# Resource Recovery – ALL WASTE TYPES – Centralised Sorting and Storage

This guide provides good-practice advice to maximise recovery rates for all types of construction and demolition (C&D) waste from designated sorting facilities and resource recovery centres.

The aim is to assist the resource recovery industry to provide systems that:

- maximise the amount of C&D waste material diverted from landfill and cleanfill
- minimise contamination and damage of the material
- avoid or minimise environmental and nuisance effects from sorting and storage.

This guideline covers:

- finding good markets for C&D waste
- setting up a waste-sorting and storage facility
- operating a waste-sorting and storage facility
- sorting procedures
- storage
- residual waste disposal
- environmental, health and safety hurdles
- a word on licensing
- resources and contacts
- other guidelines in this series.

Bricks and timber from a demolition site stockpiled for sorting (Crusaders Landscaping, Christchurch).

Read the other REBRI guides for sorting and storage practices for concrete, plasterboard and timber. These guidelines do not cover the retailing of materials.

For comprehensive details on designing and operating sorting facilities, refer to the *Guide to Best Practice at Resource Recovery and Waste Transfer Facilities* (www.zerowaste.sa.gov.au/upload/transfer-station-design-guidelines/guide_waste_transfer_resource_recovery_station.pdf).

## Finding good markets for C&D waste

Most wastes can be recycled or reused from a construction or demolition site. The options depend on current facilities and market demand in your area and may change over time. In general, materials that can be recycled or reused are:

- treated and/or untreated timber – native, hardwood, particle board, MDF, softwood, off-cuts, framing, cladding, demolition
- concrete and rubble
- plasterboard
- metal – roofing iron, reinforcing bar, electrical wire, drums, paint cans, etc.

- plastics (expanded polystyrene, numbers 1, 2, 4, 5) – packaging, pipe off-cuts, expanded polystyrene block off-cuts, buckets
- quality building components – fittings, structural materials, cladding, etc.
- left-over paint
- insulation – off-cuts, demolition
- garden waste – vegetation, trees for relocation
- soil.

### Know your markets

You won't be in business long without securing a sustainable market for your C&D waste. Waste markets are constantly changing in New Zealand, so it pays to do your homework. Here are a few suggestions for starting your search.

- Use local waste-recycling directories (www.branz.co.nz/REBRI_Recycling_Directory), Yellow Pages (www.yellowpages.co.nz), the Waste Exchange (www.nothrow.nz) and buy recycled directories (www.zerowaste.org.nz) to know what materials have markets for reuse or recycling. These change often, so it pays to keep checking.
- Do business with sorting facilities, transport operators and other agencies that follow the REBRI Guide to C&D Resource Recovery or are accredited to a nationally recognised environmental management programme such as ISO14001 or Enviro-Mark® NZ. This way, you can have greater assurance that they are working to good environmental standards and are 'doing what they say they do'.

### Understand the requirements of your clients

Each market will have its own feedstock specifications – it's best to confirm these before you start. Getting it wrong can cost you.

- Obtain specifications from recycling operators and operate according to the specifications. Things to check include:
  - material type, source of material, particle size
  - acceptable and unacceptable types and percentages of contamination or damage
  - minimum or maximum quantities accepted, including suitable containers or transportation requirements
  - documentation required, including waste-tracking forms.
- Contact recycling operators for the storage, sorting and handling requirements for each material type.
- Use the REBRI Waste Transfer Form to confirm to clients the source and nature of the C&D waste provided.

### Calculating the economics of recycling

- Before setting up business, you can use a simple cost model to estimate the economics of your sorting facility compared to disposing of waste to landfill (or other alternatives):

$$I = Q[I_t + rI_s – C_p – (1–r)C_d]$$

where:

- $I$ = gross income from waste ($)
- $Q$ = waste (tonnes)
- $I_t$ = income from receiving waste ($/tonne)
- $r$ = recovery rate of waste, from original waste received (%)
- $I_s$ = income from waste sales ($/tonne)
- $C_p$ = cost of sorting and storage ($/tonne)
- $C_d$ = disposal cost for residual waste ($/tonne).

## Setting up a waste-sorting and storage facility

Good planning in the set-up phase will help you to develop a quality product – without the council on your back.

### Factors that affect product quality and reduce the value of the product

- Contaminants, including cross-contamination of product, can affect the grade of the final product.
- Timber and plasterboard absorb moisture and can be damaged by rain.

