

*"We'll see you right"*



# ITM BUILDING GUIDE: HOW TO MINIMISE CONSTRUCTION WASTE





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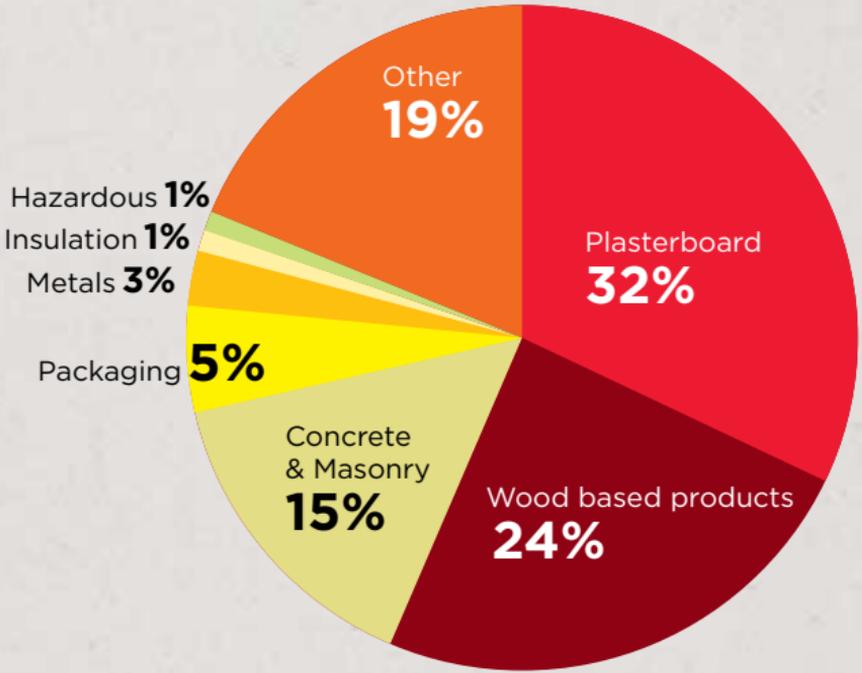
This guide provides builders, designers, estimators, project managers, and subcontractors with simple, cost-effective and practical ways to minimise construction waste. The guide will help you and your construction team to answer the following questions:

- > Why minimise construction waste?
- > What materials and quantities are contained in construction waste?
- > How can we minimise construction waste in simple, cost effective and practical ways?

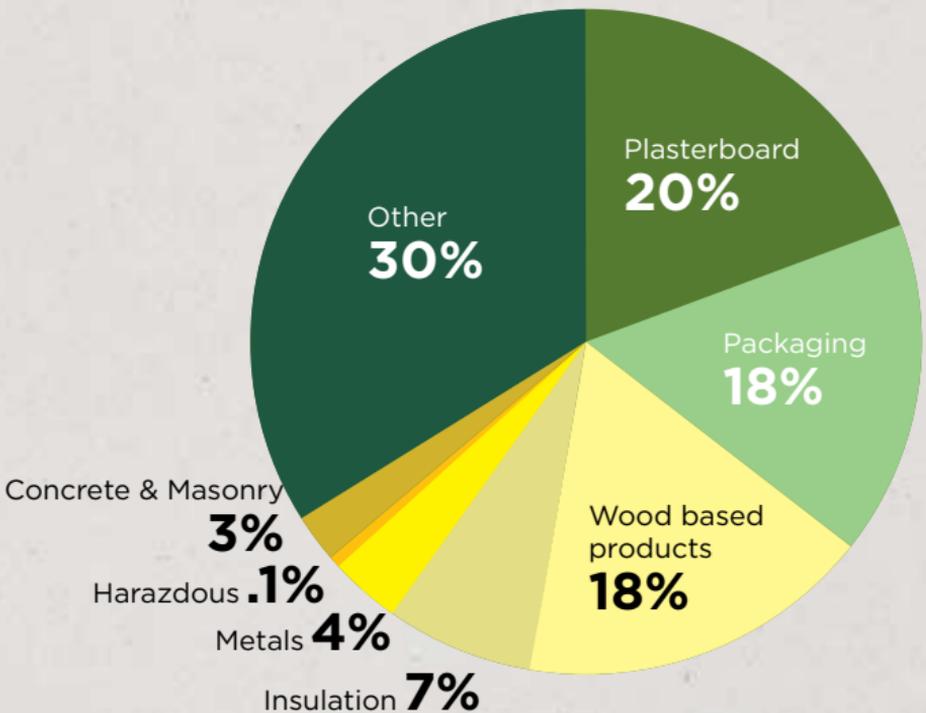
The information contained in this guide is relevant to most construction projects but particularly for new residential construction.

