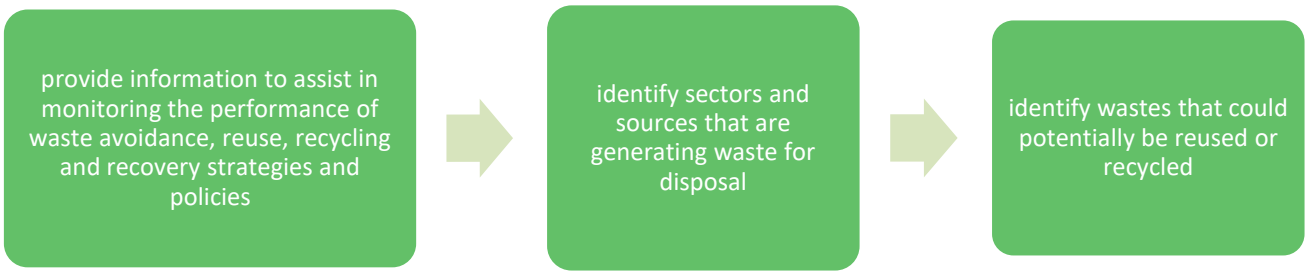
Of the remaining waste that is destined for landfill, 27% by weight is made up of potentially recoverable materials. The majority of this is recyclable material arriving at the landfill.

2 INTRODUCTION

Waste programs in the ACT are guided by the *ACT Waste Management Strategy 2011–2025* which aims for the ACT to lead innovation in the management of waste. A key goal of the ACT Government is to increase resource recovery and reduce waste to landfill. The Strategy specifically contains a number of targets for increasing resource recovery to more than 90% by 2025.

To provide accurate and current data on waste disposed in the ACT, ACT NoWaste engaged A.Prince Consulting (APC) to conduct an audit of waste disposed at Mugga Lane Landfill and Transfer Station and Mitchell Transfer Station.

This audit aimed to achieve the following:



ACT NoWaste operates the following resource management centres and activities:

Table 1: ACT waste management facilities

Mugga Lane Resource Management Centre, Mugga Lane, Symonston.
• Open 7.30 am to 5 pm, seven days a week (except Good Friday and Christmas Day) • Landfill for large vehicles • Transfer Station for small vehicles delivering mixed and general waste • Recycling drop off area: paints, cooking and motor oils, heater oils, sharps, mobile phones, car batteries, gas bottles, fire extinguishers, fluorescent lamps/tubes, e-waste: TVs and computers, drumMuster containers, household chemicals, paper and cardboard, glass jars and bottles, rigid plastic containers, aluminium cans and steel cans • Re-use centre accepts items with a saleable value
Mitchell Resource Management Centre, Flemington Road, Mitchell.
• Open 7.30 am to 5 pm, seven days a week (except Good Friday and Christmas Day) • Transfer Station for small vehicles delivering mixed and general waste • Free recycling drop off area: paints, cooking and motor oils, heater oils, sharps, mobile phones, car batteries, gas bottles, fire extinguishers, fluorescent lamps, e-waste: TVs and computers, drumMuster, paper and cardboard, glass, rigid plastic containers, aluminium cans and steel cans • Re-use centre accepts items that have saleable value

This audit was conducted in 2022 and this report also compares performance of the audited waste management facilities to the previous disposal-based audits conducted in 2015.

3 METHOD

The audit method was based on NSW *Department of Environment and Climate Change NSW Disposal based C&I Waste Audit Methodology, 2015* (*the Guidelines*) for this project. The Guidelines recommend that audits should include a visual assessment of all loads delivered and a physical audit of plastic bags in loads where bags comprise more than 20% of the load.

3.1 Project Inception Meeting

A pre-project inception meeting was attended by APC staff and relevant ACT NoWaste officers and included site visits to the landfill and both transfer stations at which detailed operational and logistical matters were discussed and finalised.

3.2 Site Inductions

APC project manager liaised with Remondis representatives to arrange site risk assessments, safety and environmental inductions.

3.3 Sample selection

ACT NoWaste provided a list of all incoming vehicle movements over a typical week by day and hour for both transfer stations and the landfill in order to ensure adequate resources were allocated based on anticipated vehicle movements per day entering the site. APC and ACT agreed to the following sample schedule:

Table 2: Agreed sampling schedule

Facility	Number of days for visual assessment	Number of loads to be assessed (see Table 3 for included/excluded load types)	Number of plastic bag extraction days	
			Weekday	Weekend
Mitchell Transfer Station	4	Visual assessment of all incoming loads. Physical sort of sample of plastic bag contents for any load containing > 20% bagged material.	1	1
Mugga Lane Landfill	5		5	0
Mugga Lane Transfer Station	4		2	1

Every effort was made to record every load, however this was subject to the timing of the deliveries, the number of loads at any one time, staff safety and the requirement for staff breaks. Staff endeavoured to take breaks at appropriate times when the number of vehicles was low. If multiple vehicles arrived at one time, the assessor obtained as much information as was safe and practical for each load.

Table 3 shows the load types that were agreed by APC and ACT NoWaste to be included and excluded from the audit.

Table 3: Included and excluded loads

Included load types	Excluded load types
• All commercial and industrial waste • All construction and demolition waste • All self haul loads	• Domestic waste delivered by contractor (general waste and bulky waste collections) • Transfer station waste delivered specifically for recycling or extracted by transfer station staff for recycling • Municipal waste from parks and gardens, public litter bins, roadside litter, council depot waste and private vehicles • MRF residue waste

3.4 Number and volume of samples audited

Table 4 shows the number and volume of samples achieved during the audit.

Table 4: Sampling dates, loads and volume assessed

Facility	Audit dates	Number of loads assessed	Total volume visually assessed(m3)	Total weight of sampled loads (tonnes)
Mitchell transfer station	14 May 2022 to 17 May 2022	857	766	115
Mugga Lane landfill	18-22 July 2022	337	3,069	651
Mugga Lane transfer station	14 May 2022 to 17 May 2022	1,144	1,256	217
Total		**2,338**	**5,091**	**982**

Table 5 shows the volume audited on each day of the audit, for each site.

Table 5: Volume audited by site, by date

	Mugga Lane landfill	Mugga Lane transfer station	Mitchell transfer station	Overall
	Volume audited (m^3)			
14/05/2022		360	306	666
15/05/2022		318	186	504
16/05/2022		439	142	582
17/05/2022		139	132	270
18/07/2022	546			546
19/07/2022	745			745
20/07/2022	446			446
21/07/2022	637			637
22/07/2022	695			695
Total	**3069**	**1256**	**766**	**5091**

Table 6 shows the weight audited on each day of the audit, for each site.

Table 6: Weight audited by site, by date

	Mugga Lane landfill	Mugga Lane transfer station	Mitchell transfer station	Overall
	Weight audited (tonnes)			
14/05/2022		62	45	106
15/05/2022		46	24	70
16/05/2022		89	22	111
17/05/2022		21	23	44
18/07/2022	95			95
19/07/2022	162			162
20/07/2022	108			108
21/07/2022	145			145
22/07/2022	140			140
Total	**651**	**217**	**115**	**982**

3.5 Visual and physical assessment of samples

3.5.1 Visual assessment of composition

APC staff attended each site from opening to closing time on each audit day. During weekdays APC stationed two staff at all sites and on weekends at the transfer stations increased this to three and four due to the number of loads to be assessed and to minimise the movement of staff between deliveries.

The auditors recorded the following information for each load:

- Date and time of the vehicle arrival
- Registration number
- Vehicle type
- Vehicle volume
- Degree of compaction

The ANZSIC codes were not collected as part of this audit as due to covid restrictions, APC staff were advised to not talk to the driver at all.

The staff made a visual estimate of the volume of waste in each load, based on 45 waste categories as shown in **Appendix A**. The definitions of each category are contained in **Appendix B.** The *NSW guidelines* set some common industry sectors that are summarised below. Industry sector definitions are provided in Error! Reference source not found..

Image 1: Waste being delivered at Mugga Lane landfill tip-face

3.5.2 Physical sorting of plastic bag contents

APC randomly selected plastic bags from commercial and self-haul loads whenever 20% or more the load comprised plastic bags. Samples were extracted from loads visually assessed daily (weekday) at Mugga Lane Landfill and on both a weekday and weekend day at each transfer station.

In commercial loads, the assessor selected approximately ten bags per load. Where the bags were not accessible due to other waste being in the way, the support of the plant operator was requested. In some cases due to the number of loads and activity at the tip face it was not possible to extract bags samples as other waste covered the bags.

For domestic self-haul deliveries, samples of bags were retrieved proportional to the amount delivered to determine the content of the bags. The number of bags selected for auditing was recorded. After selection the sample bags were placed in heavy duty bag/s and labelled with the vehicle registration number, date and transported to the sorting site for sorting by APC auditing staff.

The plastic bag contents were sorted by hand at Mugga Lane. All auditing was conducted at an undercover location adjacent to the TS in Mugga Lane. Staff sorted and weighed the contents of as many plastic bags each day as could be achieved in a 7.5 hour per day. The bags of waste were weighed on electronic floor scales. The weight was recorded prior to placing the contents on sorting tables. Bags were opened and the contents separated into 48 categories as shown in **Appendix A.** The weight of each material was entered into the appropriate space on the data recording sheet.

3.6 Data conversion, matching and scaling

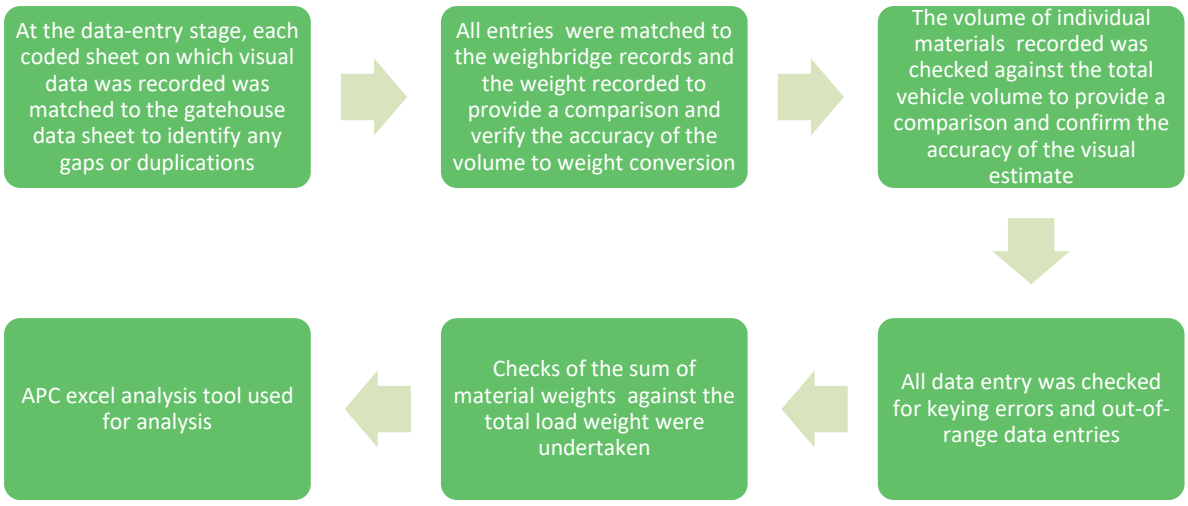
The audited composition of each stream and overall, was converted from volume to weight using the NSW EPA conversion figures provided in **Appendix D.** APC then matched each individual audited load with the corresponding weighbridge record using registration numbers, time and vehicle type. Each load was scaled in proportion to the amount of each material in the load to match the weighbridge-recorded total.

Image 2: A load of timber and bagged waste

Image 3: Coded bagged waste ready for sorting

3.7 Data verification and analysis

A number of techniques and procedures were used to check and verify data, as described below:



In the analysis phase, each waste material was classified as recyclable or not recyclable, in order to be able to inform ACT NoWaste of the potential to increase resource recovery from landfilled waste. A list of the materials considered to be potentially recoverable is contained in **Appendix C.**

Image 4: A load with large percentage of bagged material delivered at the Mugga Lane Landfill

3.8 Study limitations

The data for this study was collected and analysed using the best and most accurate methods available within the constraints of available time and budget. This study is a survey, which means that a relatively small amount of data has been collected and then treated as representative of the total. As in any survey, there are limitations to the accuracy of the data, as described below.

Time frame	• These audits were carried out over 13 sample collection days. The data was then used as being representative of all deliveries to the landfill and transfer stations. • Seasonal trends and weather events may change waste generation over time. • The results of this audit should be treated with caution when comparing the results with reports based on data taken at different times of year.
Representative sample	• The sample for this audit is necessarily small due to the high per-capita cost and resource-intensive nature of waste auditing. • There is always a small probability of inadvertently collecting waste from atypical loads, resulting in non-representative data. • APC undertook the entire sample using random loads.
Sample size limitations	• All surveys carry an element of sampling error, which is the mathematical error associated with using a sample to represent a total population. • Sampling error can be reduced by taking larger samples. The sampling error involved in waste audits is usually small and can be tabulated by producing estimates augmented by upper and lower confidence intervals.

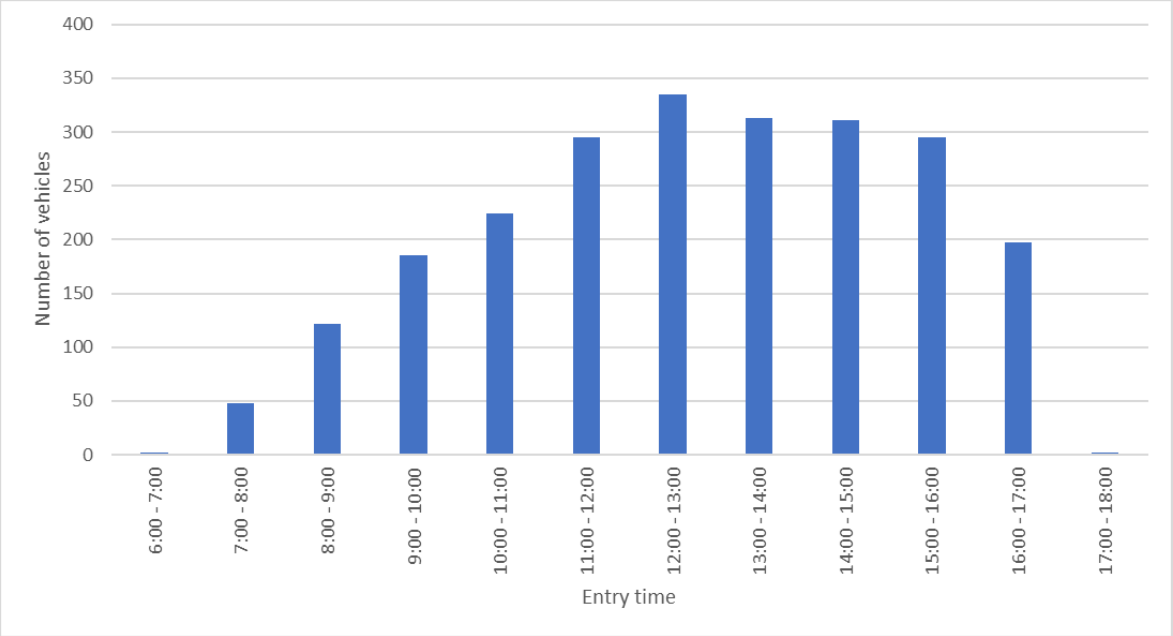
Image 5: A load containing building materials delivered at the Mugga Lane Landfill

4 RESULTS: ALL SITES COMBINED

4.1 Vehicle entry times

Figure 1 shows the time of day that the audited vehicles entered the audited sites. The peak vehicle entry time is midday to 1pm.

Figure 1: All site combined: vehicle entry times



4.2 Vehicle types delivering waste

The descriptions for the abbreviations used in this section are shown in Table 7.

Table 7: Vehicle type descriptions

Vehicle Type	Description
4WD	4WD
4WDT	4WD with trailer
C	Car
CT	Car with trailer
FB	Flat bed
FL	Front lift truck
P	Pantech
RL	Rear lift truck
RORO	Roll on Roll off
S	Station wagon
SK	Skip
ST	Station wagon with trailer
T	Tipper
U	Ute
UB	Ute with box trailer
UT	Ute with trailer
V	Van
VB	Van with box trailer
VT	Van with trailer

The types of vehicles entering each site are shown in Figure 2. The most common vehicle type at the landfill is tipper trucks. The transfer stations receive mainly utes, utes with trailers, cars and 4WD with trailers. This has not changed since 2015.

Figure 2: Vehicle types delivering waste, by site

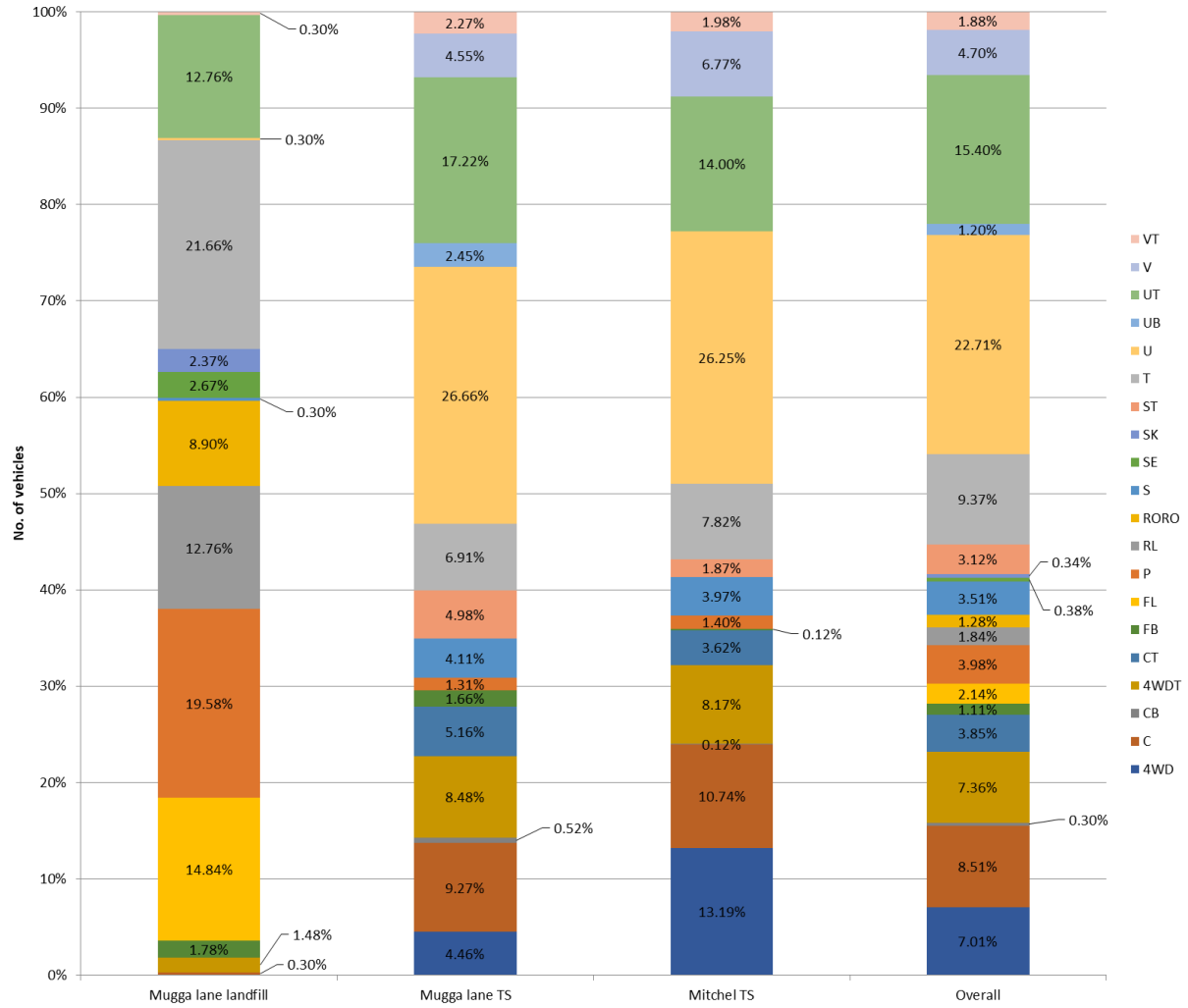


Image 6: A C&I load with range of recyclable materials delivered to Mugga landfill

Figure 3 shows the vehicles delivering each different waste type, across all sites. Construction and demolition (C&D) waste arrives primarily in Roll-on Roll offs followed by tipper trucks and utes. Commercial and industrial (C&I) waste arrives in almost all types of vehicles. Municipal solid waste (MSW) or domestic is delivered mainly in utes and 4WD or utes with trailers.