### Environmental considerations

- Stormwater can be contaminated by particles and chemicals that leach from C&D waste.
- Stockpiling can be a noise and visual nuisance in some neighbourhoods.
- You will need to consult your regional council and your city or district council before you start to identify potential environmental effects of your operation.

Guidelines for reducing the environmental effects of sorting and storage are covered below (see Environmental, health and safety hurdles).

### Design your processing facility to maximise efficiency

- Specific considerations include the following:
  - Provide adequate access and manoeuvring for all vehicles.
  - Allow sufficient space and have the appropriate machinery for manoeuvring and stockpiling large volumes of processed and unprocessed materials like concrete and timber (it is likely you will need at least several hectares).
  - Specify designated drop-off locations for pre-sorted wastes.
  - Consider how you can reduce rain damage of your product by having storage areas inside buildings or under cover and have good drainage around stockpiles that are outdoors.
  - Provide signage and directions for processed and unprocessed timber-storage areas.
  - Provide safe access for the public, if appropriate.
- For more tips, consult the *Guide to Best Practice at Resource Recovery and Waste Transfer Facilities* (www.zerowaste.sa.gov.au/upload/transfer-station-design-guidelines/guide_waste_transfer_resource_recovery_station.pdf).


Providing clear signage at the weighbridge helps transport operators to understand your requirements (Sims Pacific Metals, Auckland).

### Typical equipment includes:

- conveyor belts for sorting waste
- magnetic separators to remove metal
- an air classifier – using suction or air flow to separate lighter materials
- a float tank – using water to separate timber and other floatables from concrete and rubble material
- front-end loaders, excavators and fork lifts for moving materials and containers around the site
- skips, pallets, shipping containers, bins and other containers suitable for material storage.

### Set up a designated sorting area to receive mixed-waste loads

Sorting areas can be stationary, on a hard-stand area or on a conveyor belt.

- Designate a central tipping area with appropriate access for tipper trucks and skips to be off-loaded and for excavators and front-end loaders to operate safely.
- The sorting area should be on flat hardstand at ground level or on a conveyor belt.
- Allocate stockpile areas adjacent to the tipping area or conveyor for large volumes of materials such as metal, plasterboard and timber that will be removed from the mixed waste by excavators with grab mechanisms.
- Have skips, trailers, tipper trucks and other moveable containers for other separated waste types or smaller waste volumes and position them next to the tipping area or conveyor.
- Provide clear signage for all containers or stockpile areas.

An effective set-up should minimise the handling of materials.

# Operating a waste-sorting and storage facility

The sorting procedure guidelines provided here are general, and for mixed-waste loads. Sorting procedures may vary depending on the type of material, the mechanisation of the plant and the specifications of your client.

### Have clear operating systems and procedures

If you want a quality product, every stockpile, every shift, it makes sense to document your procedures and let everyone know what they need to do and how they should do it.

- Specific considerations include:
  - staff training (who trains, who needs to be trained, what information needs to be passed to which staff etc.)
  - manuals for operating and maintaining equipment
  - emergency procedures, including spill responses
  - health and safety procedures
  - quality and environmental monitoring.
- Check documentation regularly and keep a record of training.

For comprehensive details on designing and operating sorting facilities, consult the *Guide to Best Practice at Resource Recovery and Waste Transfer Facilities* (www.zerowaste.sa.gov.au/upload/transfer-station-design-guidelines/guide_waste_transfer_resource_recovery_station.pdf).

- Sort waste using the 5Rs of waste management: reduce, reuse, recycle, recover for energy and, as a final option, use residual disposal.
- Keeping in mind the rule above, the market will signal the most efficient operation for sorting wastes.

Conveyor system at Crusaders Landscaping, Christchurch.

### Make sure you get quality waste from C&D clients and waste transporters

- Have a written contractual agreement with waste suppliers to help them to understand your particular requirements and maximise resource recovery.
- Provide clear written instructions to your suppliers to ensure they can meet your specifications for such things as waste types and contamination tolerances.
- Consider preferring suppliers who are accredited to a nationally recognised environmental management programme such as ISO14001 or Enviro-Mark® NZ. You have greater assurance that they are working to good environmental standards and are doing what they say they do.
- Always clarify delivery arrangements, including site access locations (and any associated traffic issues), site access times, volumes that can be accepted, types of bins, skips etc. and handling procedures.
- Make sure your suppliers are clear about the charges, including penalties, for contamination or damage of materials.
- Insist on the use of the REBRI Waste Transfer Form so that you can be sure of the source of waste.
- Consider a 'three strikes. you're out' policy for the delivery of heavily contaminated loads, after which penalties are issued or business with the supplier is stopped.