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NEW RESIDENTIAL  
CONSTRUCTION WASTE  
BY **WEIGHT**



NEW RESIDENTIAL  
CONSTRUCTION WASTE  
BY **VOLUME**



# CONSTRUCTION WASTE

## KNOW WHAT YOU THROW

Use the tables as a guide to waste composition, but remember each job is unique and only you can tell whether materials are being used efficiently to minimise waste.

### RESIDENTIAL CONSTRUCTION WASTE

(Example: 200sqm New Residential Construction)

WASTE TYPE	APPROX WEIGHT (KG)	%	APPROX VOLUME (M <sup>3</sup> )	%
Plasterboard	1040	32	5.3	20
Wood based products (approx 25% untreated)	780	24	4.9	18
Concrete & Masonry	490	15	0.8	3
Packaging	165	5	4.9	18
Metals	100	3	1.0	4
Insulation	25	1	2.0	7
Hazardous	20	1	0.1	-
Other	620	19	8.0	30
<b>Total</b>	<b>3240</b>	<b>100</b>	<b>27.0</b>	<b>100</b>

#### TABLE NOTES (1):

1. Volume data based on skip volumes, including uncompacted air space.
2. Data source: Waste audit results from Beacon Pathways NOW Homes 2005 and 2006, US NAHB Residential Construction Waste Management – A Builders Field Guide 1997 and builders feedback and waste audits from the Target Sustainability Program, Christchurch, 2008.



### **DID YOU KNOW...**

The average residential construction project generates:

> 25-30m<sup>3</sup> or 3000-3500kg or 2-3 standard 9m<sup>3</sup> skips of waste.

> 16kg or 0.14m<sup>3</sup> of waste per square metre of floor area.

Data source: refer table notes (1)

## **WASTE DISPOSAL COSTS**

<b>WASTE TYPE</b>	<b>SKIP VOLUME(M<sup>3</sup>)</b>	<b>APPROX WEIGHT LIMITS (KG)</b>	<b>APPROX COST*</b>
General waste	2	300	\$120-\$200
General waste	3	450	\$160-\$230
General waste	4.5	675	\$170-\$250
General waste	6	1000	\$220-\$300
General waste	7.5	1250	\$230-\$330
General waste <sup>^</sup>	9	1500	\$270-\$350
Hardfill/Cleanfill	2	2000	\$150-\$200
Hardfill/Cleanfill	3	3000	\$190-\$260