Figure 3: Vehicle types delivering waste, by waste type

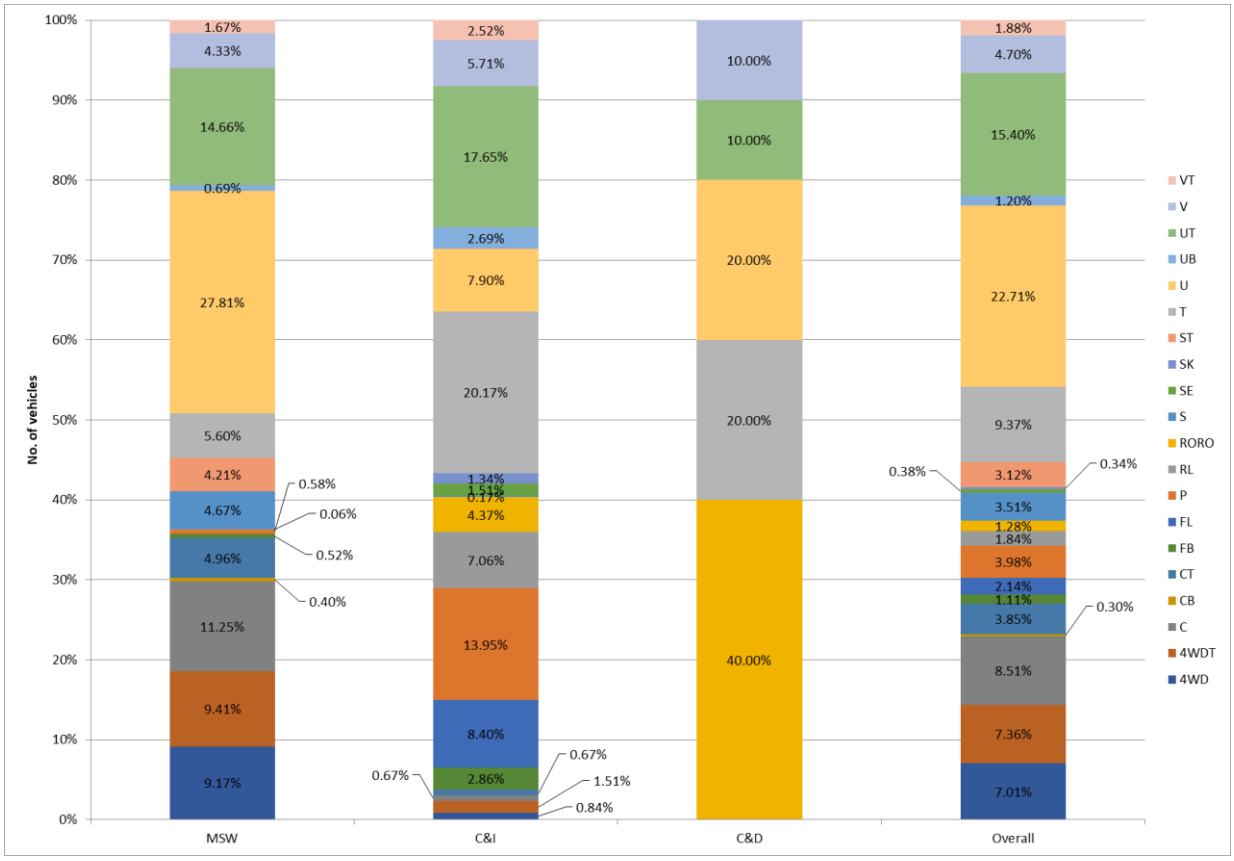
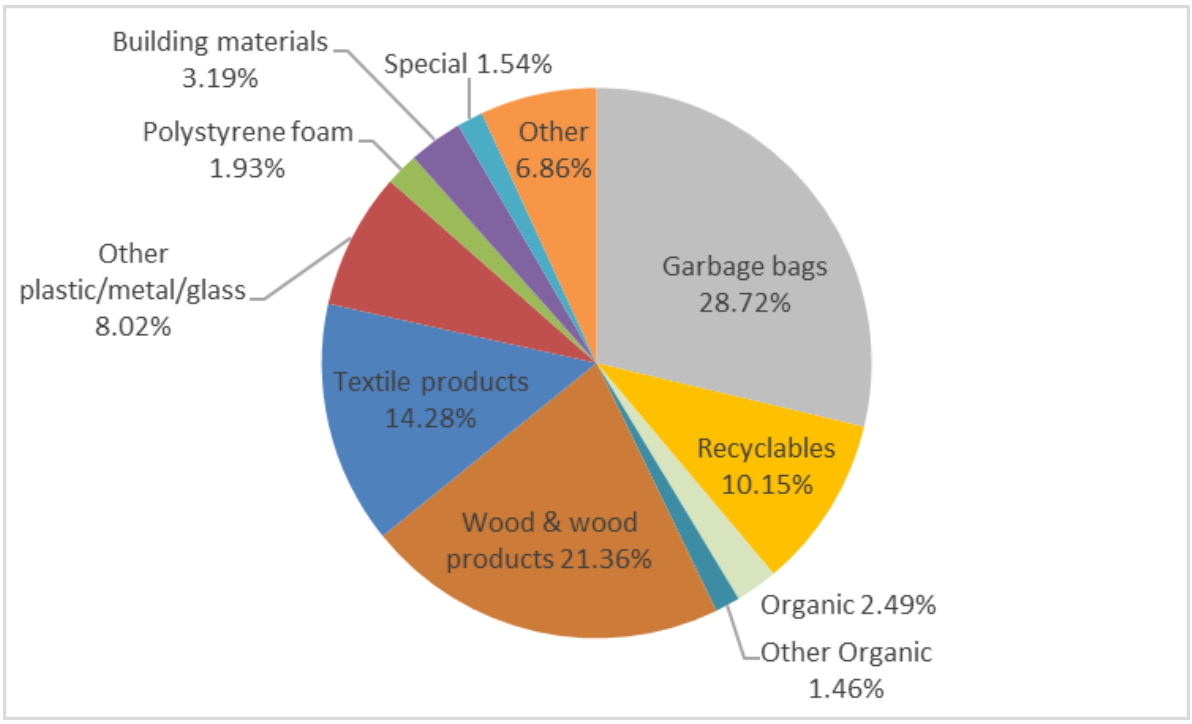


Image 7: A household cleanup load with reusable materials

4.3 Composition of incoming waste

By volume, the main components of incoming waste, across all the sites, are garbage bags of rubbish (29%), wood and wood products (21%), textiles at 14% and recyclables at 10%. Other materials such as non-recyclable plastic, metal and glass are 8%. The composition by volume is shown in Figure 4.

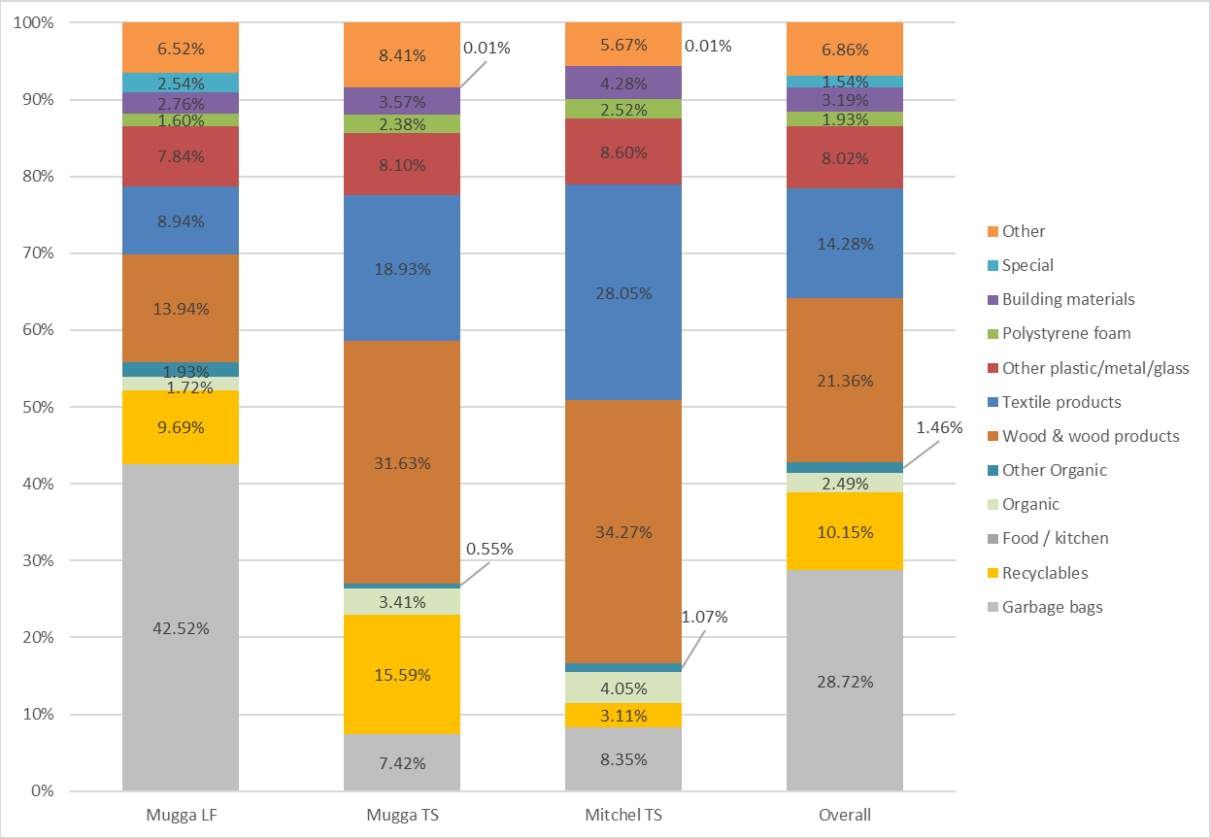
Figure 4: All sites combined: composition of incoming waste, by volume



The composition of incoming waste at each site, by volume, is shown in Figure 5. Wood and wood products, and textiles, together make up about half of all waste delivered to transfer stations, while at the landfill plastic bags and wood and wood products represent 55% by volume. Each site is analysed separately in subsequent sections.

Image 8: Reusable material separated by TS staff

Figure 5: Composition of incoming waste, by volume, by site



By weight, the main individual categories of incoming waste, across all the sites, are garbage bags of rubbish (25%), wood and wood products (17%), non-recyclable plastic, metal and glass (8%), recyclables (6%, such as plastic containers, glass containers, metal containers, large electrical items and paper/cardboard) and textiles (5%). The composition by weight is shown in Figure 6.

Figure 6: All sites combined: composition of incoming waste, by weight

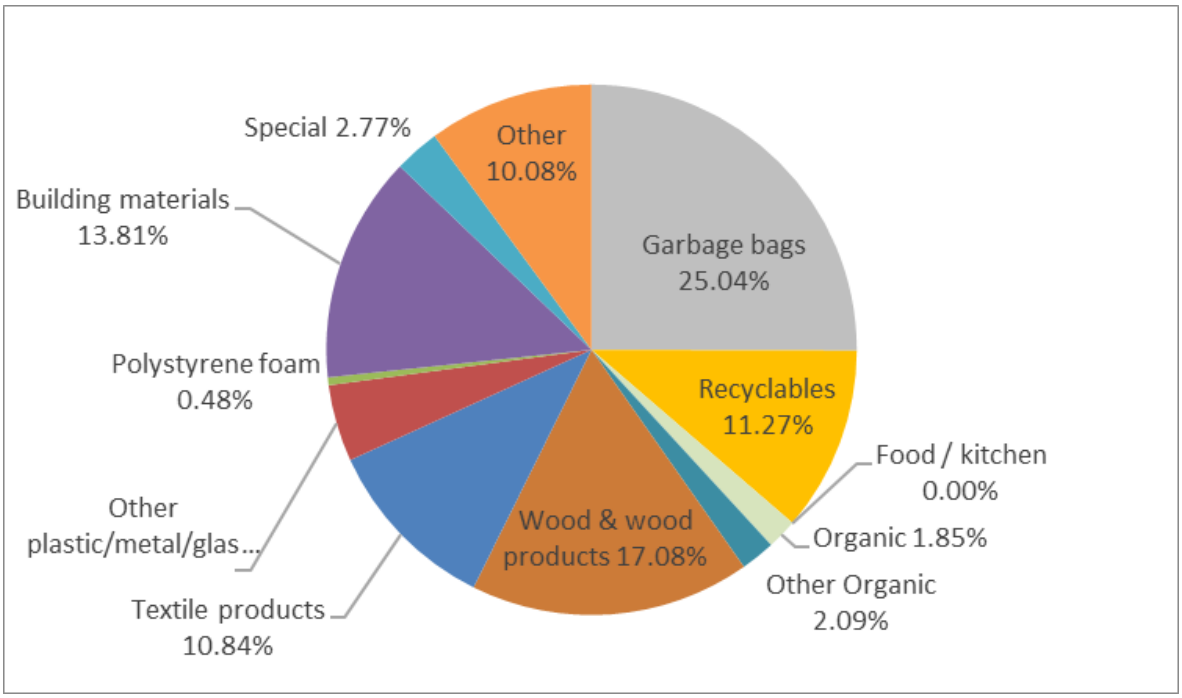
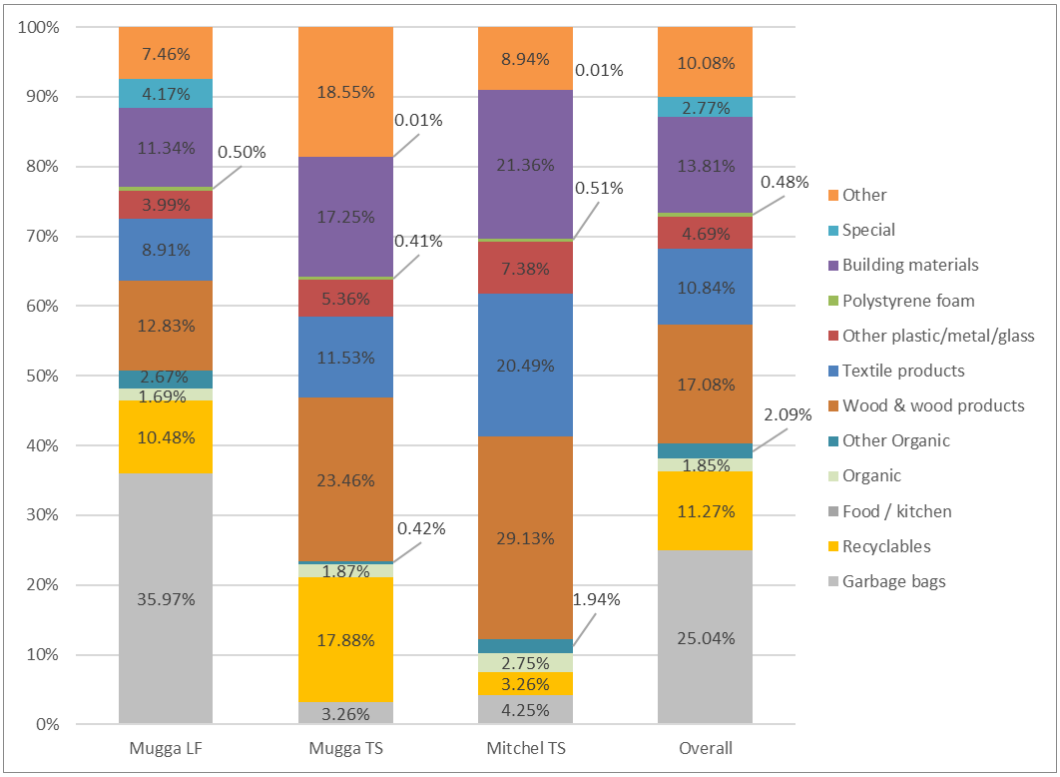


Image 9: Loads of autoclaved hospital waste

The composition of incoming waste at each site, by weight, is shown in Figure 7. Wood and wood products, building materials and textiles, together make up the key components of the material delivered to transfer stations, by weight as well as volume. Bagged material is the most common material at the landfill both by weight and volume.

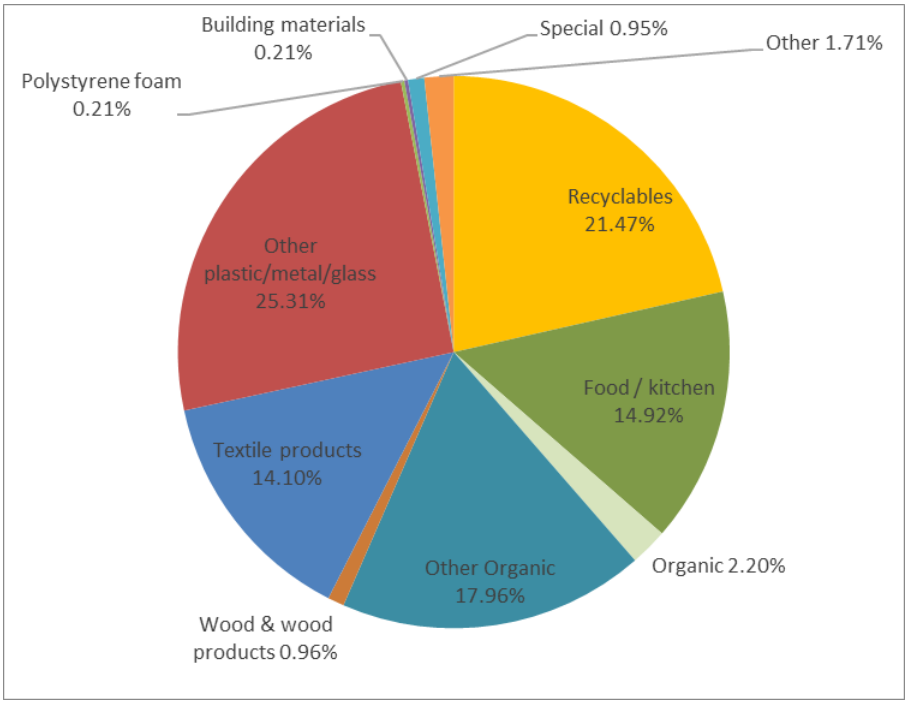
Figure 7: Composition of incoming waste, by weight, by site



The physical audit of plastic bags from loads containing > 20% bags revealed that on average the bags contain non-recyclable plastics, metal and glass at 25%, 21.5% recyclable materials followed by organic material at 18% and food waste at 15%. Interestingly, 14% of material in the bags was textiles

which is highly different from the 2015 audit. The overall composition of plastic bag contents was measured by weight and is shown in Figure 8.

Figure 8: All sites combined: contents of plastic bags



As shown in Figure 9, the composition of plastic bag contents was reasonably consistent at the transfer stations. The plastic bags of garbage delivered to the landfill had a higher proportion of other organics (non-recyclable paper and nappies), and a lower proportion of textiles.

Figure 9: Plastic bag contents: composition by site, by weight

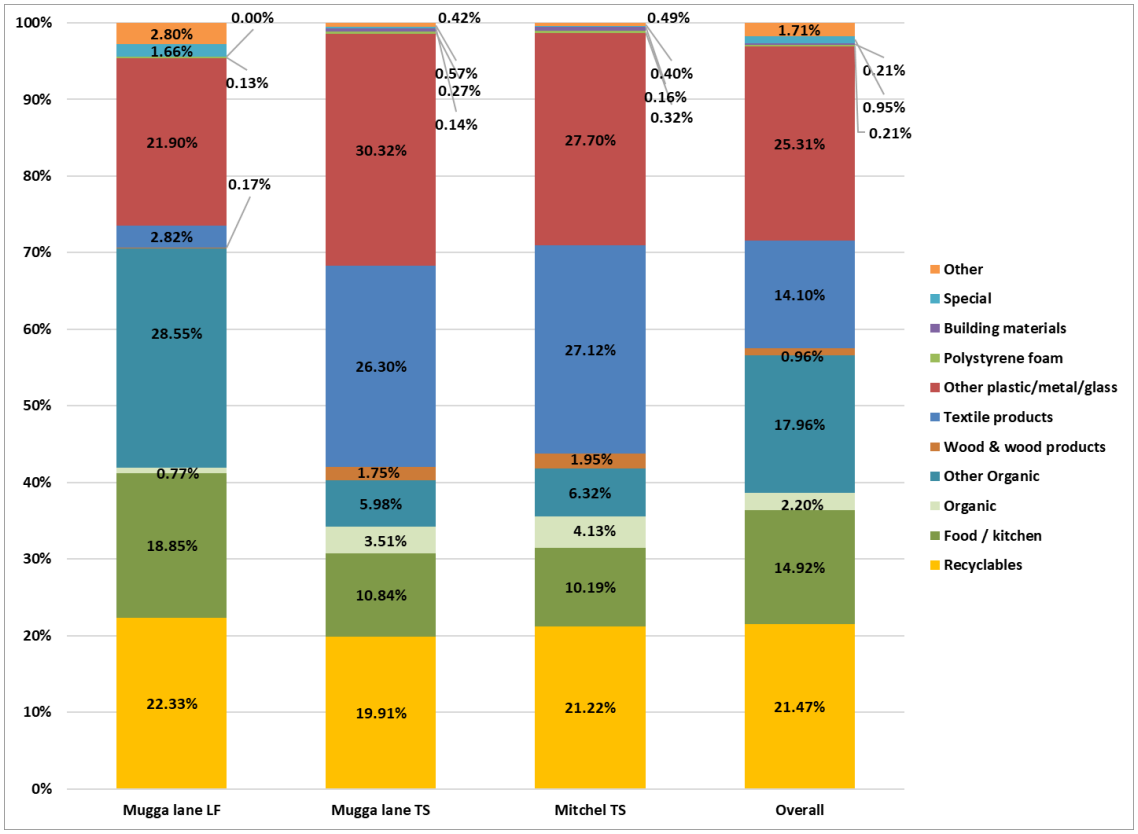
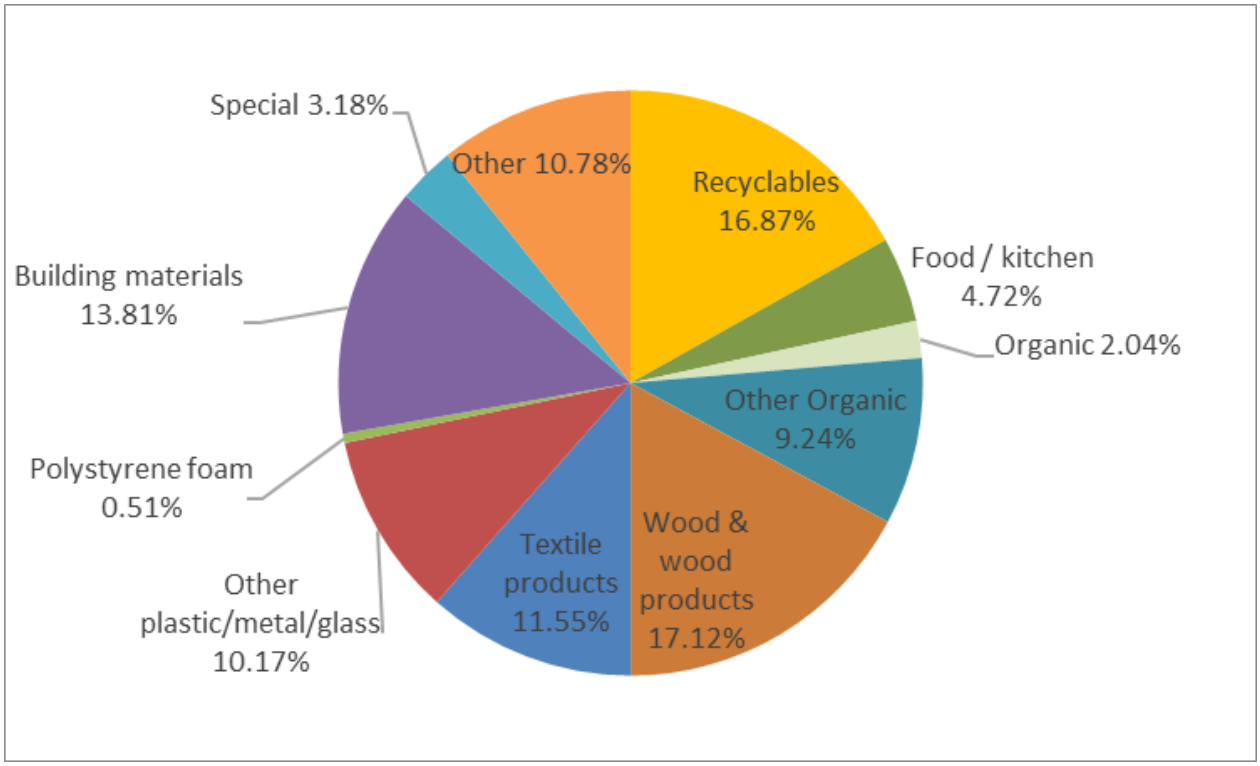


Figure 10 shows the composition of all incoming waste by weight, when the contents of plastic bags are dispersed into their individual categories. With bag contents dispersed, the main categories of incoming waste seeing the biggest increase are building materials from 0.21% to 13.8%. This is followed by wood and wood products (17%), textiles at 12%, non-recyclable plastics, metal and glass (10%), recyclables (17%), other organics (9%), and food (5%).