### Get endorsement from your peers and give your clients confidence

- Use the audit sheet at the end of this guide to show clients that you are operating in accordance with the REBRI Guide to Resource Efficiency.
- Use the REBRI Waste Transfer Form to validate the source and destination of waste to your building and recycling clients.
- Join the Enviro-Mark® NZ programme for external accreditation of your environmental management.
- Consider Environmental Choice certification for your product.
- Check with your local council that you meet any licensing requirements under the Local Government Act 2002 for the handling of waste.
- Join waste industry organisations such as the Waste Management Institute of New Zealand to network with peers. (see Links, resources and contacts.)

## Sorting procedures

### Receipt of waste for sorting

- Feedstock control is important.
- Weigh and inspect each load.
- Ensure you receive materials that you have a market for and have the appropriate skills and facilities to sort and store.
- Ensure your supplier has met your specifications, in particular, for contamination, material type etc.
- Match the consignment with the description on the waste transfer documentation.
- Reject loads that do not meet your specifications.
- Keep records of incoming materials.
- Unload the materials at the sorting location.


Accepting pre-sorted loads of materials like plasterboard can make your work easier – plasterboard sorting by Hawkins Construction.

### Minimise handling by promoting pre-sorted loads

- Handling materials more often than necessary may increase the cost and reduce the margins on resale.
- Mixing waste types can cause cross-contamination, which is difficult to remove during sorting (for example, getting plastics dirty, spilling paint or adhesives onto timber or mixing different qualities of plasterboard or timber).
- Concrete, rubble and soil should always be sorted from other waste on site and transported separately. These materials are difficult to separate once mixed and can easily damage or contaminate other materials.
- Encourage suppliers to deliver pre-sorted loads to your facility (for example, delivery of skips of only plasterboard or metal that has been separated at the building site).

- Pre-sorted loads can be unloaded directly at the segregated storage areas rather than at the mixed-waste sorting area. Allow room to perform a contamination check prior to mixing new loads with stockpiled materials.

### Sorting mixed waste

- Release mixed-waste loads into the tipping area directly from the skip or tipper truck.
- Use excavators to select and remove the bulk of the waste to designated stockpiles. Excavators with grip attachments can sort timber, plasterboard, large metal items and other bulky waste.
- Manually sort each of the material stockpiles made by the excavator to grade materials for reuse and recycling:
  - Sort for the highest-value recovery potential, based on market demand, to maximise return from the sorting process.
  - Use bins, pallets, trolleys, skips and other containers. Sort directly into the containers that will be used for storage, to avoid rehandling. Stockpiling is appropriate for large volumes of materials that can withstand damage such as plasterboard or timber for chipping.
  - Remove contamination as you sort, such as nails, to avoid rehandling.
  - Finally, move sorted stockpiles to storage areas.
- Manually sort the remaining waste in the tipping area, using the manual sorting method described above.
- Move sorted materials to storage areas.
- Recycle or otherwise dispose of all contaminants and residual waste.

Various grades of concrete stored at Ward Resource Recovery, Auckland, ready for processing.


## Storage

### Store materials to reduce contamination, damage and hazards

- Refer to the specific REBRI guides for detail on how to best store concrete, timber and plasterboard.
- Check with clients regarding any particular specifications.
- Store materials to avoid cross-contamination and damage and to allow easy movement around and off the site.
- Consider how the materials will be transported to the recycling operator or other client and store appropriately. For example, if front-end loaders and trucks will be used, stockpiling materials may be appropriate. If skips will be used, storing the materials in skips may be appropriate.
- Protect materials from rain where necessary.


### Provide good signage

- Use clear signage for all storage areas and containers. Use the RONZ symbols where possible (downloadable from www.wasteminz.org.nz/pubs/ronz-symbols).
- Include a list of unacceptable materials where relevant. Be specific (for example, “No soil or plant matter” or “No screws and nails”).

## Residual waste disposal

### Dispose of residual waste responsibly

- Only use disposal facilities that are consented by the regional council or have met the permitted activity status in regional plans. These records should be available from the disposal facilities for you to view. Otherwise, you risk fines or prosecution under the Resource Management Act 1991.
- Obtain waste acceptance criteria from disposal facilities and operate according to these criteria.
- Treated timber not separated for reuse should be disposed of to a municipal solid waste landfill.