\*Additional charges apply for exceeding weight limits

<sup>^</sup> Common size for construction waste

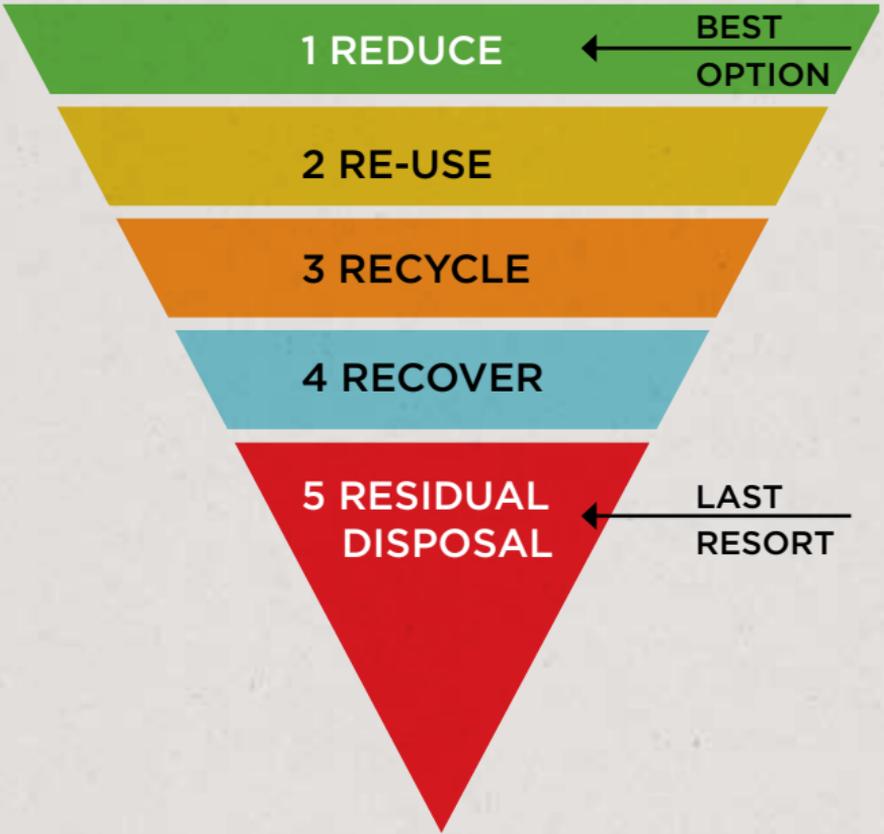
### **TABLE NOTES (2):**

1. Pricing and weight limits based on Akl/Wgn/ChCh and may vary from region to region. As at February 2014.
2. Additional charges apply for exceeding weight limits and pickup dates.
3. Hardfill/Cleanfill material includes concrete, asphalt, masonry blocks, bricks and natural materials such as clay, soil and rock. General waste excludes hardfill/cleanfill & hazardous wastes.



# HERE'S HOW: THE 5R APPROACH TO MINIMISE WASTE

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Use the 5R waste hierarchy to prioritise your waste minimisation options. In order of priority, waste reduction (or prevention) is always the best option, followed by re-use then recycling & recovery and as a last resort residual disposal to a cleanfill or landfill site.

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## ***DID YOU KNOW...***

- 'Re-use' means to make use of again without any processing i.e. to use in its original state.
- 'Recycling' diverts waste materials from disposal to produce products with potential economic or ecological benefits.
- 'Recovery' is a wider term that includes the re-use of waste products as a fuel source.

# 1 REDUCE



Assign a waste management champion

– Assign a senior staff member with an interest in waste minimisation to take responsibility for the project waste management plan (a waste management plan template can be found on the ITM website [www.itm.co.nz/sustainability](http://www.itm.co.nz/sustainability))

## **SET REALISTIC WASTE REDUCTION TARGETS**

Let your team come up with some ideas and set 'easy to understand' waste targets such as a reduced number of skips or cubic metres of waste per job or square metres of floor area.

## **REWARD YOUR TEAM**

Have incentives for your team if your waste reduction targets are met such as morning tea shouts.

## **INFORM YOUR TEAM**

Distribute this guide to your construction team. Make waste information and progress towards waste reduction targets readily available and part of your waste management plan.

## **DESIGN CONSIDERATIONS**

Encourage designers and customers to use standard product dimensions (e.g. 600 or 1200mm increments, standard door and window sizes) and prefabricated products wherever possible to reduce onsite handling, reworking and offcuts.

## **MATERIAL ESTIMATES**

Provide detailed plans and instructions so estimators and contractors can provide accurate material takeoffs. If you notice an excess of waste materials for a particular product then reduce the wastage allowance for material estimates.

## **INCENTIVISE SUBCONTRACTORS**

Add contractual terms to incentivise subcontractors to minimise waste such as; making them responsible for the disposal of any waste, or preferential consideration if they follow your waste management plan.

## **PREVENT UNAUTHORISED PUBLIC DUMPING**

This can represent up to 30% of waste removed from building sites. Avoid skips on site until absolutely necessary and keep them away from public view or access. Use a recycling site sign which prominently displays 'This Builder Recycles. NO UNAUTHORISED DUMPING'.