Figure 10: Composition of incoming waste by weight, plastic bag contents dispersed



4.4 Eligible beverage containers under the ACT Container Deposit Scheme (CDS)

The number of eligible beverage containers in the ACT CDS program were counted in the bagged material that was physically audited. The results were then scaled up to represent the number of containers in the total audit tonnages. The results are shown in Table 8.

Table 8: CDS containers audited in plastic bags

	No. of CDS eligible containers			No. of CDS containers per kilo of bagged material			No. of CDS containers per tonne of bagged material		
Material category	**Mugga LF**	**Mugga TS**	**Mitch TS**	**Mugga LF**	**Mugga TS**	**Mitch TS**	**Mugga LF**	**Mugga TS**	**Mitch TS**
Glass containers	57	20	0	0.09	0.07	0	91.2	66.1	0
Plastic containers	218	69	43	0.35	0.2	0.17	348.9	228	167
Metal containers	161	38	34	0.26	0.13	0.13	257.7	126	132
Total	**436**	**127**	**77**						

For the landfill, the results were further extrapolated to represent the number of containers anticipated to be disposed of at landfill on weekdays each year. This resulted in an estimate of almost 32.5 million CDS–eligible containers per year entering the landfill on weekdays. No audit was conducted of weekend deliveries to the landfill. The majority of eligible containers at Mugga Lane

Landfill and transfer station were plastic and metal containers. The Mitchell Transfer station (~900,00 per year) had significantly smaller number of containers as compared to Mugga lane (~7.5 million).

Table 9: Number of CDS containers scaled to audit totals

	No. of containers in bagged material component of visual audit			Estimated number of containers per year		
Material category	**Mugga LF**	**Mugga TS**	**Mitch TS**	**Mugga LF**	**Mugga TS**	**Mitch TS**
Total bagged material (tonnes)	234	7	5			
Glass containers	21,354	468	0	4,253,765	1,177,536	0
Plastic containers	81,669	1,615	812	16,268,786	4,062,500	497,847
Metal containers	60,315	889	642	12,015,021	2,237,319	393,647
Total	**163,573**	**2,980**	**1,460**	**32,537,572**	**7,477,355**	**891,494**

4.5 Composition of incoming waste by waste type

Overall, the waste entering the sites is 69% C&I and 30% MSW and 0.3% C&D, by volume. By weight, the breakdown in 73% C&I, 25% MSW and 2% C&D as shown in Figure 11 and Figure 12.

Figure 11: Waste type by volume, overall

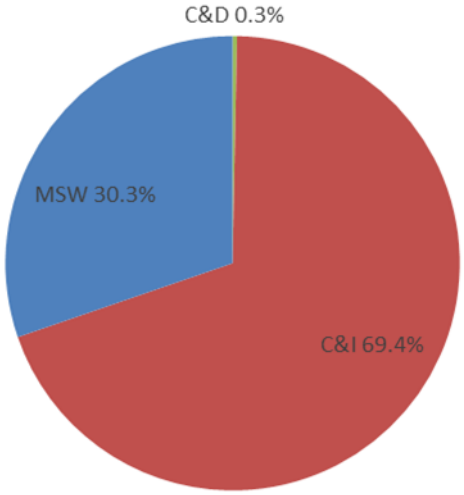


Figure 12: Waste type by weight, overall

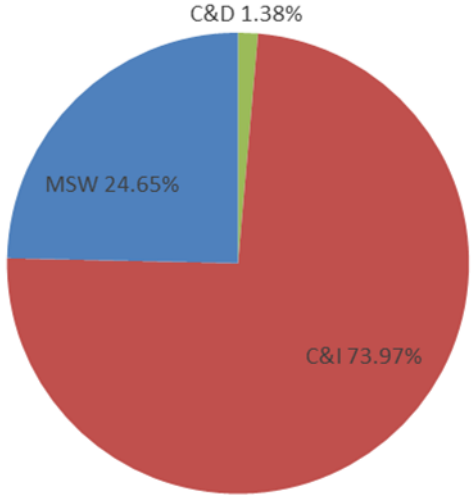


Figure 13 shows the composition of each incoming waste type, by volume. C&D waste is dominated by the ''other'' category, which comprised primarily clean fill and rock/dirt/soil. The C&I waste has a large proportion of garbage bags and wood products. Over half (51%) of domestic waste (MSW) comprises wood, wood products and textile products. The textile products were primarily covered furniture, carpet and underlay, clothing and shoes.

Figure 13: Composition of incoming waste, by volume, by waste type

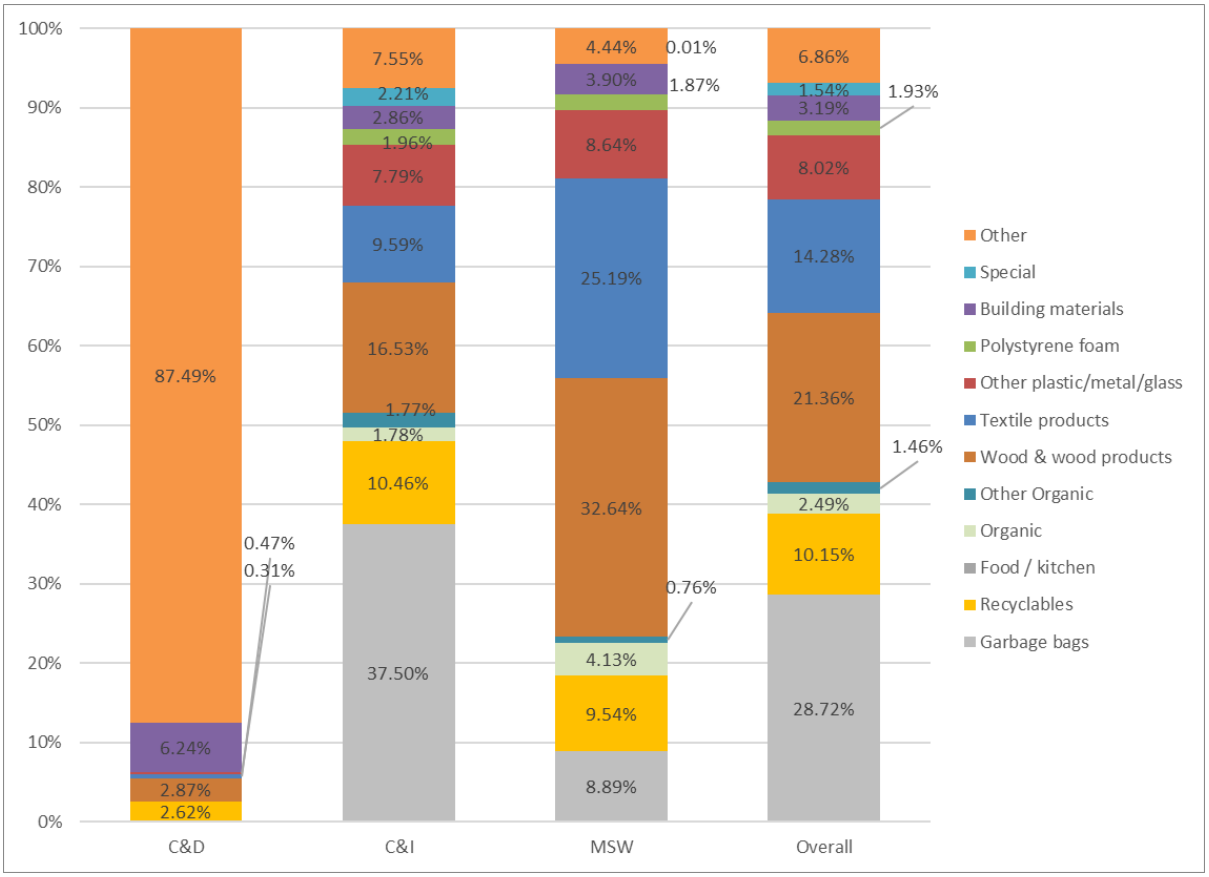


Image 10: C&I load seemingly from office cleanup delivered to Mugga Lane Landfill

Figure 14 shows the composition of each incoming waste type, by weight. The influence of heavy materials such as clean fill and rock/dirt/soil in the "other" category can be seen.

Figure 14: Composition of incoming waste, by weight, by waste type

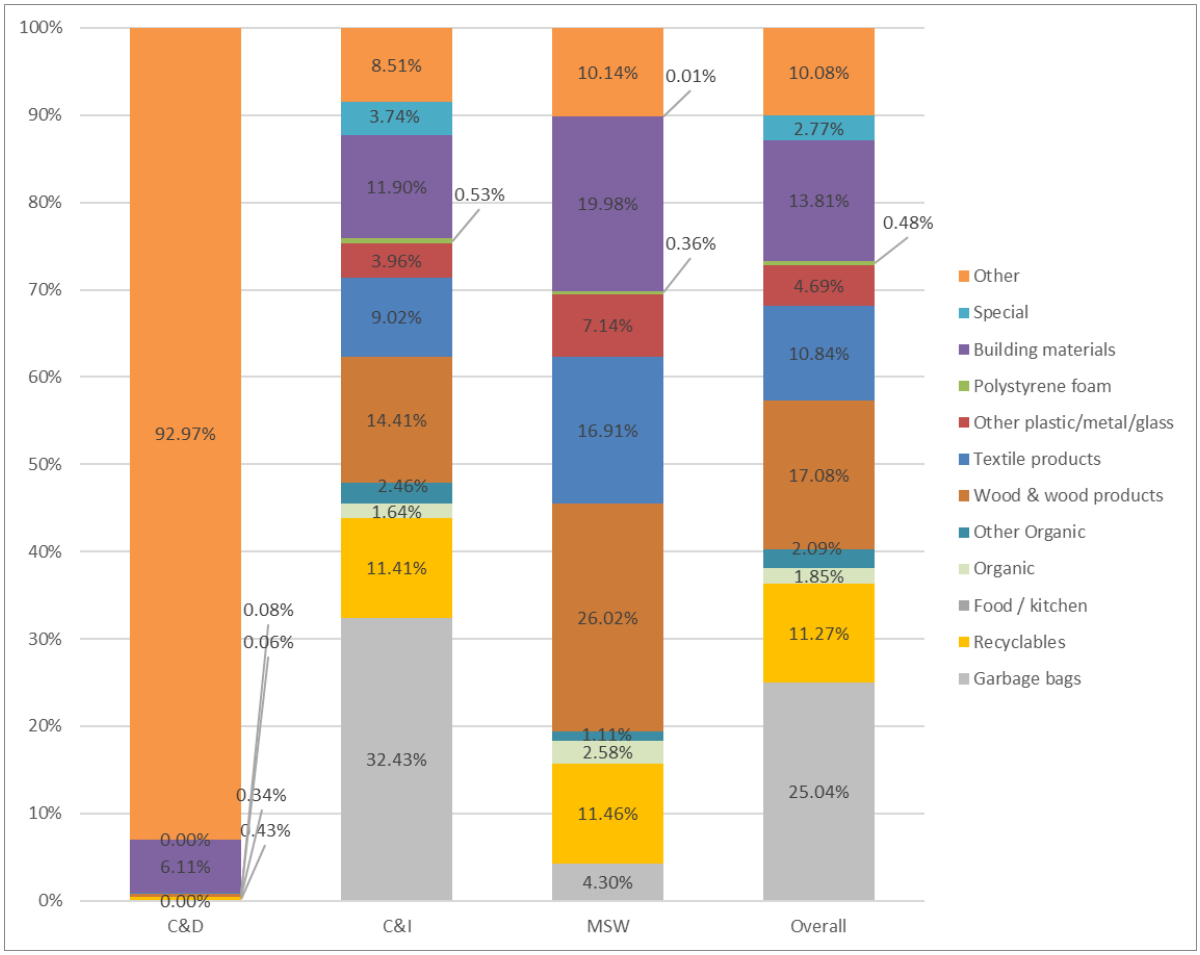


Figure 15 shows the composition of incoming waste by weight, when the contents of plastic bags are dispersed into their categories. This reveals that C&I waste contains 11% food, and the proportion of recyclables is 13% in MSW and 17% in C&I.

Image 11: Tyres segregated for recycling at Mitchell Transfer station

Figure 15: Composition of incoming waste by weight, by waste type, bag contents dispersed

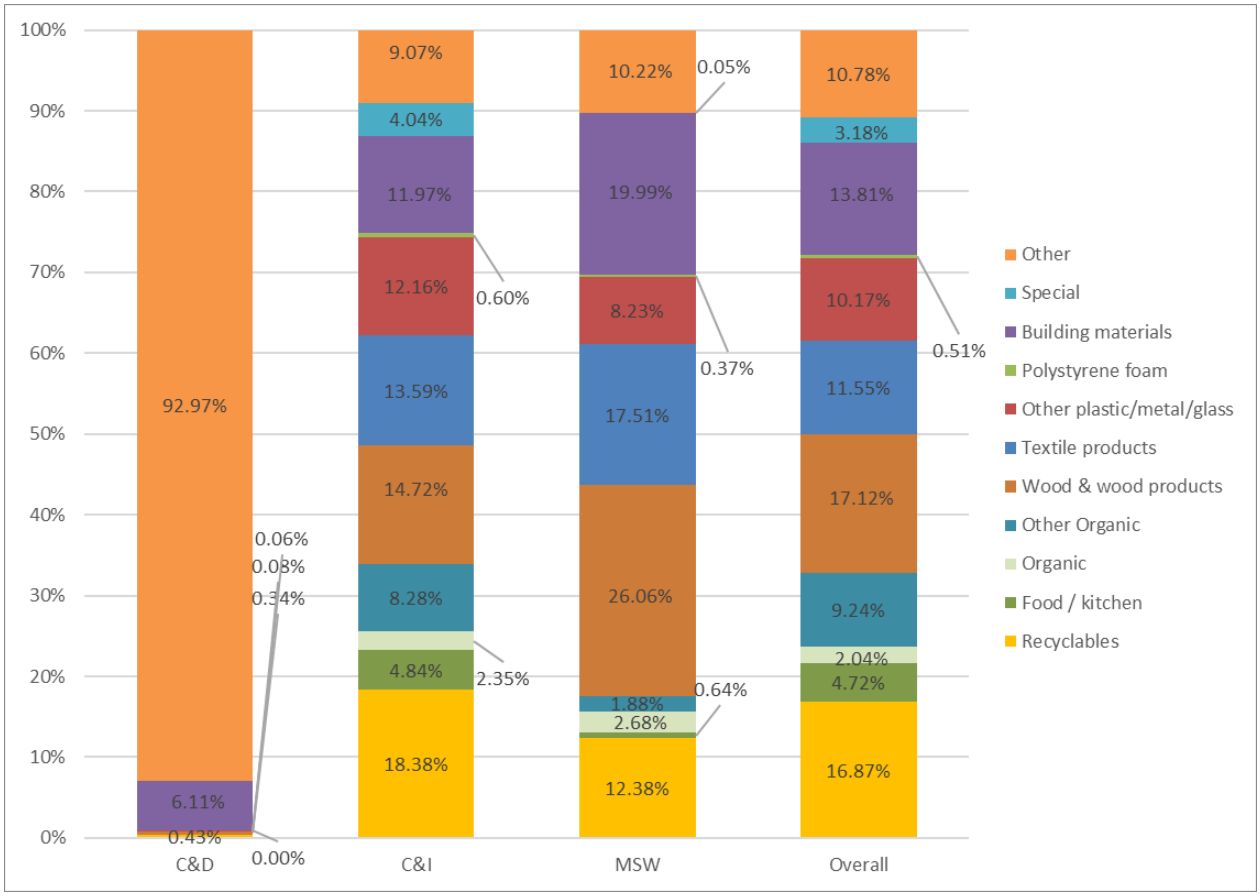


Image 12: A typical load of household cleanup

4.6 Resource recovery from incoming waste: current and potential

4.6.1 Current resource recovery

Overall, 5.3% of incoming waste is recovered for recycling. This includes materials that are dropped off at the transfer stations as well as the materials that are removed by staff at the transfer stations. Mugga Lane transfer station recovers an overall 6.5% of the waste destined for landfill, for recycling while at Mitchell transfer station 26.4% was recovered. No materials are recovered at the landfills. The percentages of materials recovered for recycling at the transfer stations are shown in Figure 16. The percentages were the same by weight and volume.

Figure 16: Incoming waste: percentage removed for recycling by site staff

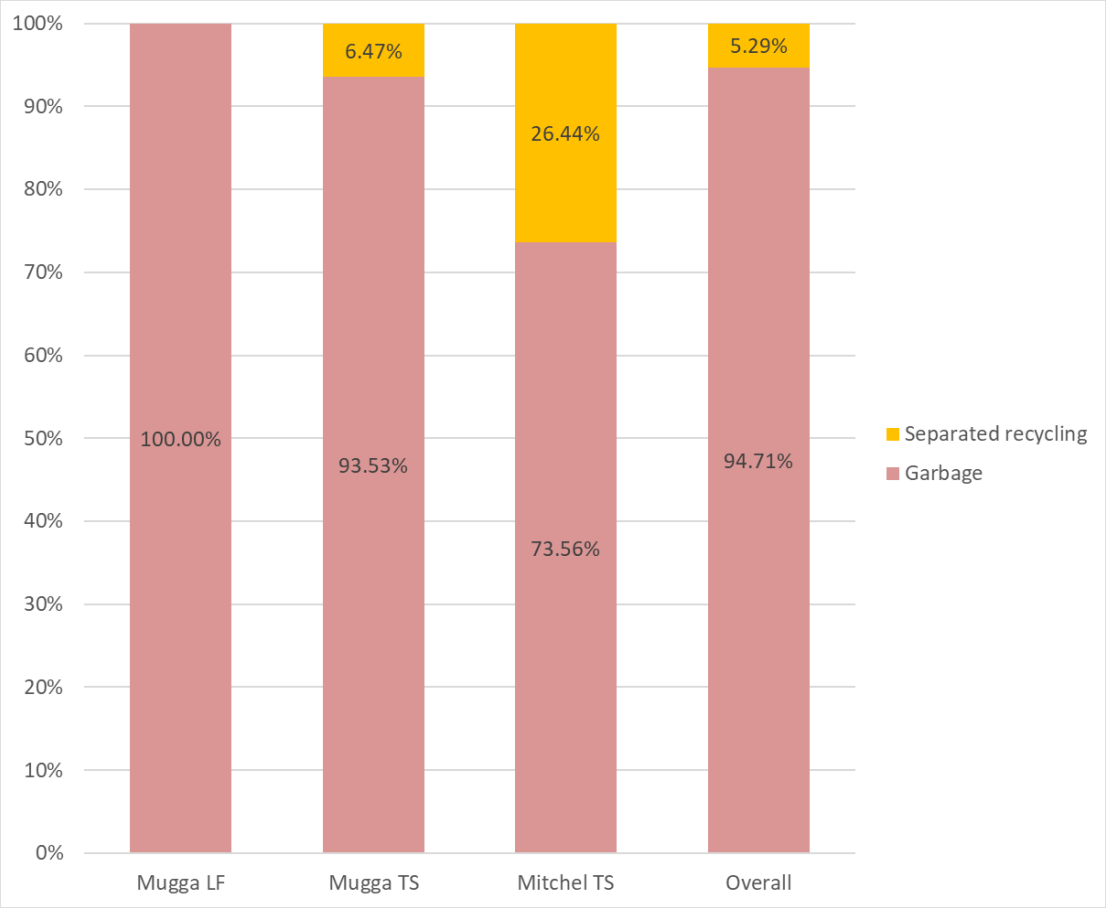
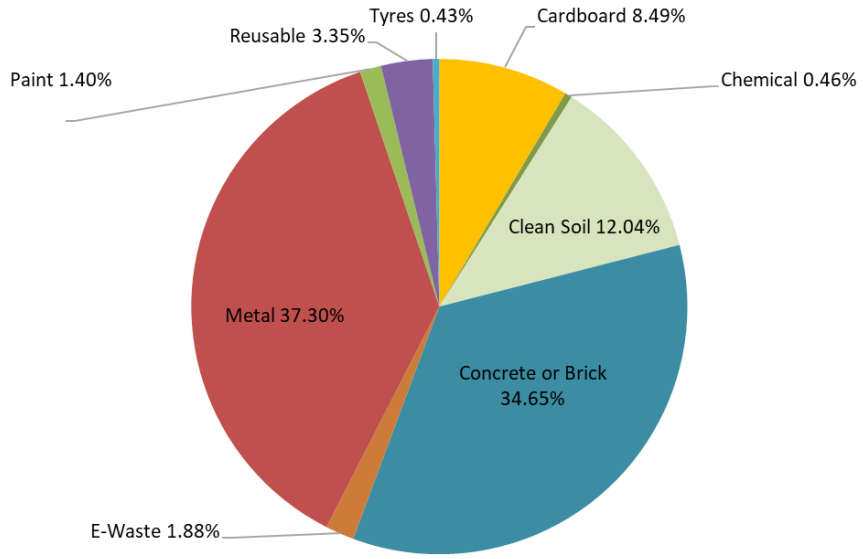


Figure 17 shows the materials that transfer station staff are removing from the waste that is destined for landfill. Most was metals, concrete or bricks, clean soil and cardboard.

Figure 17: Materials recycled from waste incoming into the facility



4.6.2 Potential resource recovery

Of the remaining waste that is destined for landfill, 27% by weight is made up of potentially recoverable materials. The majority of this is recyclable material arriving at the landfill, as shown in Figure 18. The list of what materials are considered potentially recoverable is provided in **Appendix C.**

Figure 18: Potentially recoverable material: all sites combined

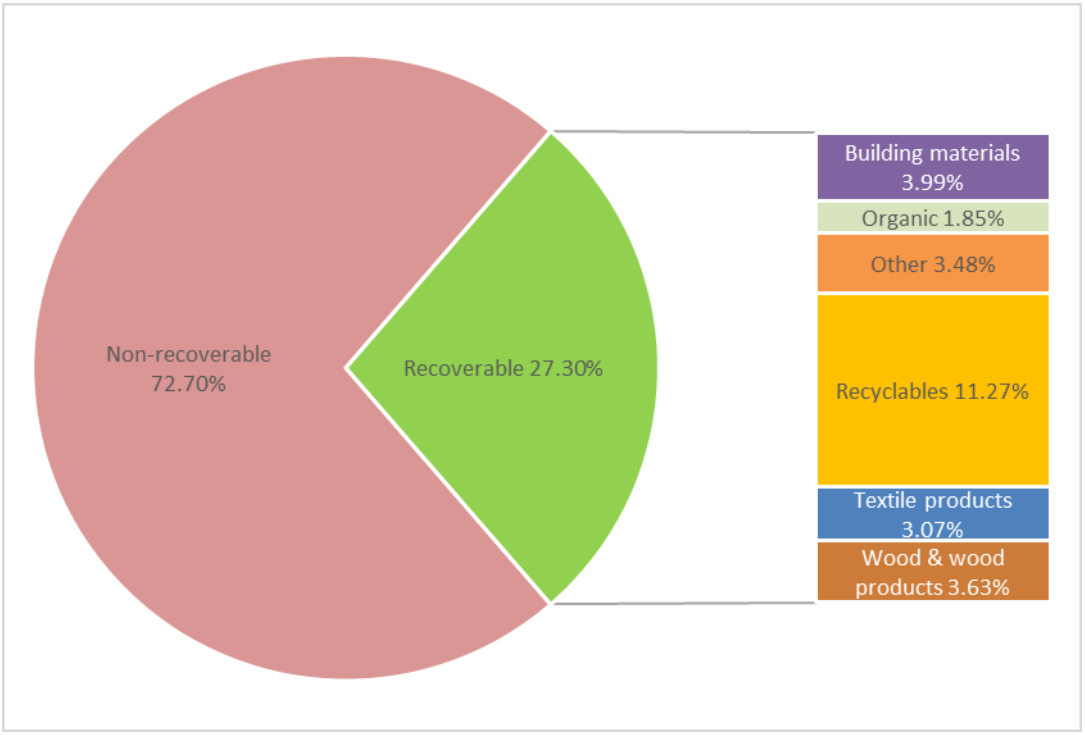


Image 13: A load of bagged waste and cardboard

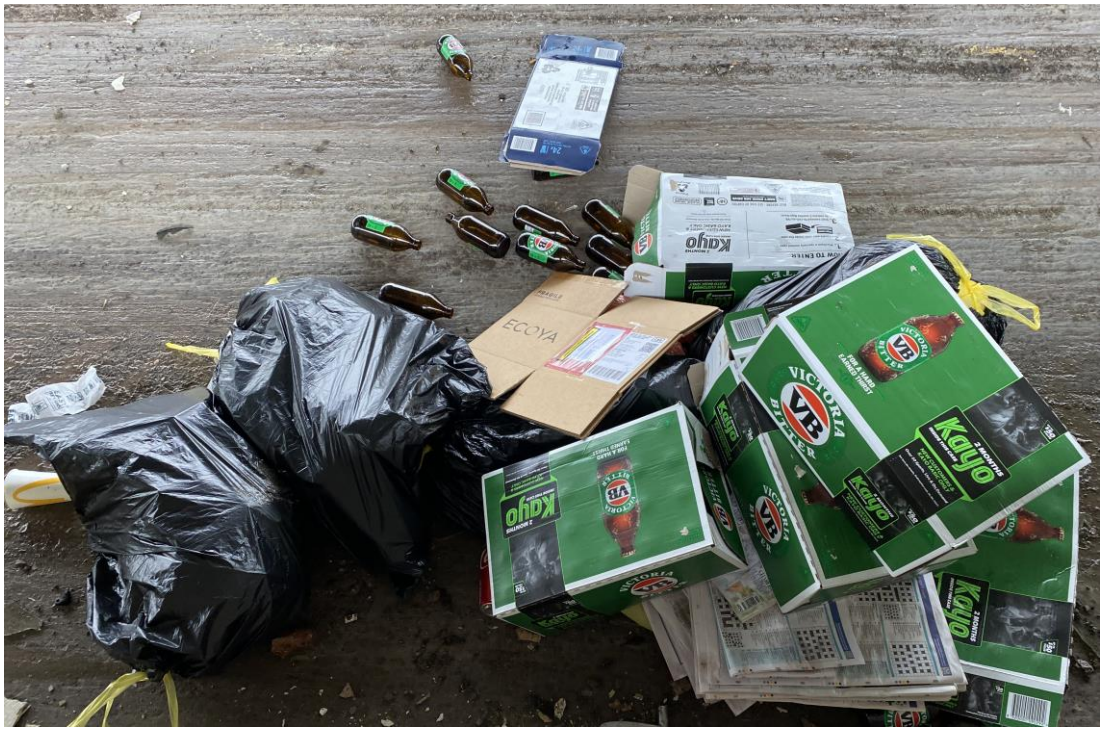


Figure 19 shows the percentages of recoverable material at each site. The Mugga transfer station has a higher percentage of recoverable material with almost 18% recyclable material found. The recoverable component at the Mitchell Transfer station is mostly made up of building materials.

Figure 19: Recoverable materials in incoming waste, percentage by site

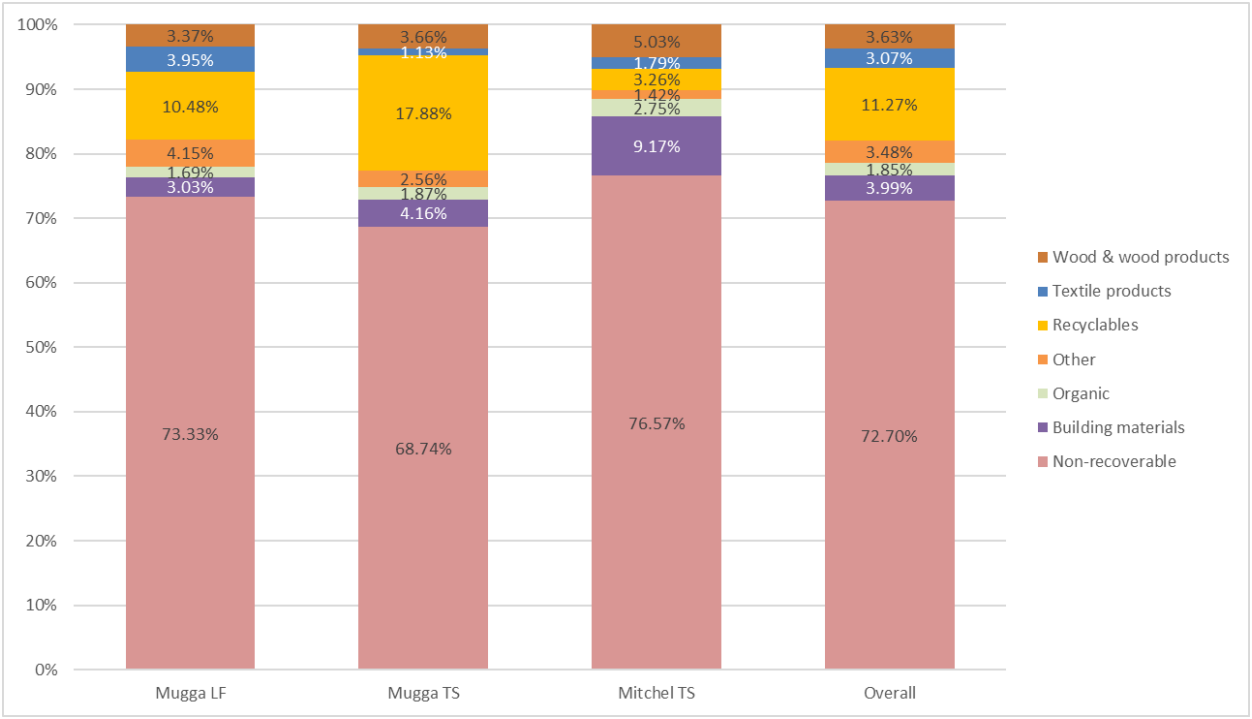
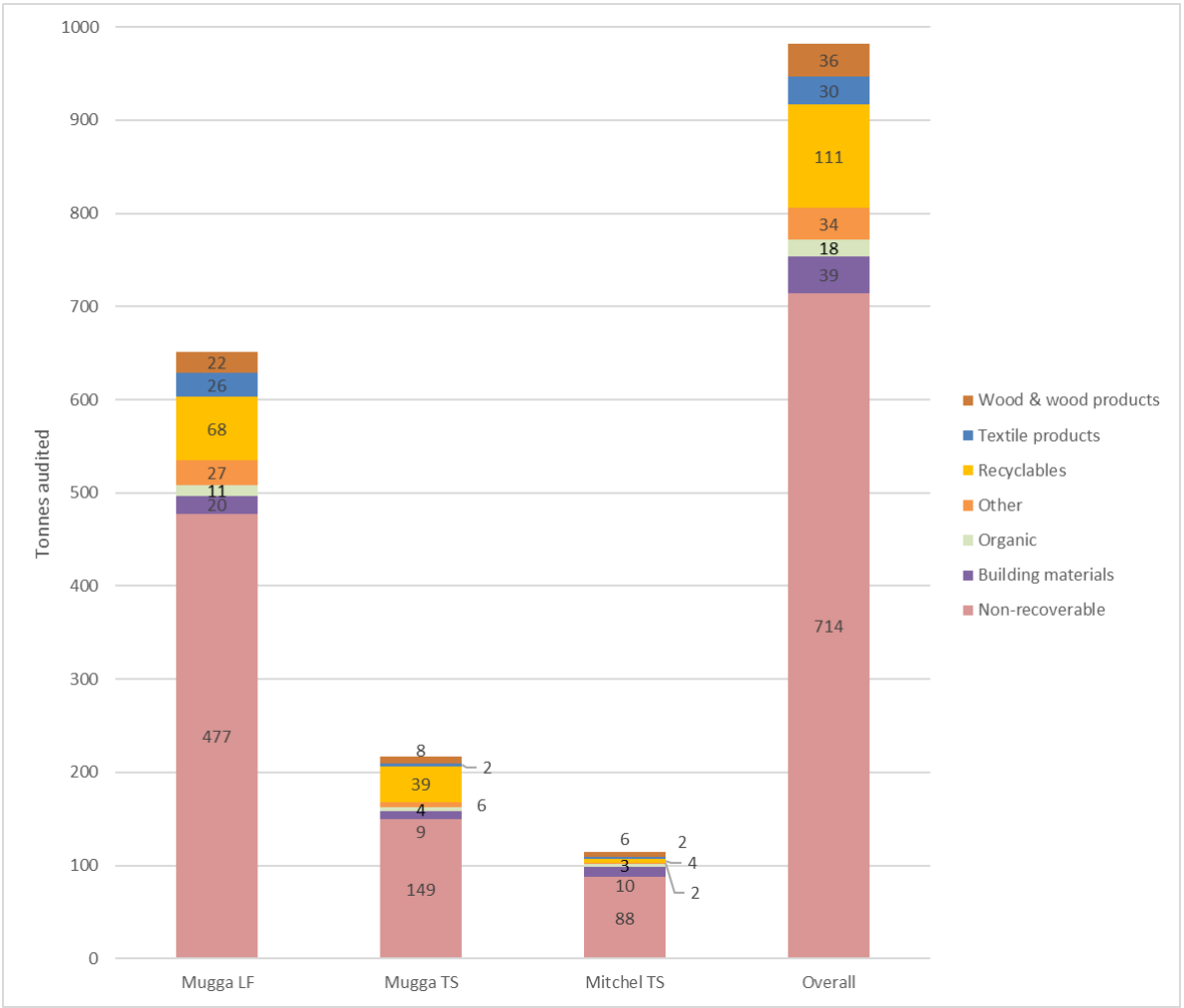


Image 14: A load of soft plastic at Mugga TS

The actual tonnes available for recovery primarily comprise recyclable materials entering the landfill, as shown in Figure 20.

Figure 20: Recoverable materials in incoming waste, tonnes audited, by site



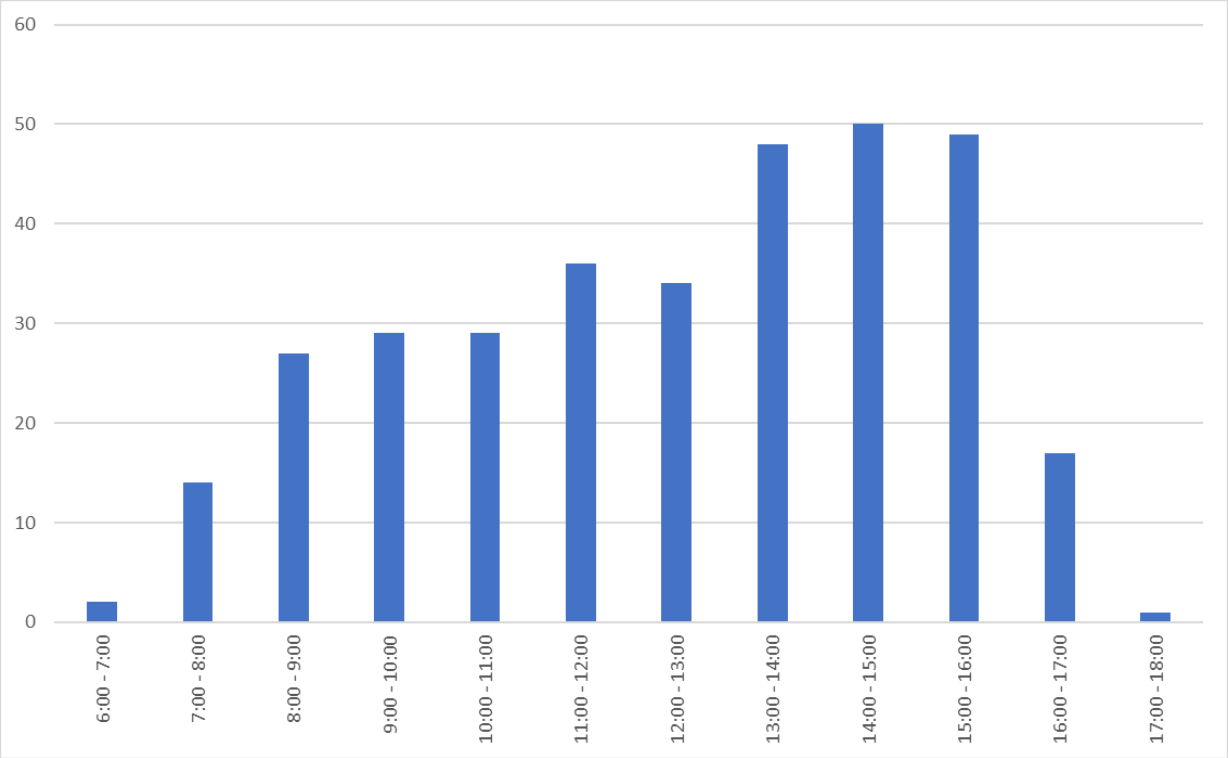
Each site is analysed separately in subsequent sections.

5 RESULTS: MUGGA LANE LANDFILL

5.1 Vehicle entry times

Figure 21 shows the time of day that the audited vehicles entered Mugga Lane landfill. The peak vehicle entry time is 1 – 4 pm followed by 11 am to noon.

Figure 21: Mugga Lane landfill: vehicle entry times

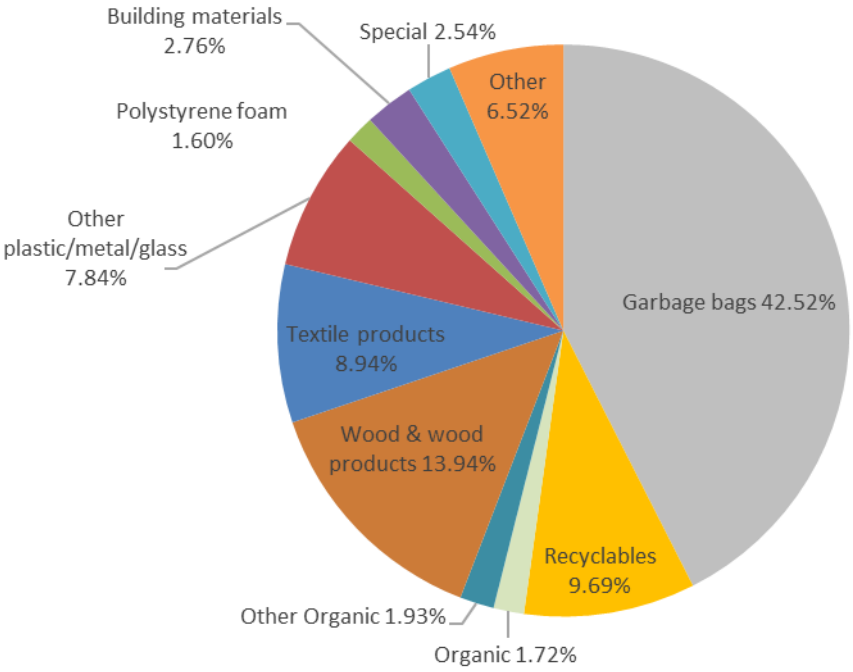


5.2 Composition of incoming waste

By volume, the main components of incoming waste to the landfill are garbage bags of rubbish (43%), wood and wood products (14%), recyclable at 10% and textiles at 9%.

The next most common materials are “other”” (7%, almost all is clean fill and rock/soil/dirt), non-recyclable plastic, metal and glass (8%), Special (hazardous) waste makes up 2.5%. The composition by volume is shown in Figure 22.

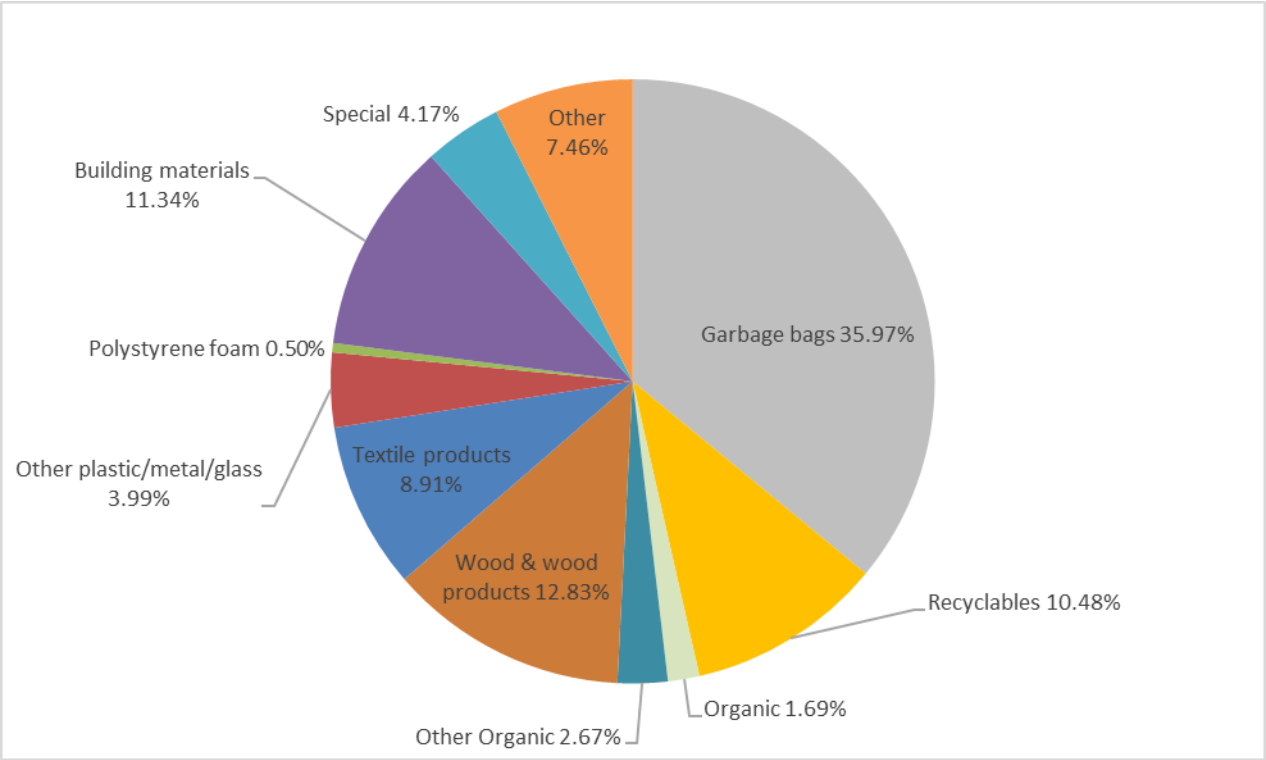
Figure 22: Mugga Lane landfill: composition of incoming waste, by volume



By weight, the main individual categories of incoming waste at the landfill are garbage bags at 36%, wood and wood products at 13%, recyclable materials at 10.5%, textile products at 9%, building materials at 11% and "other" (this is almost all clean fill and rock/soil/dirt) at 7%.

The composition by weight is shown in Figure 23.

Figure 23: Mugga Lane landfill: composition of incoming waste, by weight



The physical audit of plastic bags from loads containing > 20% bags revealed that on average the bags contain 30% non-recyclable plastic, metal and glass. The next largest component is textile products at 26%, followed by recyclables at 20% and food or kitchen organics at 11%.
The overall composition of plastic bag contents was measured by weight and is shown in Figure 24.

Figure 24: Mugga Lane landfill: contents of plastic bags

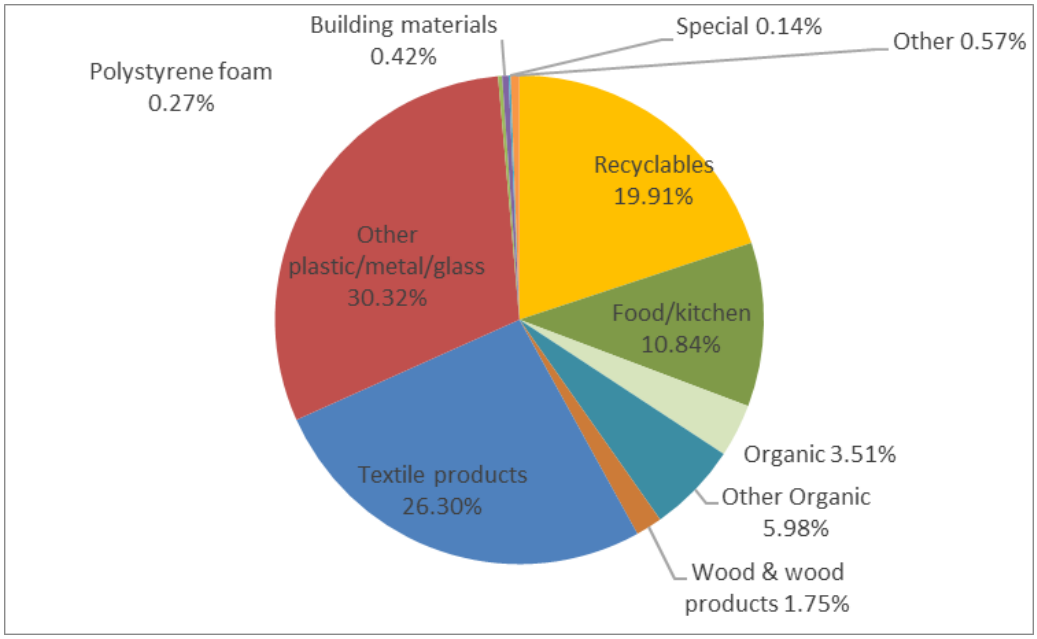
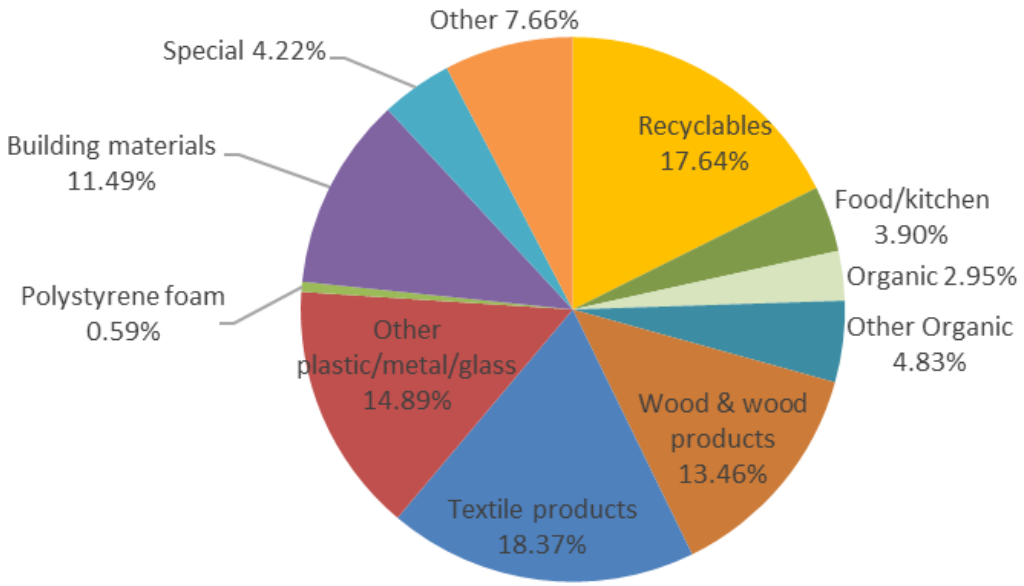


Figure 25 shows the composition of all incoming waste by weight, when the contents of plastic bags are dispersed into their individual categories. With bag contents dispersed, the percentage of recyclables is 18%. Textile products is 18%, wood and wood products in 13% and building materials at 11.5%.