# HERE'S HOW:

## THE 5R APPROACH TO MINIMISE WASTE

### 2 RE-USE



#### Return for credit

- Ask your supplier whether pallets and unused products in good condition can be returned for credit.

#### **BUILDERS RE-USE**

Several waste materials can be readily re-used: larger lengths of timber, large pieces of flooring, cladding, building wrap, polythene, slightly damaged finished products such as mouldings, cabinets and doors and leftover paints. Individually these materials don't fill skips but collectively they can send your total waste from one or two skips per job to two or three.

#### **RE-USE BY HOMEOWNERS AND OTHERS**

Valuable or useful excess materials such as leftover paint, floor coverings, fixtures and fittings can be neatly stored for the homeowner's future use. Alternatively, try selling excess re-usable product on Trademe or exchanging materials on the Freecycle website ([www.nz.freecycle.org](http://www.nz.freecycle.org)) or Waste Exchange ([www.nothrow.co.nz](http://www.nothrow.co.nz)), giving it away to others, offering 'FREE' kerbside collection or donating them to non-profit organisations, such as Habitat ReStores as a tax-deductible charitable donation.

#### ***DID YOU KNOW...***

Some skip companies will take your mixed waste skip from your building site and sort out the recyclable materials offsite at Material Recovery Facilities (MRF's). This can save you considerable time, cost and space on site sorting recyclables. Mixed waste recyclables can include untreated timber, plasterboard, metals, cardboard & plastic packaging (check with your skip bin provider).

## 3 RECYCLE



Most residential construction waste is recyclable including untreated timber, plasterboard, cardboard, metal, polystyrene and some plastics, some carpets and paint so check your options with your waste company, recycling facilities, suppliers and contractors.

### QUESTIONS TO ASK YOUR SKIP COMPANY:

- > Can they sort and recycle your *mixed waste* skip offsite?
  - if not, it may be time to review your skip company.
- > What specific materials can they recycle?
- > How much of your overall skip waste can they recycle?

### PREFERRED WASTE OPERATORS

Keep a list of preferred skip companies, and waste recycling depots on hand for your team to use and make them part of your waste management plan.

### ONSITE SORTING AND RE-USE OF MATERIALS

High sided skips can encourage “out-of-sight, out-of-mind” wasteful practices. An alternative is to fence off a waste storage area with rolled wire or plastic mesh to encourage sorting and re-use of materials and to avoid a skip on site until absolutely necessary. Suggested re-use and/or recycling piles in the order they normally occur are: steel, concrete & masonry, timber products, plastics/ building wrap, insulation, plasterboard, paint tins and cardboard. Sorting onsite will produce a significantly higher rate of recycling than offsite sorting of commingled waste skips.

### LUNCH WASTE

Provide a dedicated rubbish bin or bag for workers lunch wrappers, food scraps etc to avoid skip contamination and a recycling bin for bottles, cans, newspapers, magazines etc.

### DISPOSAL TIP

Compacting, consolidating, sorting and flat stacking your plasterboard, timber, metals, insulation, cardboard and plastic packaging waste can save considerable volume in your waste skips.

# HERE'S HOW:

## WASTE MINIMISATION BY PRODUCT

### PLASTERBOARD

About 30 percent of residential construction waste, five kilograms per m<sup>2</sup> of floor area or five m<sup>3</sup> per tonne.



#### OFFSITE RECYCLING

Plasterboard is essentially gypsum and paper and after it is ground it is commonly applied as a soil conditioner. Gypsum, the main ingredient improves soil condition (reduces compaction and improves water drainage, retention and conservation) while supplying essential nutrients (calcium and sulphur). Gypsum is a natural, non-toxic mineral and is not harmful to children or pets and even when applied at very high levels it will not damage soil or plants. Plasterboard is best recycled when dry so try to cover or store in a sheltered place such as the garage until collection.

#### ONSITE RECYCLING

For onsite disposal use clean unpainted standard plasterboard only (excluding wet area board and bracing board which may contain wax or fibreglass additives). Pulverize to pieces smaller than 2cm diameter and place below topsoil to accelerate breakdown of the product. Spread evenly and apply at a rate of up to 5kg per square metre (standard sheet is approx 20kg). Avoid wet areas as prolonged anaerobic conditions can cause possible sulfide gas formation.