Figure 25: Composition of incoming waste by weight, plastic bag contents dispersed, Mugga Lane landfill



5.3 Composition of incoming waste by waste type

By volume, the waste entering Mugga Lane landfill is 79% from C&I loads and 21% C&D loads, as shown in Figure 26. By weight, the split is about half and half, as shown in Figure 27.

Figure 26: Waste type by volume, Mugga LF

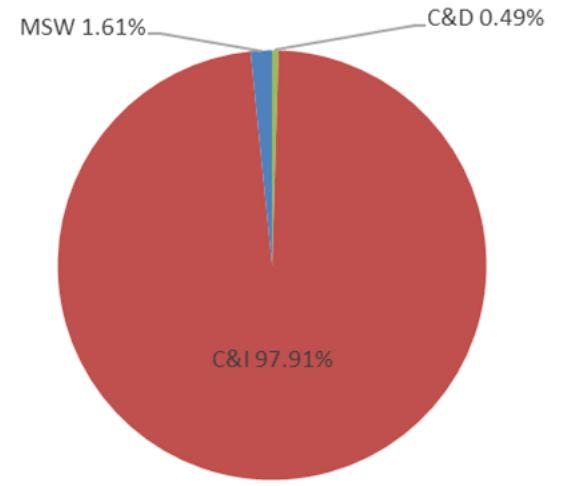


Figure 27: Waste type by weight, Mugga LF

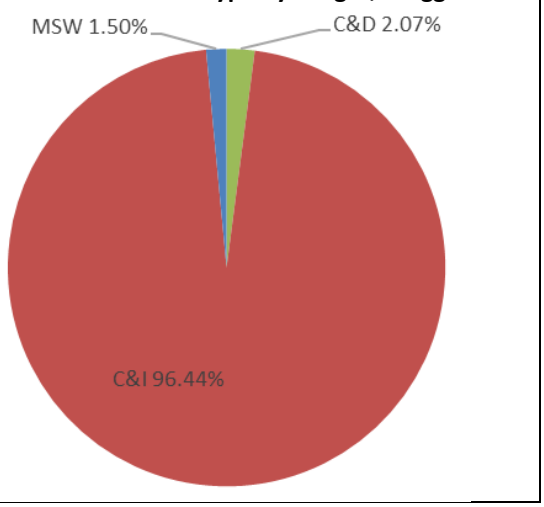


Figure 28 shows the composition of each incoming waste type, by volume, at the landfill.

C&D waste is dominated by the ''other'' category, which comprised primarily clean fill and rock/dirt/soil. Very small quantities of C&D materials were recorded at the landfill.

The C&I waste has a large proportion of garbage bags (43%). This is followed by recyclables (10%), wood and wood products (14%) and textiles (9%).

Over one third of domestic waste (MSW) is wood and wood products (38%), though hardly any MSW was recorded.

Image 15: Load containing residual mattresses after removing recyclables

Figure 28: Composition of incoming waste, by volume, by waste type, Mugga Lane landfill

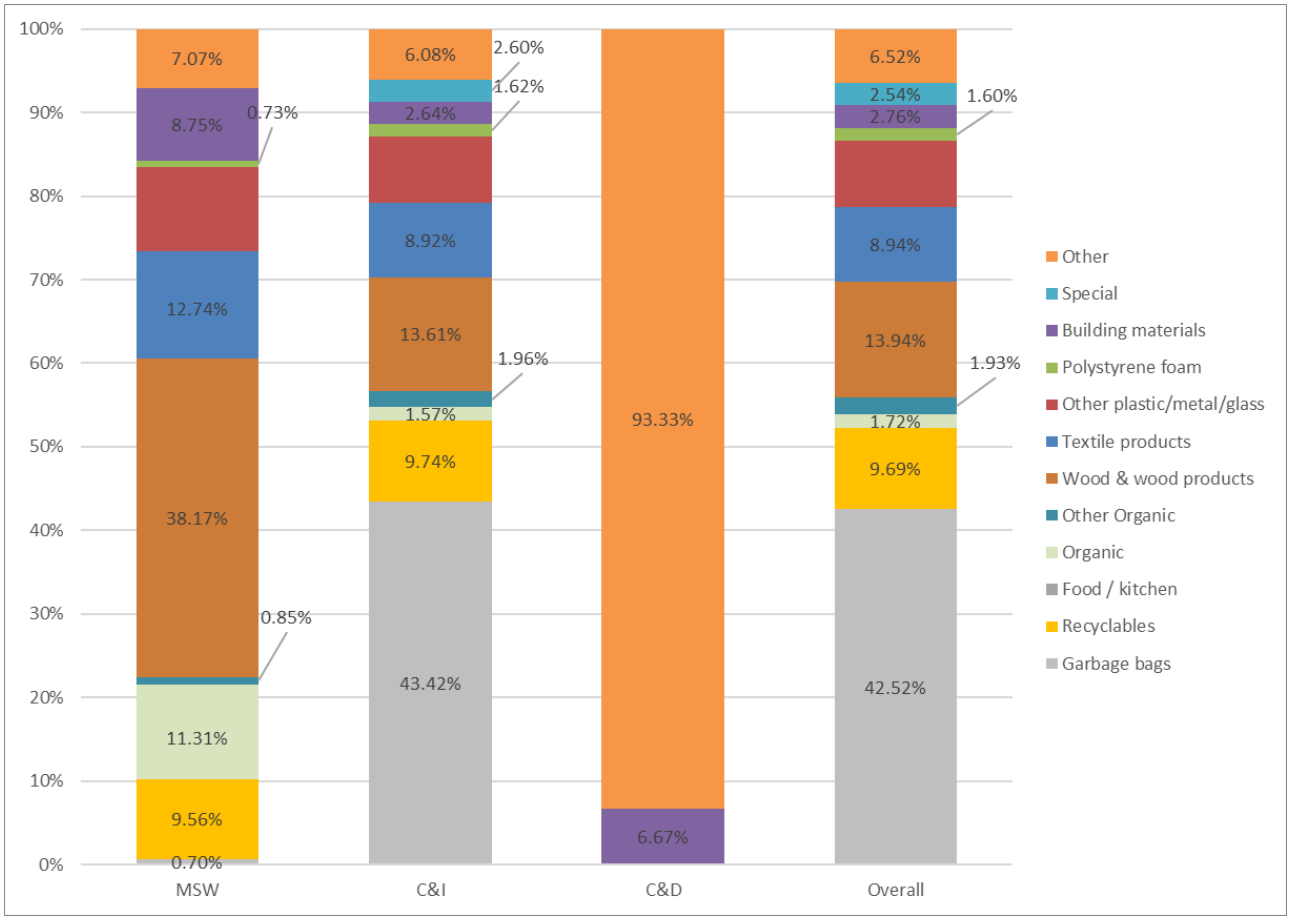
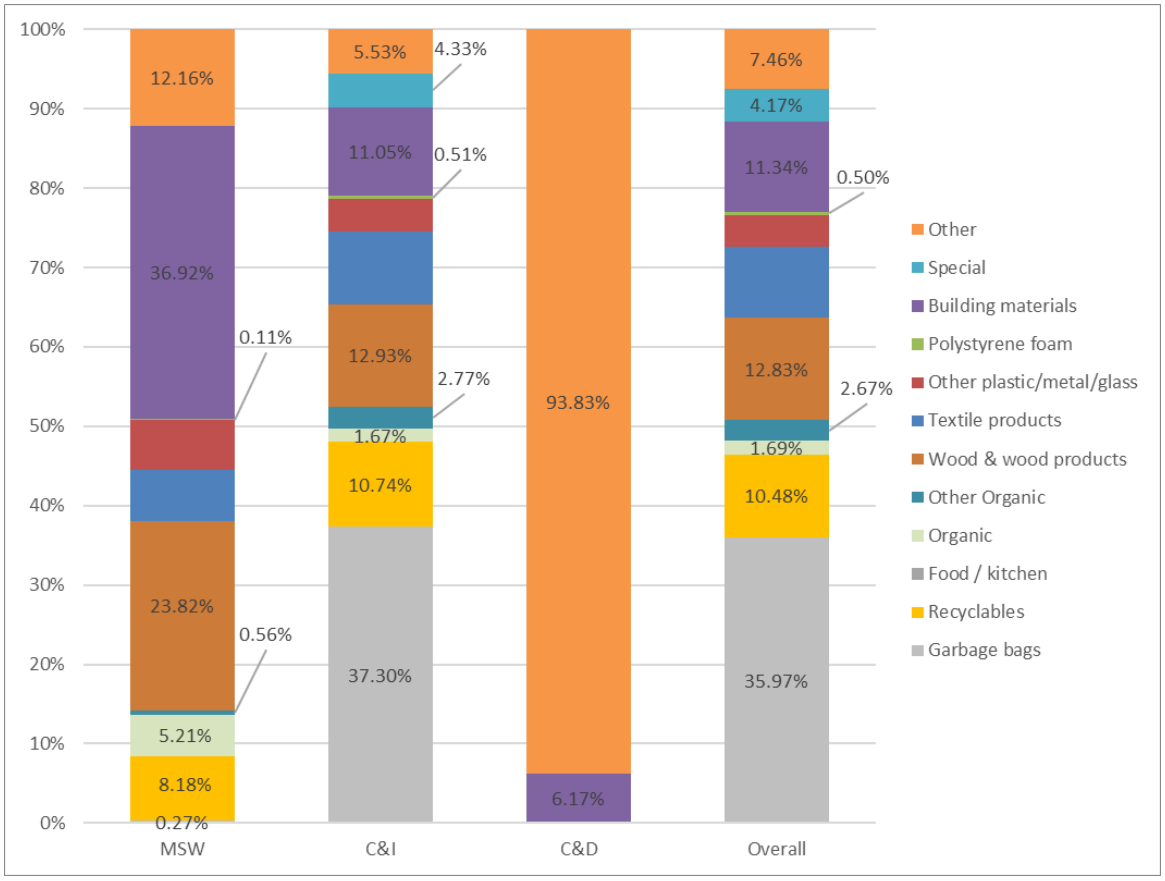


Figure 29 shows the composition of each incoming waste type, by weight. The influence of heavy materials such as clean fill and rock/dirt/soil in the "other" category can be seen.

Interestingly, the bagged material proportion fell slightly but not by a lot indicating that the bagged material contains relatively heavy materials.

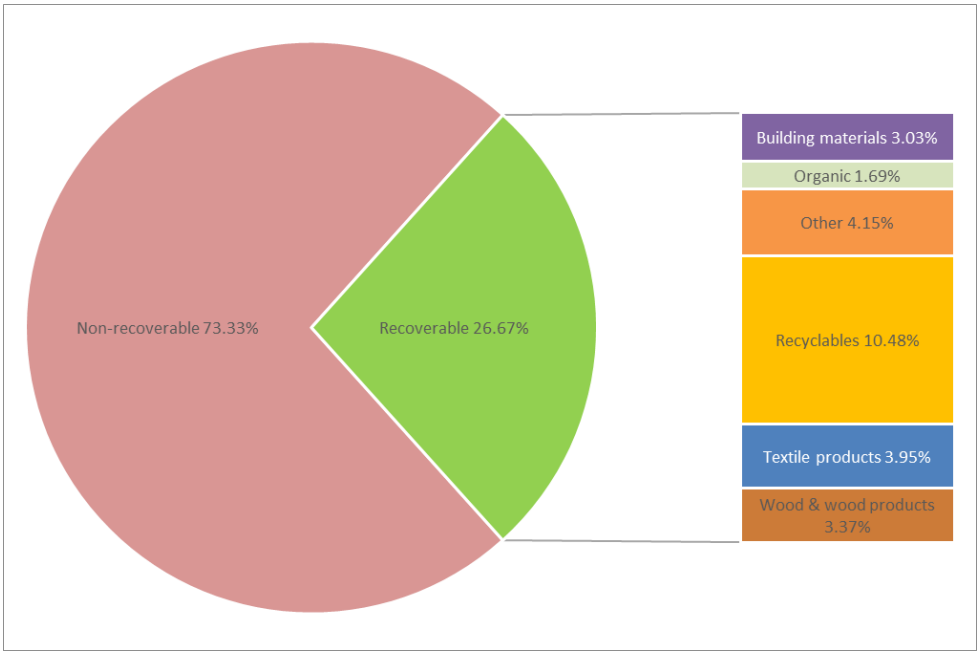
Figure 29: Composition of incoming waste, by weight, by waste type, Mugga Lane landfill



5.4 Resource recovery: current and potential

No waste was recovered from incoming loads for recycling during the audit period. Twenty-seven per cent (27%) of the material entering the landfill is potentially recoverable material, as shown in Figure 30. The main opportunities are recovery of recyclables, textiles and wood and wood materials.

Figure 30: Potentially recoverable material, Mugga Lane landfill



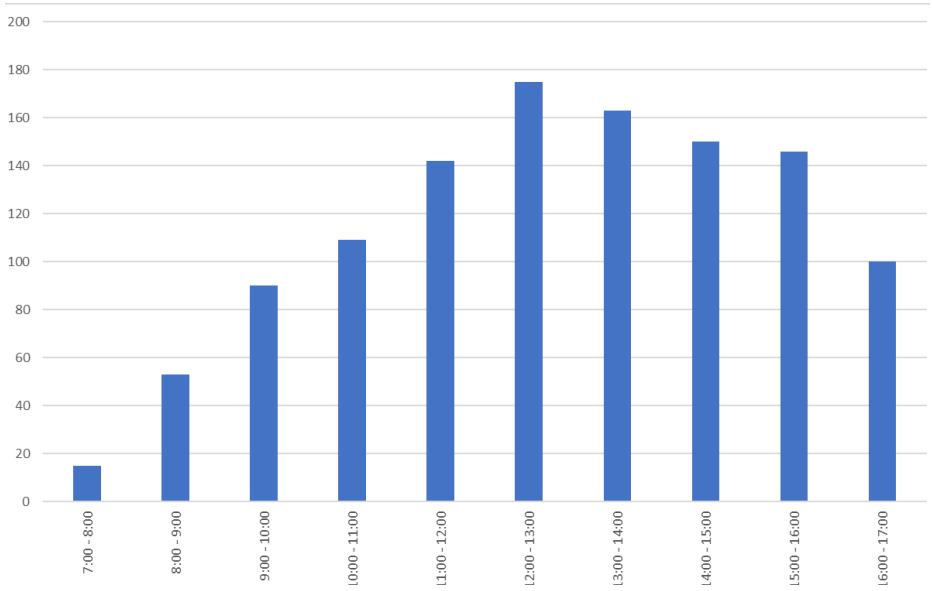
The list of what materials are considered potentially recoverable is in **Appendix C.**

6 RESULTS: MUGGA LANE TRANSFER STATION

6.1 Vehicle entry times

Figure 31 shows the time of day that the audited vehicles entered Mugga Lane transfer station. The peak vehicle entry times are from midday to 1 pm.

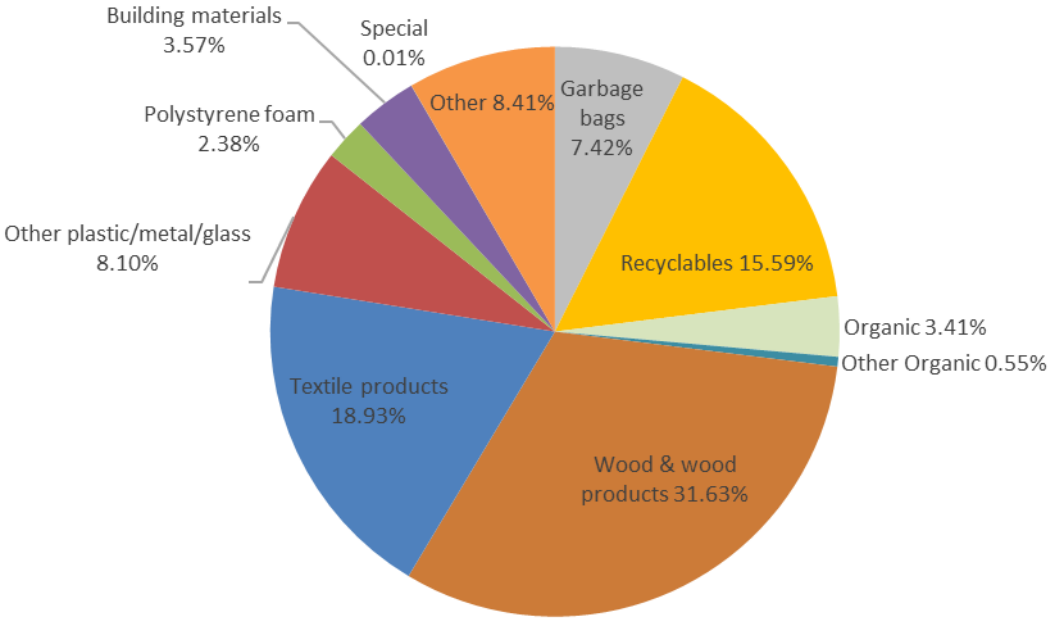
Figure 31: Mugga Lane transfer station: vehicle entry times



6.2 Composition of incoming waste

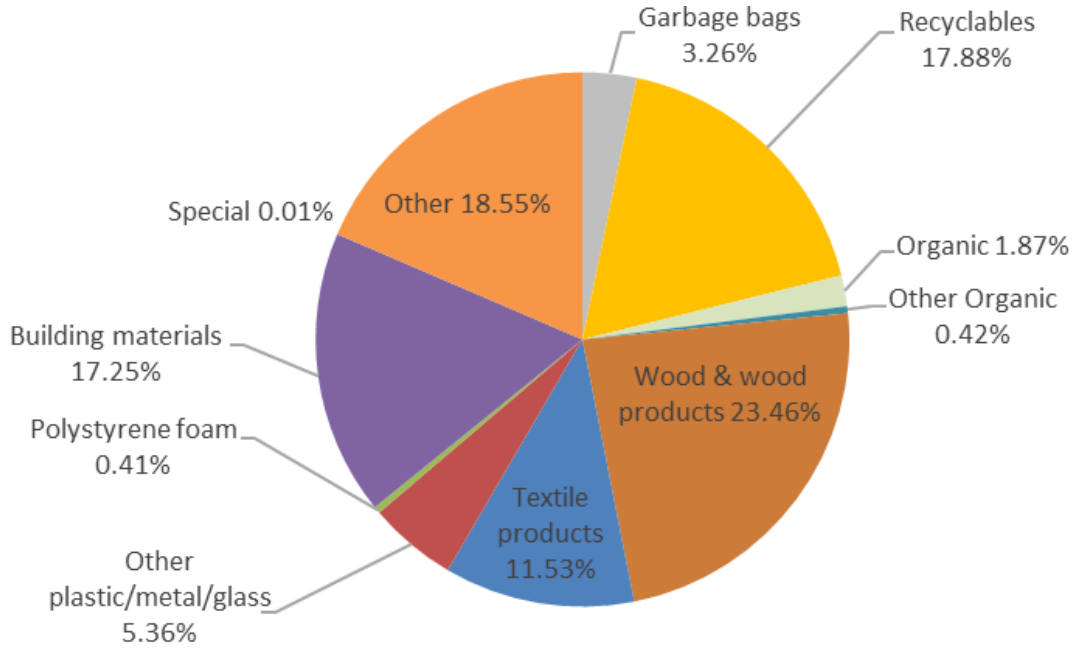
By volume, the main components of incoming waste to Mugga Lane transfer station are wood and wood products (32%), textile products (19%), recyclables (16%, such as plastic containers, glass containers, metal containers, large electrical items and paper/cardboard), building materials (4%) and non-recyclable plastic, metal and glass (8%). Special (hazardous) waste is very low at 0.01%. The composition by volume is shown in Figure 32.

Figure 32: Mugga Lane transfer station: composition of incoming waste, by volume



By weight, the proportions of each material are similar to when analysed by volume. The composition by weight is shown in Figure 33.

Figure 33 Mugga Lane transfer station: composition of incoming waste, by weight



The physical audit of plastic bags from loads containing > 20% bags revealed that on average the bags contain 26% textile products, 20% recyclables such as paper, cardboard and plastic, glass or metal containers, followed by food waste (11%). The overall composition of plastic bag contents was measured by weight and is shown in Figure 34.

Figure 34 Mugga Lane transfer station: contents of plastic bags

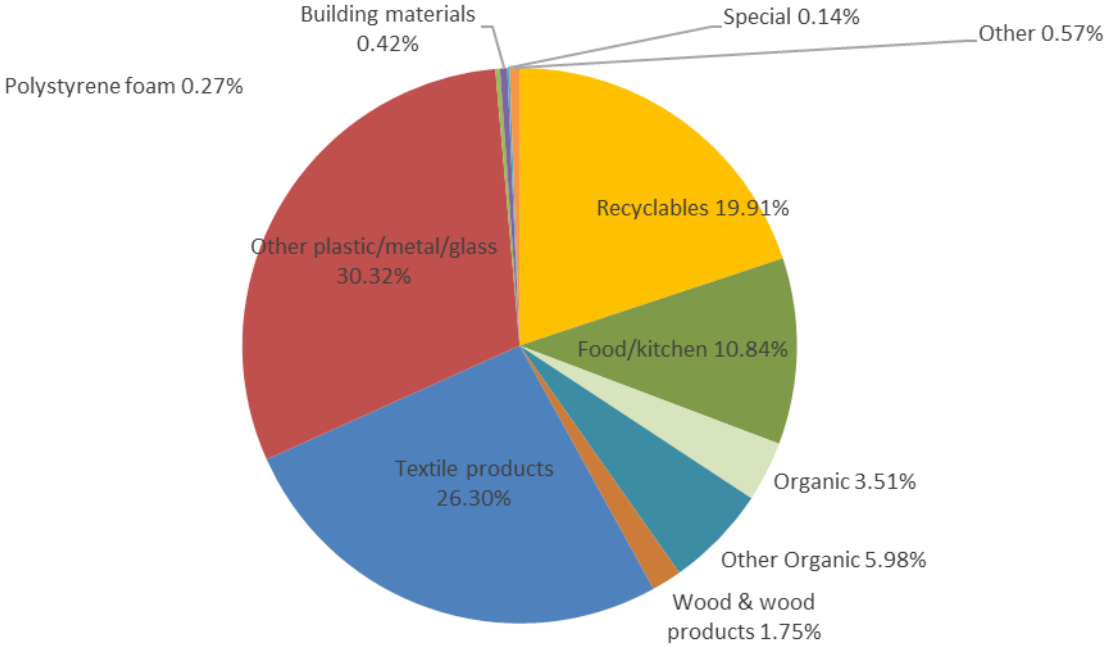


Figure 35 shows the composition of all incoming waste by weight, when the contents of plastic bags are dispersed into their individual categories. With bag contents dispersed, the percentage of food is 0.35%, textile products 12% and recyclables 18%.

Figure 35: Composition of incoming waste by weight, plastic bag contents dispersed, Mugga TS

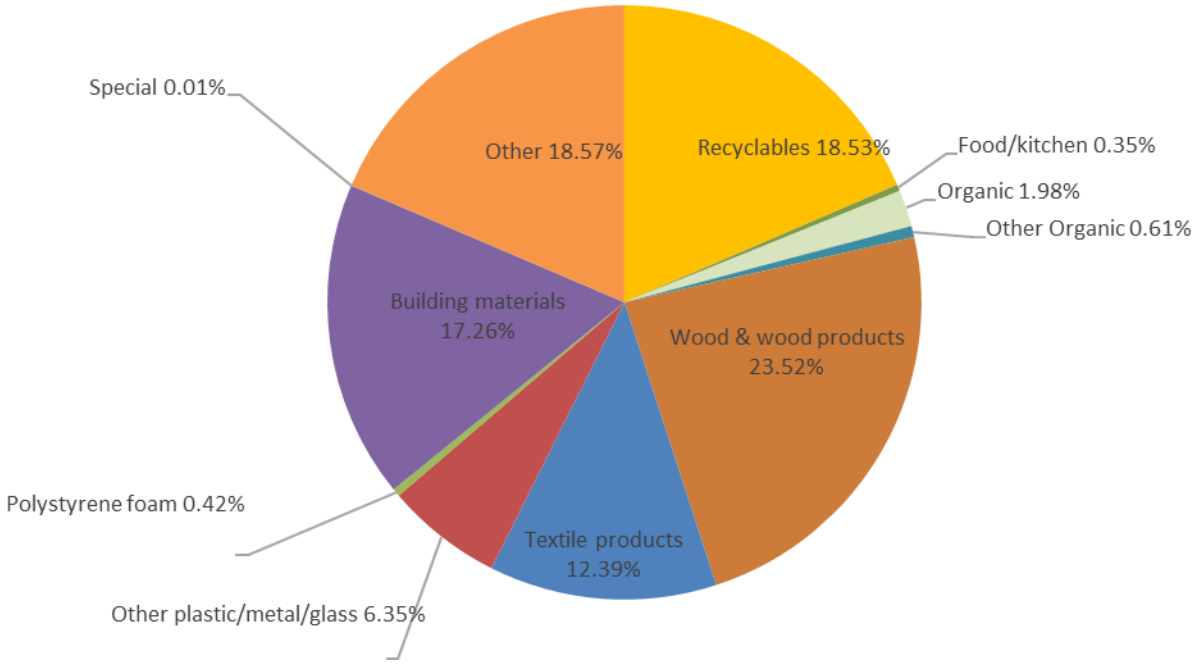


Image 16: Corflute signs ready for recycling

6.3 Composition of incoming waste by waste type

The waste entering Mugga Lane transfer station is about two thirds domestic (MSW) and one third C&I, as shown in Figure 36 and Figure 37.

Figure 36: Waste type by volume, Mugga TS

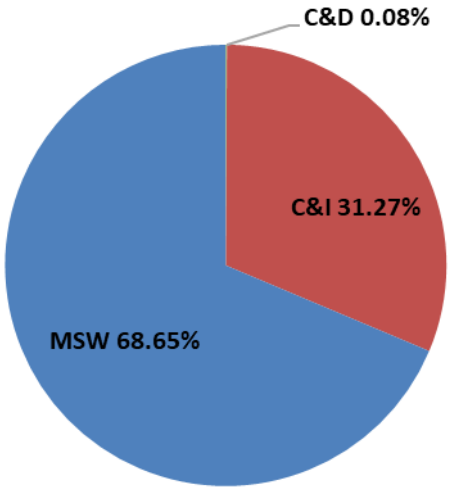


Figure 37: Waste type by weight, Mugga TS

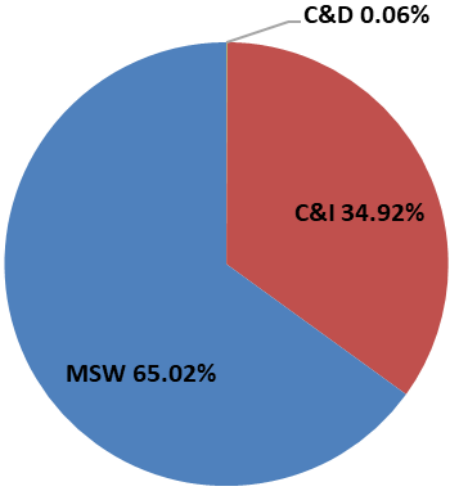


Image 17: ULABs and gas bottles ready for recycling

Figure 38 shows the composition of each incoming waste type, by volume, at the Mugga Lane transfer station. C&D waste, though minimal, is dominated by wood and wood products. MSW is mainly wood, textiles and recyclables. The C&I waste's largest categories are wood, other materials and recyclables.

Figure 38: Composition of incoming waste, by volume, by waste type, Mugga Lane transfer station

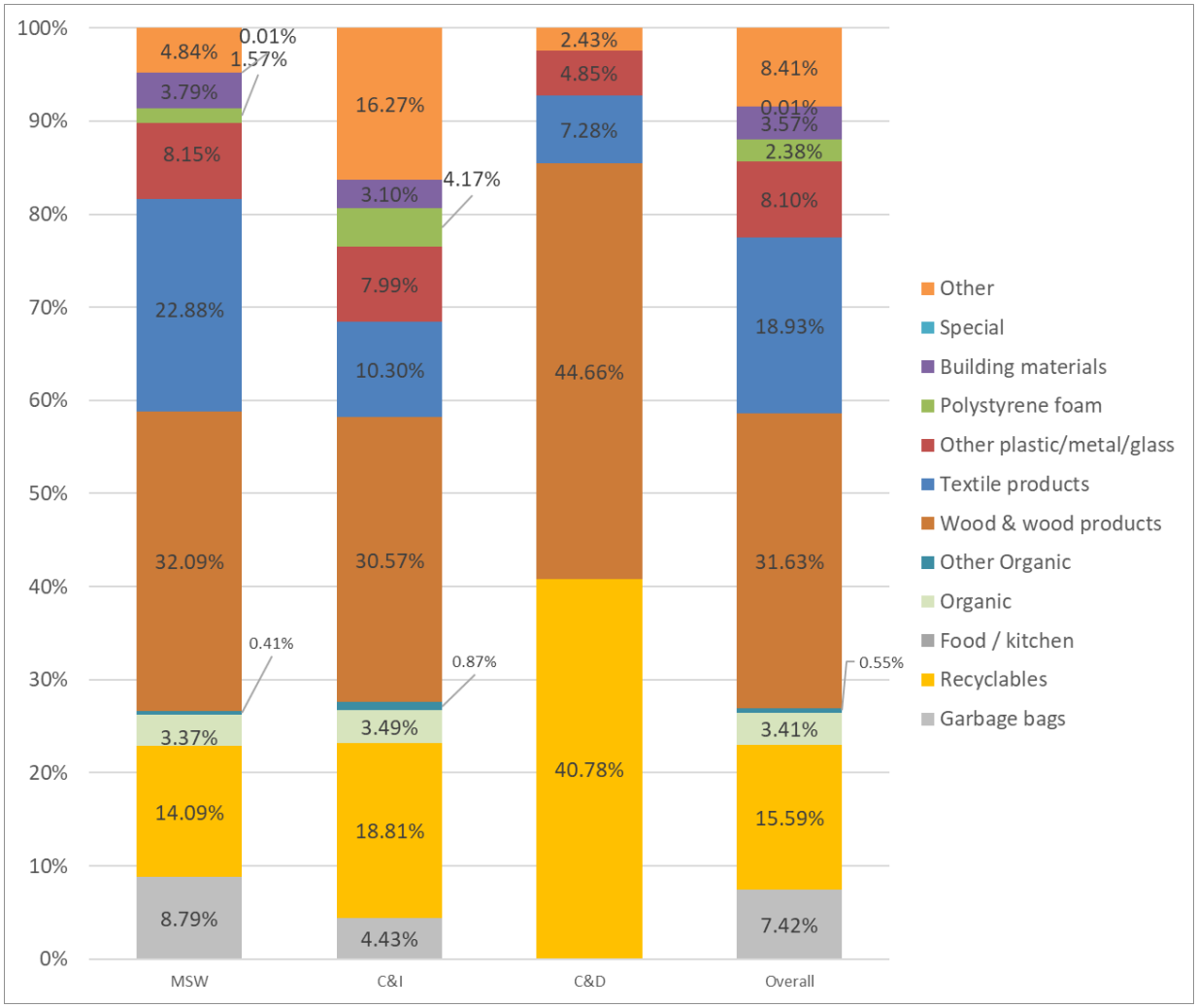


Figure 39 shows the composition of each incoming waste type, by weight. The patterns are similar to the analysis by volume.

Figure 39: Composition of incoming waste, by weight, by waste type, Mugga Lane transfer station

6.4 Resource recovery: current and potential

6.4.1 Current resource recovery from incoming waste

During the audit period, 6.5% of the waste destined for landfill at Mugga Lane transfer station was removed for recycling by transfer station staff as well as drop-off by the community. This represented 5 tonnes of recyclables recovered for recycling each day. The material removed for recycling was mainly concrete or brick, cardboard, reusable materials and metals as shown in Figure 40.

Figure 40: Composition of material recovered for recycling at Mugga Lane transfer station

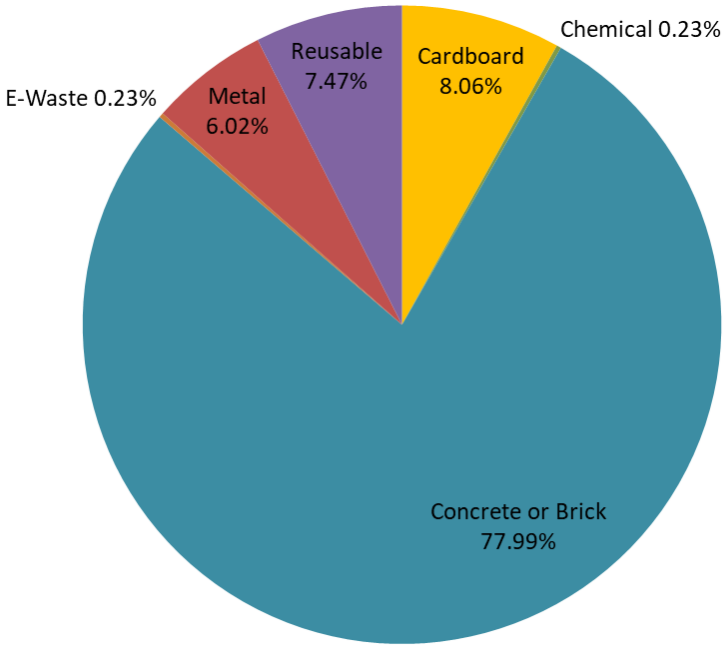
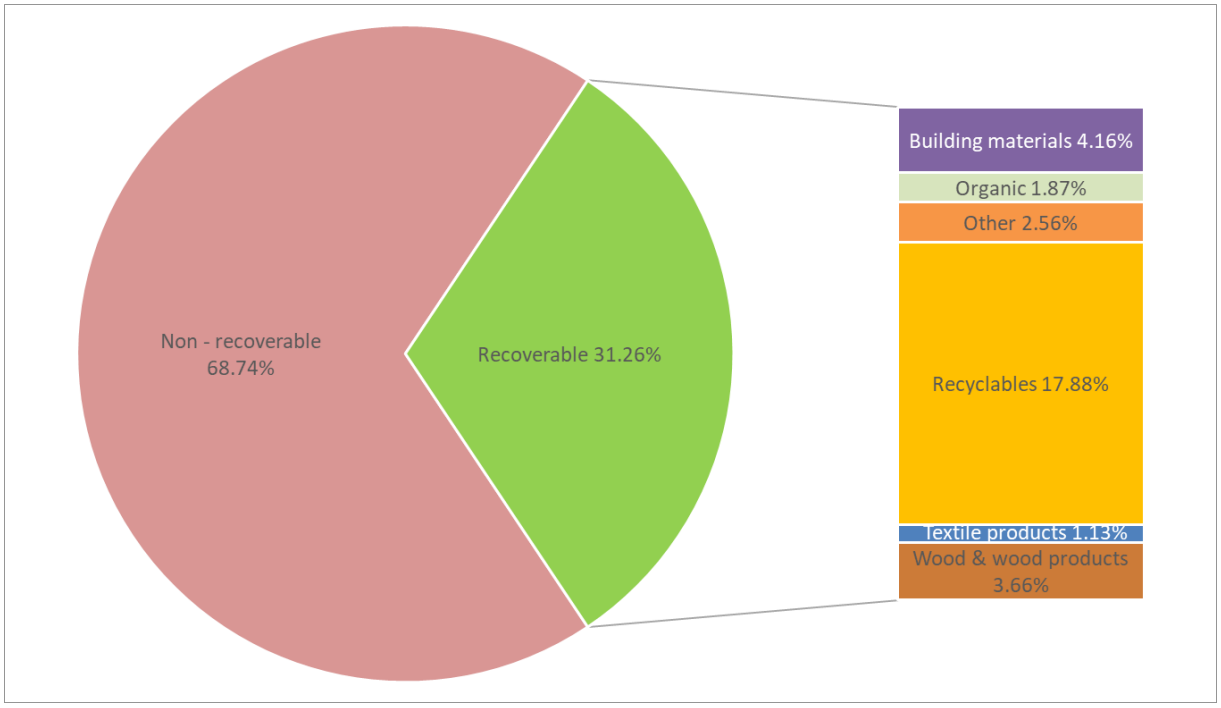


Image 18: Fridges and freezers ready for de-gassing and recycling

6.4.2 Potential resource recovery

Of the remaining material destined for landfill, 31% is potentially recoverable material, as shown in Figure 41. The main opportunities are recyclables (metals, cardboard), wood products (untreated timber and pallets), vegetation and building materials (brick, tiles and concrete) available for potential recovery.

Figure 41: Potentially recoverable materials, Mugga Lane transfer station



The list of what materials are considered potentially recoverable is in **Appendix C.**

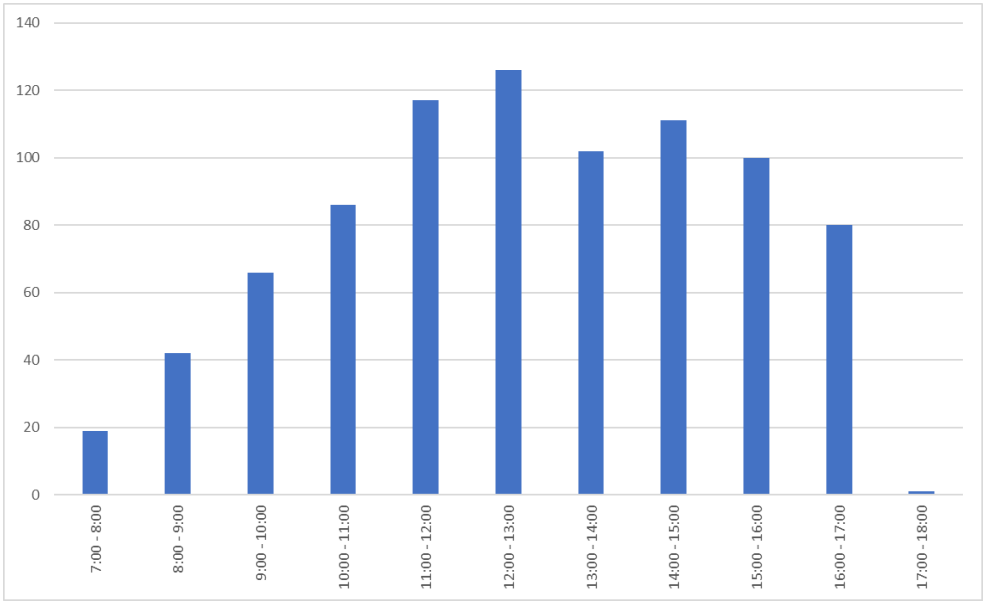
Image 19: A mixed load of non-recyclable material

7 RESULTS: MITCHELL TRANSFER STATION

7.1 Vehicle entry times

Figure 48 shows the time of day that the audited vehicles entered Mitchell transfer station. The peak vehicle entry time is midday to 1pm.

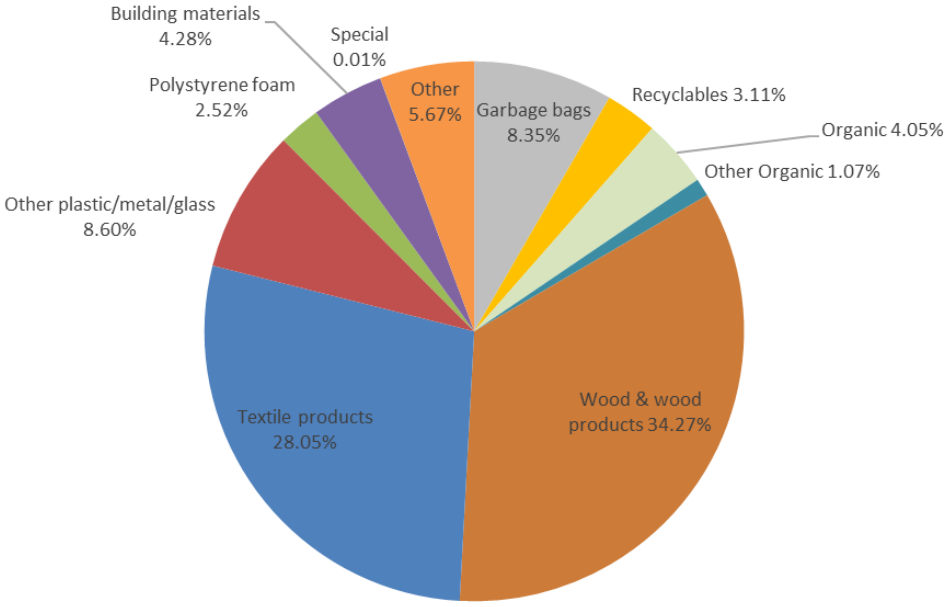
Figure 42: Mitchell transfer station: vehicle entry times



7.2 Composition of incoming waste

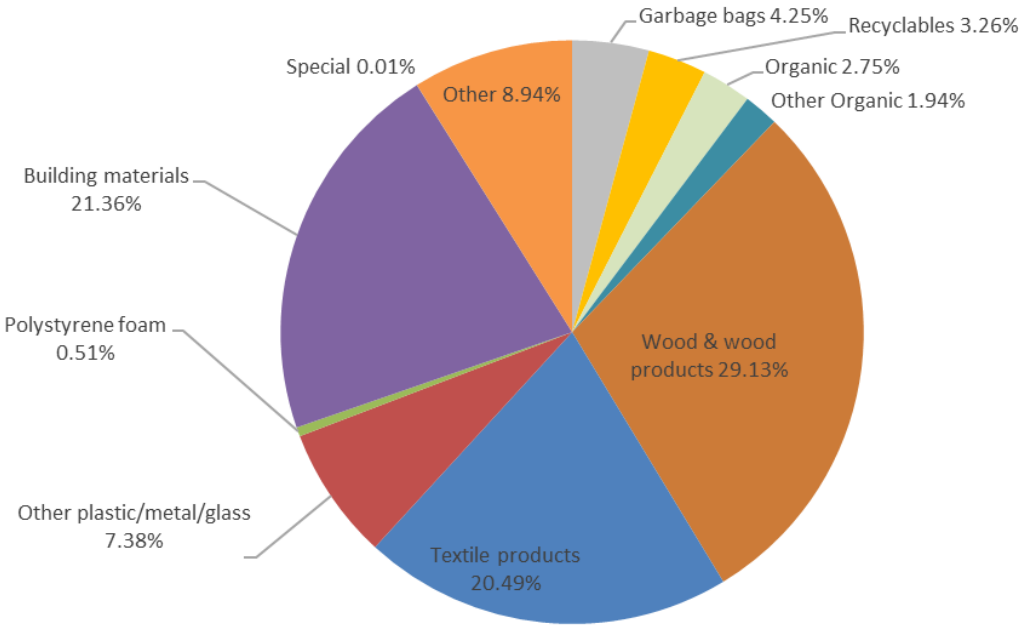
By volume, the main components of incoming waste to Mitchell transfer station are wood and wood products (34%), textile products (28%), non-recyclable plastic, metal and glass (9%) and vegetation and stumps (4%). Special (hazardous) waste is very low at 0.01% and almost 8% of material is in garbage bags. The composition by volume is shown in Figure 43.

Figure 43: Mitchell transfer station: composition of incoming waste, by volume



By weight, the proportions of each material are similar to when analysed by volume. The composition by weight is shown in Figure 44.

Figure 44: Mitchell transfer station: composition of incoming waste, by weight



The physical audit of plastic bags from loads containing > 20% bags revealed that on average the bags contain 28% non-recyclable plastics, metal and glass, followed by textiles at 27%, 21% recyclables such as paper, cardboard and plastic, glass or metal containers, followed by food waste (10%). The overall composition of plastic bag contents was measured by weight and is shown in Figure 45.