**Check compliance with your local territorial authority beforehand.** Information courtesy of [www.gypsum.org](http://www.gypsum.org).

#### WASTE DEFERRAL

It can be cost effective to store clean offcuts within internal wall spaces, providing the opportunity to recycle them at the end of the homes' useful life. Offcuts should be cut down or scored and folded 'concertina' style up to four sheets max to allow for future wiring. Care must be taken to select wall cavities without insulation, wiring, plumbing or HVAC ducts such as wardrobes, hot water cupboards, stairwells or garages. Place pieces securely to avoid rattling and consider the sequence of lining rooms to ensure vacant walls are available as each room is completed.

### METALS

Steel, copper, aluminium and most other metals are valuable and readily recycled.



#### RECYCLE

If metal quantities are sufficient you should sort on site and sell them to a local metal recycler. Otherwise, many skip companies will collect your mixed waste skip and sort any metal offsite for recycling.

## WOOD BASED PRODUCTS



About 25 percent of residential construction waste or four kilograms per m<sup>2</sup> of floor area or six m<sup>3</sup> per tonne.

### REDUCE

Reduce timber offcuts by using efficient pre-fabricated wall framing and roof trusses. They are often numbered and packed sequentially to minimise resulting damage from unnecessary onsite handling.

### RE-USE

Formwork, timber scaffolding, bracing, pegs and larger lengths of timber etc can be re-used on your next project. Untreated timber offcuts can be donated to local school woodworking classes or left at the kerbside for free firewood. Pallets should be returned to your suppliers (a credit may apply).

### RECYCLING UNTREATED TIMBER (APPROX. 25% OF TIMBER WASTE)

Specify untreated timber in all applications where this is allowed to encourage future recycling. Because timber waste is usually a mixture of treated and untreated timber it is often difficult to sort and recycle small quantities. If untreated timber can be successfully sorted by you or your skip company, recyclers will often chip for use as mulch, compost, landscaping, animal bedding, landfill cover, potential re-use in building products or as a fuel source for industrial burners and domestic wood pellets.

### RECYCLING TREATED OR ENGINEERED TIMBER (APPROX. 75% OF TIMBER WASTE)

There are very limited markets for recycling treated or engineered timber (ply, particleboard, strandboard, MDF, laminated beams etc). Your best options are to reduce and re-use as much as possible and to keep in contact with your local skip companies and recyclers as further research on recycling and recovery markets develop. Never burn treated timber or sawdust.

# HERE'S HOW:

## WASTE MINIMISATION BY PRODUCT

### PACKAGING



Cardboard, paper, plastic & polystyrene – About 18% of total waste volume is packaging and if unconsolidated, can send your job-site skip to the landfill long before necessary.

#### REDUCE

Ask your suppliers to limit packaging. Specify no frame & truss wrapping to avoid unnecessary packaging waste (**but only if weatherproofing is not required**). Some appliance suppliers will help unpack products and take away plastic, polystyrene and cardboard packaging. By consolidating waste your supplier can collect more economical volumes for recycling purposes.

#### RECYCLE

If domestic recycling operates in the area, you can put out stacked cardboard on the kerbside ready for collection or drop off at local recycling depots.

### INSULATION



About 7% of total waste volume.

#### REDUCE

Excess insulation should be carefully placed in the ceiling space, especially at perimeters or any vacant wall cavities or gaps. Larger polystyrene sheets can be used under concrete floors and driveways or as a protective lining behind retaining walls or underground walls.

### CONCRETE & MASONRY



About 15% of total weight and if unchecked can quickly exceed skip weight limits. A cubic metre of solid concrete equals 2400kg!

#### RE-USE

Most concrete, masonry and brick waste is inert fill and can be used on site for landscaping, backfill, under walkways or driveways. Because of its weight re-using on site can be far more effective than additional handling, excess weight and disposal costs.

#### RECYCLE

If quantities allow, your skip company can supply a specific hardfill skip. Recyclers will separate and crush any concrete & masonry waste offsite for re-use as aggregates and also separate and recycle any steel reinforcing bar and mesh.