Figure 45: Mitchell transfer station: contents of plastic bags

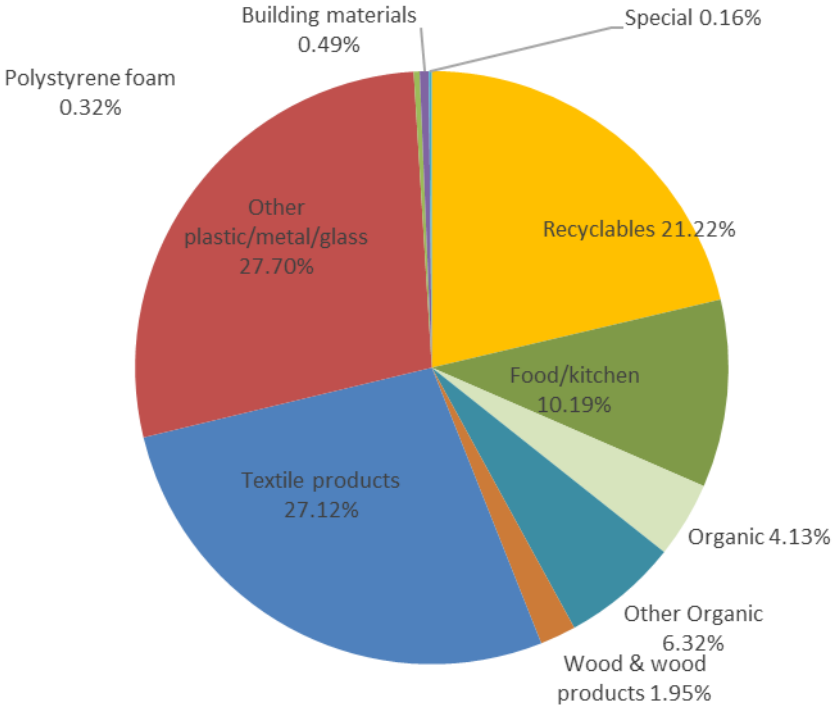
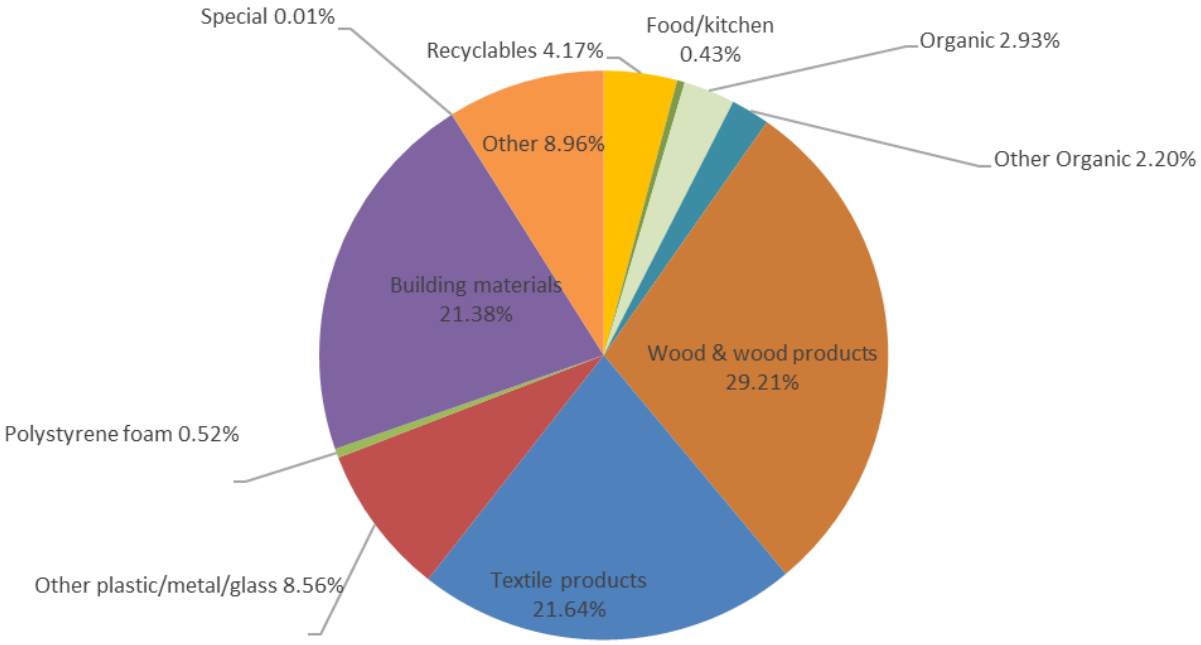


Figure 46 shows the composition of all incoming waste by weight, when the contents of plastic bags are dispersed into their individual categories. With bag contents dispersed, the percentage of food is 0.43%, textile products 21% and recyclables 4%.

Figure 46: Composition of incoming waste by weight, plastic bag contents dispersed, Mitchell transfer station



7.3 Composition of incoming waste by waste type

The waste entering Mitchell transfer station is 82% MSW and 18% C&I by volume. By weight, the breakdown in 80% MSW and 21% C&I as shown in Figure 47 and Figure 48.

Figure 47: Waste type by volume, Mitchell TS

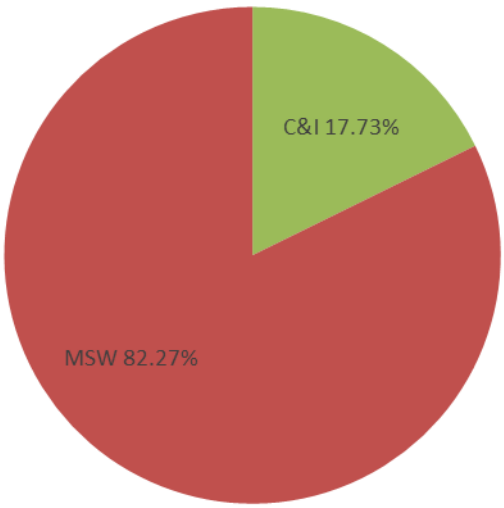


Figure 48: Waste type by weight, Mitchell TS

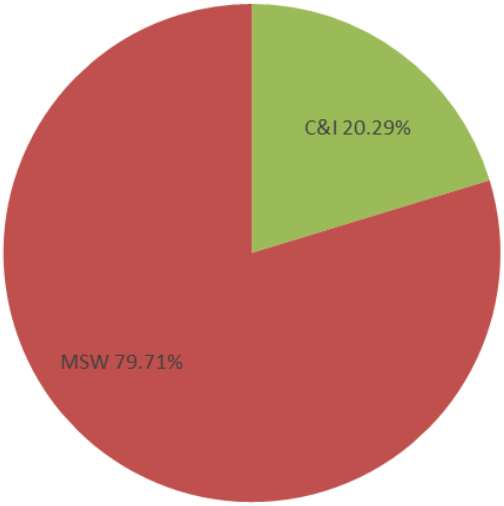


Figure 49 shows the composition of each incoming waste type, by volume, at the Mitchell transfer station. No C&D waste was detected at the Mitchell TS. About 30% of MSW and 40% of C&I is made up of wood products followed by 29% and 22% textile products. The focus should be on the MSW loads due to the amount that they contribute to the total deliveries.

Figure 49: Composition of incoming waste, by volume, by waste type, Mitchell transfer station

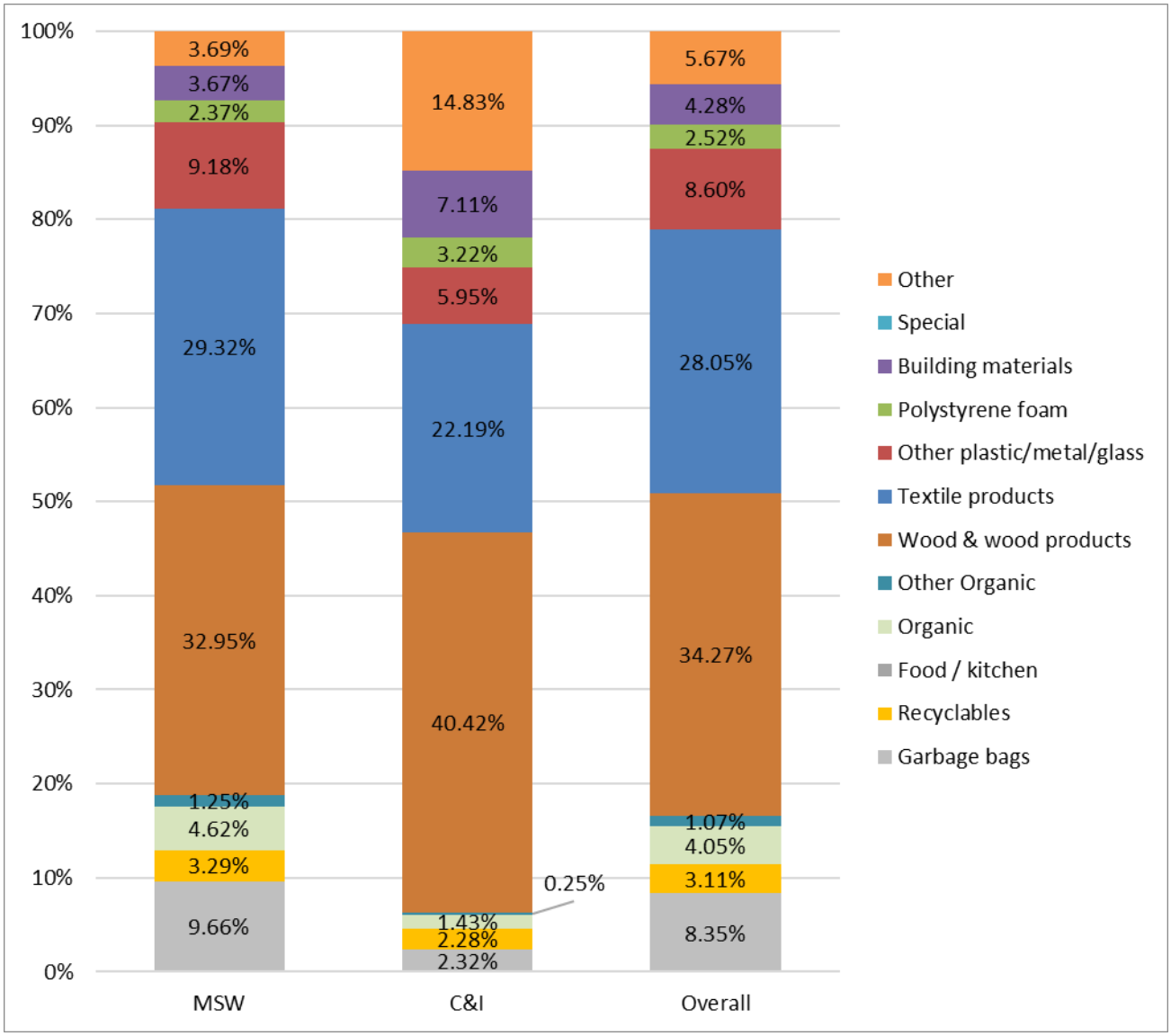


Figure 50 shows the composition of each incoming waste type, by weight. By weight, the wood products make up a high percentage and both C&I and MSW should be the focus given the amount that these loads contribute to the total deliveries. However, due to the dense nature of the building materials, 30% of C&I loads and 20% of MSW loads are represented by this category by weight.

Figure 50: Composition of incoming waste, by weight, by waste type, Mitchell transfer station

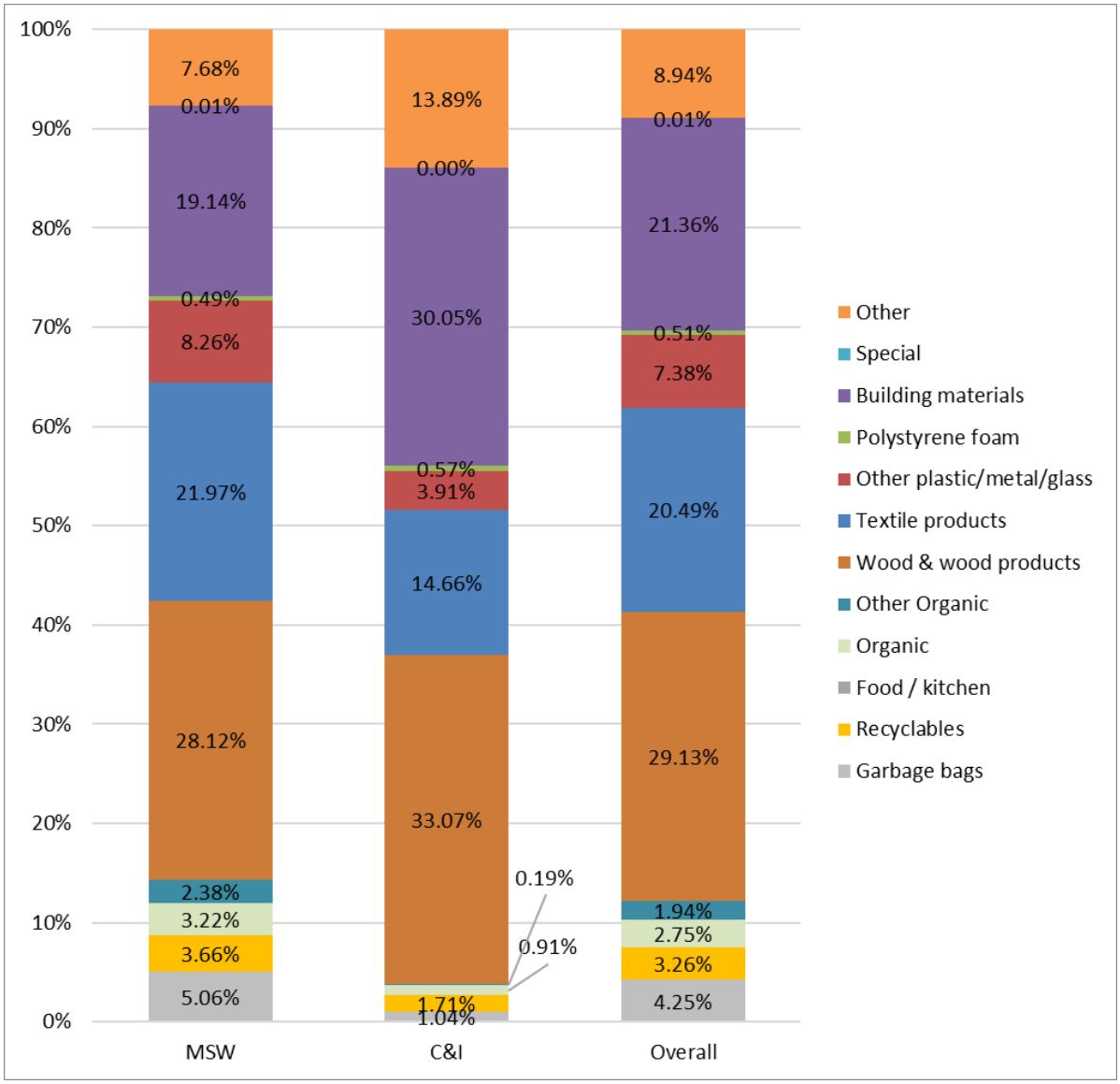


Image 20: Material being delivered to the transfer station

7.4 Resource recovery: current and potential

7.4.1 Current resource recovery from incoming waste

During the audit period, 26.4% of the waste destined for landfill at Mitchell transfer station was removed for recycling by transfer station staff as well as dropped off by community for recycling. This represented 18 tonnes of recyclables recovered each day. The material removed for recycling was mainly metals, concrete and brick, clean soil, cardboard and reusables as shown in Figure 51.

Figure 51: Composition of material removed for recycling at Mitchell transfer station

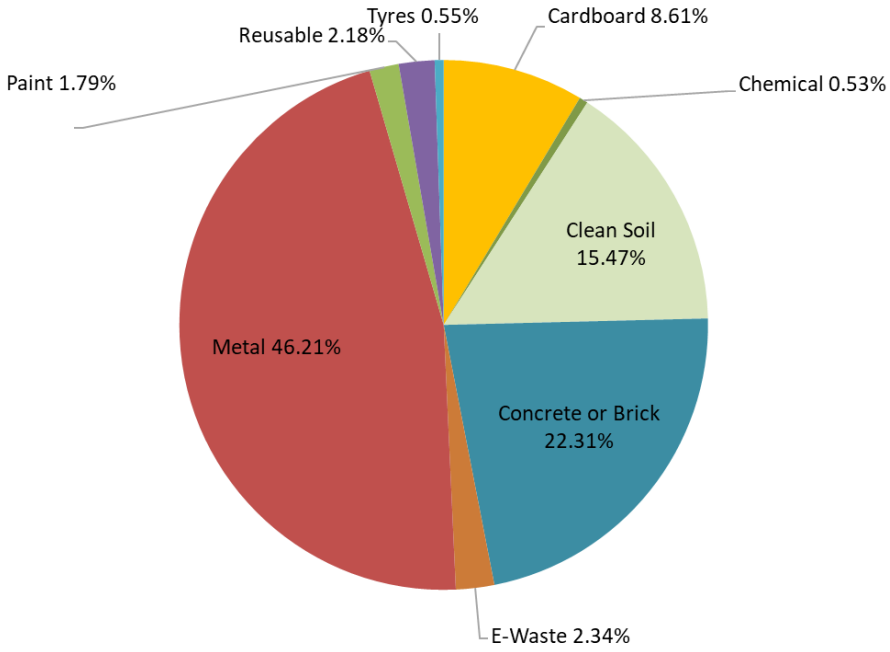
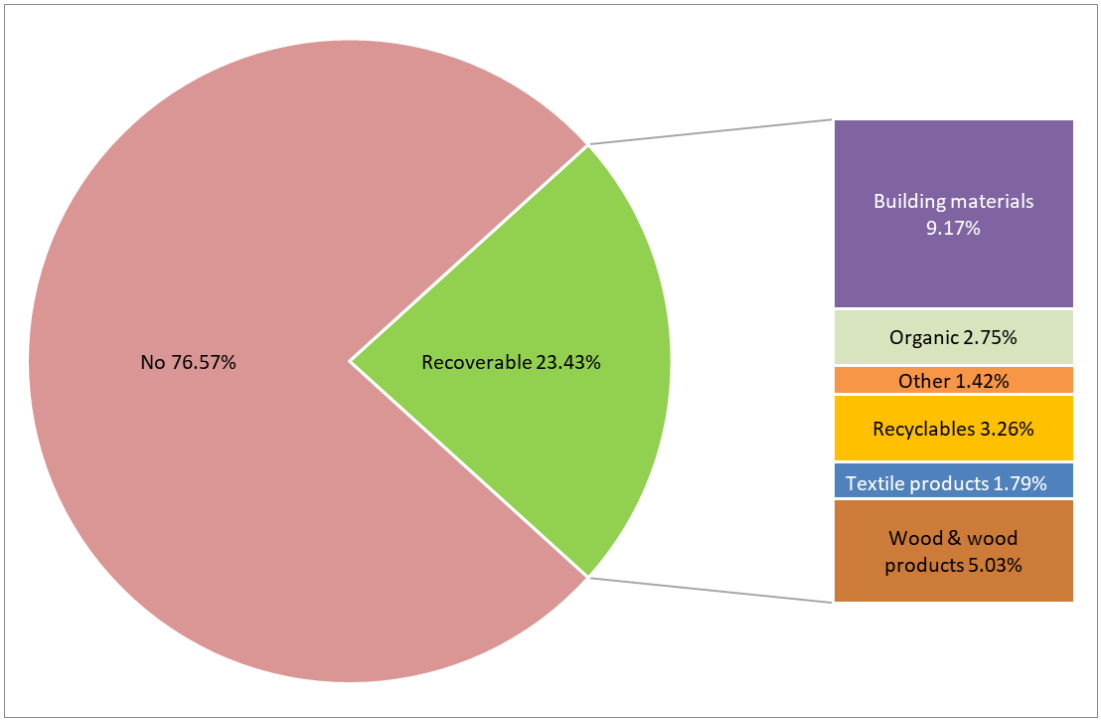


Image 21: A typical mixed load being delivered

7.4.2 Potential resource recovery

Of the remaining waste destined for landfill, 23% is potentially recoverable material, as shown in Figure 52. The main opportunities for recovery are recyclables (metals, cardboard), wood products (untreated timber and pallets), vegetation, textile products (mattresses) and building materials (tiles and concrete).

Figure 52: Potentially recoverable materials, Mitchell transfer station



The list of what materials are considered potentially recoverable is in **Appendix C.**

Image 22: Typical load of pallets and timber

8 KEY FINDINGS

8.1 All sites overall

- The peak vehicle entry time is midday to 1pm.

- The most common vehicle type at the landfill is tipper trucks. The transfer stations receive mainly utes, utes with trailers, cars and 4WD with trailers. This has not changed since 2015.

- By volume, the main components of incoming waste, across all the sites, are garbage bags of rubbish (29%), wood and wood products (21%), textiles at 14% and recyclables at 10%. Other materials such as non-recyclable plastic, metal and glass are 8%.

- By weight, the main individual categories of incoming waste, across all the sites, are garbage bags of rubbish (25%), wood and wood products (17%), non-recyclable plastic, metal and glass (8%), recyclables (6%, such as plastic containers, glass containers, metal containers, large electrical items and paper/cardboard) and textiles (5%).

- The bags within loads contain non-recyclable plastics, metal and glass at 25%, 21.5% recyclable materials followed by organic material at 18% and food waste at 15%. Interestingly, 14% of material in the bags was textiles which is highly different from the 2015 audit.
- With bag contents dispersed, the main categories of incoming waste seeing the biggest increase are building materials from 0.21% to 13.8%. This is followed by wood and wood products (17%), textiles at 12%, non-recyclable plastics, metal and glass (10%), recyclables (17%), other organics (9%), and food (5%).

- Beverage containers that would be eligible under the NSW Container Deposit Scheme (CDS) were counted in the bagged waste that was audited. At Mugga Lane Landfill 436 containers were found, followed by 127 at Mugga Transfer Station and 77 at Mitchel Transfer Station. When scaled to annual inputs, this results in an estimate of 32.5 million CDS-eligible beverage containers entering the landfill each year. The Mitchell Transfer station (~900,00 per year) had significantly smaller number of containers as compared to Mugga lane (~7.5 million).

- Overall, the waste entering the sites is 69% C&I and 30% MSW and 0.3% C&D, by volume. By weight, the breakdown in 73% C&I, 25% MSW and 2% C&D

- By volume. C&D waste is dominated by the ‘‘other’’ category, which comprised primarily clean fill and rock/dirt/soil. The C&I waste has a large proportion of garbage bags and wood products. Over half (51%) of domestic waste (MSW) comprises wood, wood products and textile products.

- By weight, when the contents of plastic bags are dispersed into their categories, C&I waste contains 11% food, and the proportion of recyclables is 13% in MSW and 17% in C&I.

- Overall, 5.3% of incoming waste is recovered for recycling. This includes materials that are dropped off at the transfer stations as well as the materials that are removed by staff at the transfer stations. No materials are recovered at the landfills. This is due to the size and nature of the loads and sits conditions. Mugga Lane transfer station recovers an overall 6.5% of the waste destined for landfill, for recycling while at Mitchell transfer station 26.4% was recovered. The high recovery rate at Mitchell transfer station is a result of the recovery of metals that are dropped off at the metal drop-off which is heavy in nature. Most of the recovered material was metals, as well as smaller amounts of concrete, bricks and mattresses.
- Of the remaining waste that is destined for landfill, 27% by weight is made up of potentially recoverable materials.

8.2 Mugga Lane landfill

- The peak vehicle entry time is 1 – 4 pm followed by 11 am to noon.

- By volume, the main components of incoming waste to the landfill are garbage bags of rubbish (43%), wood and wood products (14%), recyclable at 10% and textiles at 9%. The next most common materials are “other”” (7%, almost all is clean fill and rock/soil/dirt), non-recyclable plastic, metal and glass (8%), Special (hazardous) waste makes up 2.5%.

- By weight, the main individual categories of incoming waste at the landfill are garbage bags at 36%, wood and wood products at 13%, recyclable materials at 10.5%, textile products at 9%, building materials at 11% and “other” (this is almost all clean fill and rock/soil/dirt) at 7%.

- The bags contain 30% non-recyclable plastic, metal and glass. The next largest component is textile products at 26%, followed by recyclables at 20% and food or kitchen organics at 11%.

- With bag contents dispersed, the percentage of recyclables is 18%. Textile products is 18%, wood and wood products in 13% and building materials at 11.5%.

- By volume, the waste entering Mugga Lane landfill is 79% from C&I loads and 21% C&D. C&D waste is dominated by the ‘’other’’ category, which comprised primarily clean fill and rock/dirt/soil. Very small quantities of C&D materials were recorded at the landfill. The C&I waste has a large proportion of garbage bags (43%). This is followed by recyclables (10%), wood and wood products (14%) and textiles (9%). Over one third of domestic waste (MSW) is wood and wood products (38%), though hardly any MSW was recorded.

- No waste was recovered from incoming loads for recycling during the audit period. Twenty-seven per cent (27%) of the material entering the landfill is potentially recoverable material. The main opportunities are recovery of recyclables, textiles and wood and wood materials.

8.3 Mugga Lane transfer station

- The peak vehicle entry times are from midday to 1 pm.
- By volume, the main components of incoming waste to Mugga Lane transfer station are wood and wood products (32%), textile products (19%), recyclables (16%, such as plastic containers, glass containers, metal containers, large electrical items and paper/cardboard), building materials (4%) and non-recyclable plastic, metal and glass (8%). Special (hazardous) waste is very low at 0.01%.
- By weight, the proportions of each material are similar to when analysed by volume.
- The physical audit of plastic bags from loads containing > 20% bags revealed that on average the bags contain 26% textile products, 20% recyclables such as paper, cardboard and plastic, glass or metal containers, followed by food waste (11%).
- With bag contents dispersed, the percentage of food is 0.35%, textile products 12% and recyclables 18%.
- The waste entering Mugga Lane transfer station is about two thirds domestic (MSW) and one third C&I.
- By volume, at the Mugga Lane transfer station. C&D waste, though minimal, is dominated by wood and wood products. MSW is mainly wood, textiles and recyclables. The C&I waste's largest categories are wood, other materials and recyclables. By weight, the patterns are similar to the analysis by volume.
- During the audit period, 6.5% of the waste destined for landfill at Mugga Lane transfer station was removed for recycling by transfer station staff and dropped off by the community. This represented 5 tonnes of recyclables recovered for recycling each day. The material removed for recycling was mainly concrete or brick, cardboard, reusable materials and metals.
- Of the remaining material destined for landfill, 31% is potentially recoverable material.
- The main opportunities are recyclables (metals, cardboard), wood products (untreated timber and pallets), vegetation and building materials (brick, tiles and concrete) available for potential recovery.

8.4 Mitchell transfer station

- The peak vehicle entry time is midday to 1pm.

- By volume, the main components of incoming waste to Mitchell transfer station are wood and wood products (34%), textile products (28%), non-recyclable plastic, metal and glass (9%) and vegetation and stumps (4%). Special (hazardous) waste is very low at 0.01% and almost 8% of material is in garbage bags. By weight, the proportions of each material are similar to when analysed by volume.

- On average the contents of bags contain 28% non-recyclable plastics, metal and glass, followed by textiles at 27%, 21% recyclables such as paper, cardboard and plastic, glass or metal containers, followed by food waste (10%). With bag contents dispersed, the percentage of food is 0.43%, textile products 21% and recyclables 4%.

- The waste entering Mitchell transfer station is 82% MSW and 18% C&I by volume. By weight, the breakdown in 80% MSW and 21% C&I.

- by volume, at the Mitchell transfer station. No C&D waste was detected at the Mitchell TS. About 30% of MSW and 40% of C&I is made up of wood products followed by 29% and 22% textile products.

- By weight, the wood products make up a high percentage and both C&I and MSW should be the focus given the amount that these loads contribute to the total deliveries. However, due to the dense nature of the building materials, 30% of C&I loads and 20% of MSW loads are represented by this category by weight.

- During the audit period, 26.4% of the waste destined for landfill at Mitchell transfer station through removal for recycling by transfer station staff as well as community drop-off. The material removed for recycling was mainly metals, concrete and brick, clean soil, cardboard and reusables.

- Of the remaining waste destined for landfill, 23% is potentially recoverable material. The main opportunities for recovery are recyclables (metals, cardboard), wood products (untreated timber and pallets), vegetation, textile products (mattresses) and building materials (tiles and concrete).

APPENDIX A DATA RECORDING SHEETS

Table 10: Visual assessment data recording sheet

Date:	Auditor:					
	Load 1		Load 2		load 3	
Entry Time						
Vehicle Registration Number						
Type Of Vehicle						
Maximum Capacity (M^3)						
Compaction (High, Medium, Low)						
Tipping Point						
Source (C&I / C&D / MSW)						
Sector (M S H O X C T L E U G)						
	Volume (litres)		Volume (litres)		Volume (litres)	
Garbage Bags Of Rubbish						
Paper - Recyclable						
Paper - Non-Recyclable						
Cardboard						
Food / Kitchen						
Nappies						
Dead Animals						
Vegetation / Garden						
Stumps, Logs (10 Cm Diameter +)						
Wood - Furniture, Painted Wood						
Wood - Chipboard, MDF						
Wood - Pallets						
Wood - Board/Pole, Untreated						
Wood - Board/Pole, Treated						
Covered Furniture						
Carpet & Underlay						
Textiles - Clothing / Cloth						
Textiles - Composite (Shoes, Bags)						
Mattresses - Spring						
Rubber - Tyres						
Rubber / Foam						
Glass - Containers Recyclable						
Glass - Plate / Other						
Plastic - Containers Recyclable						
Plastic - Plastic Bags & Film						
Plastic - Polystyrene Foam						
Plastic - Other						
Metals - Recyclable Containers						
Metals - Ferrous (Steel)						
Metals - Non-Ferrous						
Concrete / Cement						
Bricks						
Tiles						
Plasterboard						
Clean Fill						
Rock / Dirt / Soil						
Asphalt						
Sludge						
	VOL (LITRES)	**NUMBER**	**VOL (LITRES)**	**NUMBER**	**VOL (LITRES)**	**NUMBER**
Toner Cartridges						

Date:	Auditor:					
	Load 1		Load 2		load 3	
Entry Time						
Vehicle Registration Number						
Type Of Vehicle						
Maximum Capacity (M^3)						
Compaction (High, Medium, Low)						
Tipping Point						
Source (C&I / C&D / MSW)						
Sector (M S H O X C T L E U G)						
	Volume (litres)		Volume (litres)		Volume (litres)	
Electrical Large e.g. Whitegoods						
Electrical Medium e.g. televisions						
Electrical Small e.g.blender						
Insulation						
Hazardous / Special						
Other - Organic						
Other - Inert						

Table 11: Plastic bag contents data recording sheet

Type:	**Domestic / Commercial / Bagged**	
Date:		
Rego:		
Total weight of bag:		
Material	**Weight**	
Paper – Recyclable		
Paper – Non-Recyclable		
Cardboard		
Food/kitchen		
Nappies		
Vegetation / garden		
Wood - untreated		
Wood - treated		
Textiles /rags		
Glass – recyclable containers		CDS no.
Glass –fines/plate/other		
Plastic containers - recyclable		CDS no.
Plastic – bags & film		
Plastic – polystyrene foam		
Plastic - other		
Steel - containers recyclable		
Steel - other		
Aluminium - containers		CDS no.
Aluminium – other		
Building waste (specify)		
Rock/dirt/soil		
Electrical items- small (specify)		
Hazardous (specify) – batteries, toner cartridges, medical		
Other – organic		
Other- inert		
Comment:(tell us anything unusual)		

APPENDIX B SORTING CATEGORY DEFINITIONS

Material Categories	Definitions
Garbage bags of rubbish	Enclosed bags of garbage
Paper - Recyclable	Office paper, magazines, newspapers, brown craft paper,
Paper – Non recyclable	rolls of low-grade paper, hand towels, wet or heavily soiled paper & cardboard
Cardboard	Dry cardboard boxes, cardboard rolls, clean dry cardboard
Food / Kitchen	Pre and post-consumer fruit, vegetable, meat, fat, bone
Nappies	Nappies
Dead animals	Whole or large parts of dead animals such as road kill or abattoir waste
Vegetation / garden	Plant material, leaves, grass, small branches
Stumps/logs (10cm + dia)	Any large stumps and logs
Wood – pallets	Wooden pallets
Wood - furniture, painted	Wardrobes, painted fence posts, varnished furniture, wooden chairs, doors, etc
Wood - chipboard, MDF	Any engineered timber products, old kitchen benches, chipboard
Wood - board/pole,	Untreated - timber without signs of treatment. timber off-cuts, pallets, posts
Wood - board/pole,	Treated - solid timber with visible signs of chemical treatment. CCA treated timber
Covered Furniture	Materials / Leather-covered chairs and couches,
Carpet & underlay	Rolls of carpet ,carpet off-cuts, carpet tiles, felt underlay, synthetic underlay
Textiles – clothing. cloth	Clothes, rags, rolls of fabric, fabric off-cuts
Textiles – composites	Shoes, bags, luggage, belts
Mattresses - spring	All spring mattresses bases and tops,
Rubber/ Foam	All tyres and inner-tubes, Rubber mats, tubes, washers, foam rubber, foam mattress
Glass – containers	Recyclable -glass bottles and jars
Glass – plate/other	Window glass, non-recyclable glass such as wine glasses
Plastic - containers	Recyclable - Plastic bottles and jars - food/beverage containers (PET & HDPE)
Plastic – bags & film	Film wrap, plastic bags (not filled)
Plastic - Polystyrene foam	Packaging foam
Plastic - other	All other plastics not elsewhere classified - i.e. plastic containers, plastic drums
Metals - ferrous steel	Any items that are mainly steel or iron
Metals - non-ferrous	Aluminium Siding, aluminium foil, copper wire
Concrete / cement	Any concrete, bags of cement dust, etc
Bricks	Full-bricks, broken bricks
Tiles	Roof tiles, whole or broken
Plasterboard	Plasterboard, gypsum
Rock/dirt/soil	Stones, uncontaminated soil, Inert material not elsewhere classified
Clean fill	Clean soil that could be used as cover
Asphalt	Asphalt, bitumen
Toner cartridges	Toner cartridges from photocopiers, printers, etc
Electrical – large	Whitegoods, fridges, freezers, washing machines, photocopiers,etc,
Electrical – medium	Televisions, microwaves, CD players, stereos, computers, monitors, printers
Electrical – small	Blenders, hair-dryers, clock radios
Insulation	Roofing insulation
Hazardous / special	Batteries, chemicals, clinical waste, contaminated material
Other organic	Anything that doesn't fit into the other categories that is predominantly made of material that would compost over time

APPENDIX C WHAT IS CONSIDERED POTENTIALLY RECOVERABLE

Table 12: Classification of recyclable vs non-recyclable materials

Consolidated category	Material category	Is it potentially recoverable?
Recyclables	Paper – recyclable	Yes
	Cardboard	Yes
	Glass – containers	Yes
	Plastic – containers	Yes
	Metals –containers	Yes
	Metals - ferrous steel	Yes
	Metals – non-ferrous	Yes
	Toner cartridges	Yes
	Electrical large	Yes
Food/kitchen	Food/kitchen	No
Garbage bags	Garbage bags	No
Polystyrene	Polystyrene	No
Organic	Vegetation / garden	Yes
	Stumps, logs	Yes
Other organic	Paper - non-recyclable	No
	Nappies	No
	Dead animals	No
	Sludge	No
	Other –organic	No
Other plastic/metal/glass	Glass – plate/other	No
	Plastic – plastic bags & film	No
	Plastic – other	No
Wood/wood products	Wood - furniture, painted	No
	Wood - chipboard, MDF	No
	Wood - pallets	Yes
	Wood - untreated	Yes
	Wood - board/pole, treated	No
Textile products	Covered furniture	No
	Carpet & underlay	No
	Textiles – clothing/ cloth	No
	Textiles – composite	No
	Mattresses – spring	Yes
	Rubber - tyres	Yes
	Rubber/foam	Yes
Building materials	Concrete / cement	Yes
	Bricks	Yes
	Tiles	Yes
	Plasterboard	No
Special	Hazardous/special waste	No
Other	Clean fill	Yes
	Rock/dirt/soil	Yes
	Asphalt	Yes
	Electrical medium	Yes
	Electrical small	Yes
	Insulation	No
	Other - inert	No

APPENDIX D VOLUME TO WEIGHT CONVERSION FACTORS

Table 13: Volume to weight conversion factors

Material	Uncompacted	Semi compacted	Compacted
	Kilograms per cubic metre		
Garbage bags of rubbish	76	152	228
Paper – recyclable	76	152	228
Paper - non-recyclable	130	130	130
Cardboard	260	260	260
Food / Kitchen	343	514	1029
Nappies	55	92	130
Dead animals	156	156	156
Vegetation / garden	91	227	445
Stumps, logs	160	170	400
Wood - furniture, painted	120	160	360
Wood - chipboard, MDF	180	220	260
Wood - pallets	156	156	156
Wood -, untreated	100	150	350
Wood - board/pole, treated	100	150	350
Covered furniture	91	120	240
Carpet & underlay	90	100	450
Textiles – clothing/ cloth	91	91	240
Textiles – composite	200	200	200
Mattresses – spring	400	400	400
Rubber - tyres	260	260	260
Rubber/foam	280	280	280
Glass – containers	411	411	411
Glass – plate/other	72	72	72
Plastic – containers	39	78	156
Plastic – plastic bags & film	14	21	28
Plastic - polystyrene foam	30	30	90
Plastic – other	170	170	360
Metals –containers	120	120	120
Metals - ferrous steel	120	120	120
Metals – non-ferrous	139	139	139
Concrete / cement	830	830	830
Bricks	828	828	828
Tiles	470	550	640
Plasterboard	922	922	922
Clean fill	1048	1048	1048
Rock/dirt/soil	227	227	227
Asphalt	227	227	227
Sludge	680	680	680
Toner cartridges	265	265	265
Electrical large	105	113	120
Electrical medium	227	227	227
Electrical small	170	170	350
Insulation	87	170	348
Hazardous / special	87	170	348
Other –organic	343	514	1029
Other - inert	830	830	830

APPENDIX E DETAILED AUDIT RESULTS

Table 14: Audit results by volume by site: all incoming waste

Material	Consolidation category	Mugga lane LF	Mugga lane TS	Mitchel TS	Overall
Garbage bags of rubbish	Garbage bags	1304.985	93.225	63.985	1462.195
Paper recyclable	Recyclables	5.18	3.615	3.265	12.06
Paper non recyclable	Other Organic	33.11	6.94	2.755	42.805
Cardboard	Recyclables	226.14	115.84	8.1	350.08
Food kitchen	Food / kitchen	0	0	0	0
Nappies	Other Organic	0	0	0	0
Dead animals	Other Organic	0	0	0	0
Vegetation garden	Organic	52.855	40.448	26.259	119.562
Stumps logs 10 cm diameter	Organic	0	2.34	4.77	7.11
Wood furniture painted wood	Wood & wood products	126.72	213.529	79.72	419.969
Wood chipboard mdf	Wood & wood products	125.52	64.745	51.12	241.385
Wood pallets	Wood & wood products	69.93	31.11	25.37	126.41
Wood board pole untreated	Wood & wood products	47.205	31.015	18.08	96.3
Wood board pole treated	Wood & wood products	58.34	56.95	88.215	203.505
Covered furniture	Textile products	73.49	127.675	120.685	321.85
Carpet underlay	Textile products	52.89	52.165	44.38	149.435
Textiles clothing cloth	Textile products	44.805	33.051	19.675	97.531
Textiles composite shoes bags	Textile products	13.54	16.29	23.24	53.07
Mattresses	Textile products	4.9	0.2	1	6.1
Rubber tyres	Textile products	0	0.335	0	0.335
Rubber foam	Textile products	84.8	8.155	5.885	98.84
Glass containers recyclable	Recyclables	2.28	1.02	0.915	4.215
Glass plate mirror other	Other plastic/metal/glass	5.29	7.725	3.925	16.94
Plastic containers recyclable	Recyclables	2.955	1.715	2.54	7.21
Plastic plastic bags film	Other plastic/metal/glass	152.357	31.43	15.164	198.951
Plastic polystyrene foam	Polystyrene foam	49.035	29.885	19.32	98.24
Plastic other hard	Other plastic/metal/glass	83.1	62.635	46.802	192.537
Metals steel	Recyclables	50.837	57.342	6.66	114.839
Metals aluminium	Recyclables	8.74	12.325	2.175	23.24
Concrete cement	Building materials	14.585	4.62	4.69	23.895
Bricks	Building materials	4.53	2.108	1.435	8.073
Tiles	Building materials	6.855	7.345	11.525	25.725
Plasterboard	Building materials	58.65	30.81	15.14	104.6
Clean fill	Other	11.5	0.66	0.75	12.91
Rock dirt soil	Other	61.645	14.63	2.47	78.745
Asphalt	Other	1.2	0	0	1.2
Sludge	Other Organic	1.2	0	0	1.2
Toner cartridges	Recyclables	0	0.05	0	0.05
Electrical large i e whitegoods	Recyclables	1.2	3.94	0.18	5.32

Material	Consolidation category	Mugga lane LF	Mugga lane TS	Mitchel TS	Overall
Electrical medium i e televisions	Other	2.545	4.98	0.82	8.345
Electrical small i e blender	Other	0.595	2.375	0.56	3.53
Insulation	Other	113.76	46.035	31.775	191.57
Hazardous special	Special	78.02	0.125	0.07	78.215
Other organic	Other Organic	25	0	5.42	30.42
Other inert	Other	8.8	36.995	7.04	52.835
Total		**3069.089**	**1256.378**	**765.88**	**5091.347**

Table 15: Audit results by weight by site: all incoming waste

Material	Consolidation category	Mugga lane LF	Mugga lane TS	Mitchel TS	Overall
Garbage bags of rubbish	Garbage bags	234.0614	7.0851	4.86286	246.0093
Paper - recyclable	Recyclables	0.80788	0.27474	0.24814	1.33076
Paper - non-recyclable	Paper - non-recyclable	4.3043	0.9022	0.35815	5.56465
Cardboard	Recyclables	58.7964	30.1184	2.106	91.0208
Food / Kitchen	Food / kitchen	0	0	0	0
Nappies	Other Organic	0	0	0	0
Dead animals	Other Organic	0	0	0	0
Vegetation / garden	Vegetation / garden	10.97145	3.680768	2.389569	17.04178
Stumps, logs (>10 cm diameter)	Organic	0	0.3744	0.7632	1.1376
Wood - furniture, painted wood	Wood & wood products	20.586	25.62348	9.5664	55.77588
Wood - chipboard, MDF	Wood & wood products	27.7912	11.6541	9.2016	48.6469
Wood - pallets	Wood & wood products	10.90908	4.85316	3.95772	19.71996
Wood - board/pole, untreated	Wood & wood products	11.0305	3.1015	1.808	15.94
Wood - board/pole, treated	Wood & wood products	13.1715	5.695	8.8215	27.688
Covered furniture	Textile products	8.26925	11.61843	10.98234	30.87001
Carpet & underlay	Textile products	15.1535	4.69485	3.9942	23.84255
Textiles - clothing / cloth	Textile products	6.136435	3.007641	1.790425	10.9345
Textiles-composite (shoes, bags)	Textile products	2.708	3.258	4.648	10.614
Mattresses	Textile products	1.96	0.08	0.4	2.44
Rubber - tyres	Textile products	0	0.0871	0	0.0871
Rubber / foam	Textile products	23.744	2.2834	1.6478	27.6752
Glass - containers recyclable	Recyclables	0.93708	0.41922	0.376065	1.732365
Glass - plate /mirror /other	Other plastic/metal/glass	0.38088	0.5562	0.2826	1.21968
Plastic - containers recyclable	Recyclables	0.160095	0.066885	0.09906	0.32604
Plastic - plastic bags & film	Other plastic/metal/glass	3.488478	0.44002	0.212296	4.140794
Plastic - polystyrene foam	Polystyrene foam	3.22785	0.89655	0.5796	4.704
Plastic - other hard	Other plastic/metal/glass	22.0842	10.64795	7.95634	40.68849
Metals - (steel)	Recyclables	6.10044	6.88104	0.7992	13.78068
Metals - (Aluminium)	Recyclables	1.25686	0.6116	0.091045	1.959505
Concrete / cement	Building materials	12.10555	3.8346	3.8927	19.83285
Bricks	Building materials	3.75084	1.745424	1.18818	6.684444
Tiles	Building materials	3.84145	3.45215	5.41675	12.71035
Plasterboard	Building materials	54.0753	28.40682	13.95908	96.4412

Material	Consolidation category	Mugga lane LF	Mugga lane TS	Mitchel TS	Overall
Clean fill	Other	12.052	0.69168	0.786	13.52968
Rock / dirt / soil	Other	13.99342	3.32101	0.56069	17.87512
Asphalt	Other	0.2724	0	0	0.2724
Sludge	Other Organic	0.816	0	0	0.816
Toner cartridges	Recyclables	0	0.01325	0	0.01325
Electrical large i.e. whitegoods	Recyclables	0.126	0.4137	0.0189	0.5586
Electrical medium i.e. televisions	Other	0.577715	1.13046	0.18614	1.894315
Electrical small i.e. blender	Other	0.12275	0.40375	0.0952	0.6217
Insulation	Other	14.20832	4.005045	2.764425	20.97779
Hazardous / special	Special	27.14574	0.010875	0.00609	27.16271
Other - organic	Other Organic	12.2857	0	1.85906	14.14476
Other - inert	Other - inert	7.304	30.70585	5.8432	43.85305
Total		**650.7139**	**217.0463**	**114.5185**	**982.2788**