## HAZARDOUS MATERIALS



**Minimal weight and volume but potentially very damaging so dispose of them responsibly to protect the public's health, the environment, and yourself from any liability.**

### RE-USE

Leftover paints, stains, solvents, adhesives, sealants etc should be re-used where possible.

### RECYCLE

Paint & stain can usually be recycled so contact your supplier or contractor for options or try Resene's paintwise recycling program visit [www.resene.co.nz/paintwise.htm](http://www.resene.co.nz/paintwise.htm) for a local collection point.

### CORRECT DISPOSAL

Toxic runoff and hazardous substances must never enter waterways or stormwater drains. Hazardous substances such as adhesives, sealers, paints, paint stripper, stains, timber treatments, cement and solvents must be contained carefully and disposed of correctly. To minimise hazardous wastes use low volatile organic compound (low VOC) paints and zero VOC, solvent and odour free adhesives and sealants. For hazardous waste disposal options contact your territorial authority, supplier or contractor, skip company, local landfill or Material Recovery Facility. Add them to your waste management plan.



# HERE'S WHY:

## 5 GOOD REASONS TO MINIMISE CONSTRUCTION WASTE

- 1 COST** - A residential construction project typically spends \$500-\$1000 for waste disposal services. However, the true cost of construction waste includes material cost, additional onsite storage and handling (allow 2.5 hours extra per tonne of waste), transport & landfill costs, lost salvage value and the environmental effects.
- 2 EFFICIENCY** - Knowing what materials end up in your skip can tell you a lot about the accuracy of your material estimates and how efficiently your designers, workers and subcontractors are using materials. Every \$100 saved is bottom line profit – that equals a \$1000 of sales at a 10% profit margin!
- 3 LIABILITY** - As a large generator of waste, some potentially hazardous, it is important that you manage your waste responsibly to minimise risk and potential liability.
- 4 CONSERVATION** - A significant amount of building waste is recyclable. By looking at your waste as potential resources you can play an important part in conserving natural resources and landfill space.
- 5 MARKETING** - Let the buying public know you are minimising waste to protect our environment. Provide them with a flyer explaining your company's waste management plan and the total landfill space per year your company saves. Display a prominent sign on your site or skip bin displaying your company logo, a recycling symbol and stating 'This Builder Recycles'.

### ***DID YOU KNOW...***

> Construction & demolition waste represents up to 50% of all waste generated in NZ.<sup>1</sup>

> Plasterboard, wood based products, concrete & masonry, and packaging comprise about 75% of residential building waste by weight.

1. Data source: <http://www.mfe.govt.nz/issues/waste/construction-demo/index.html>

2. Data source: Refer table notes (1).

# INNOVATIVE NEW IDEAS

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## ON-SITE GRINDING

It is possible to grind up plasterboard and untreated timber waste and apply it to the site before covering with topsoil - you'll need to check with the local territorial authority to determine the acceptability of this method. If all untreated timber waste and plasterboard could be handled this way, storage, transport, and landfill costs would be eliminated for approximately 40% of your building waste.

## COMMINGLED RECYCLING BINS

Some waste bin companies have lockable bins for commingled recyclable packaging waste including plastics & polystyrene (including polythene film and synthetic builders wrap), cardboard and paper.

## ADDITIONAL REFERENCES

Additional waste minimisation resources, including a waste management plan template, can be found on the ITM website [www.itm.co.nz/sustainability](http://www.itm.co.nz/sustainability) or visit the REBRI website: [www.rebri.org.nz](http://www.rebri.org.nz)

## DISCLAIMER

This document contains a range of information, data, advice and recommendations, which are intended as a guide only.

Whilst the information in this document has been prepared with due care we do not warrant or assume any legal liability or responsibility for the accuracy, currency, completeness, or usefulness of any information, product or process disclosed.

This document is not a substitute for independent professional advice and users should obtain any appropriate professional advice relevant to their circumstances. Please contact your waste disposal company, suppliers, product manufacturers and local territorial authority for further advice.

Produced in association with BRANZ and WasteMINZ



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