## Environmental, health and safety hurdles

Good practice wouldn't be complete without considering the effects of your operation on the neighbourhood, local environment and the health and safety of you and your workers. The following guidance is not comprehensive but should give you enough information to start talking with your city, district or regional council or occupational health and safety adviser.

### Before you set up a processing facility, check waste-handling and environmental regulations

- Check with your city or district council:
  - that you meet any waste management licensing requirements under the Local Government Act 2002
  - regarding resource consent requirements under the Resource Management Act 1991 to operate a sorting facility, including (but not limited to) any noise and dust issues, operating hours, stockpiling, trade waste discharges, signage and traffic movements
  - regarding requirements to alter, demolish or construct sheds and other buildings under the Resource Management Act 1991 and the Building Act 2004.

- Check with your regional council regarding requirements for:
  - stormwater discharges and stormwater protection measures
  - discharges to air of dust and odour
  - storage of hazardous materials.

- Seek professional help to obtain the relevant resource consents.
- Ensure all staff are aware of environmental obligations by documenting procedures and providing regular training.

### Avoid noise and dust disturbances

- Noise and dust are considered adverse environmental impacts under the Resource Management Act 1991 and must be managed to avoid impacts on people and wildlife. Noise and dust are also a health and safety in employment issue.
- Considerations for noise management include:
  - operate in typical business hours (check with your city or district council)
  - maintain plant to perform at the manufacturer's specification or use low-noise emissions plant
  - modify plant by enclosing it or adding noise mitigation parts
  - turn equipment off when not in use
  - provide protective equipment and reduce the time staff are exposed to noisy equipment (for example, by swapping tasks).
- Considerations for dust management include:
  - minimise handling stockpiled material (the more you move materials around, the more chance there is of releasing dust)
  - spray stockpiles lightly with water to suppress dust during dry and windy weather or cease working in extreme conditions
  - moisten materials during loading or moving where dust may cause a nuisance
  - have a speed restriction for vehicles to reduce dust disturbance
  - provide wheel and truck washes to prevent dust and dirt from migrating off site
  - provide protective equipment.

Manage run-off from the site to prevent contamination of soils and streams

- Stormwater can be contaminated by a change in pH (acidity), by chemicals and additives leaching from products and by particles of concrete, sawdust, etc.
- A resource consent may be required for any discharge of stormwater to ground or waterway (check with your regional council).
- Cover stockpiles and plant from rain where possible.
- Do not stockpile materials within at least 10 metres of a natural waterway or stormwater drainage system nor in a manner where stormwater run-off may reach a natural waterway without settlement and treatment. Greater than 10 metres may be required in areas with high rainfall or sloping ground.
- Create earth or concrete bunds around the site (or stockpile area) to prevent untreated stormwater from flowing to streams.
- Where stormwater cannot be absorbed on site, provide ponding areas for stormwater run-off for settlement of fine particles prior to discharge to stormwater systems or natural waterways.
- Check the quality of stormwater prior to discharging water from the ponds. The pH can be checked using a pH meter, and clarity can be checked using a clarity tube. Resource consents will have additional stormwater monitoring and management requirements. Ask an environmental professional or regional council officer for appropriate monitoring for your site.
- Consider a recycled water system, and use the stormwater for dust and stockpile suppression. Ensure that the stormwater does not contain contaminants that might affect the end product.

## A word on licensing

Licensing of waste-sorting and storage facilities

Under the Local Government Act 2002, city and district councils have the power to pass bylaws that require facilities handling waste to be licensed by the council. Check the licensing requirements of your council because they can affect the way you do business. There are a few things to note:

- The licensing concept is new to councils but may become more common in future.
- Unlicensed operators may not be able to operate in the city or district and could be fined for doing so.
- There can be a licence fee to cover administration costs.
- Licences can have conditions requiring such things as keeping records of waste volumes and the source and destination of waste consignments.
- Licensees can be responsible for collecting waste levies from the waste producers on behalf of the council.

## Resources and contacts

Relevant legislation and regulations

- Health and Safety in Employment Act 1992
- Local Government Act 2002
- Building Act 2004
- Hazardous Substances and New Organisms Act 1996
- Resource Management Act 1991
- Regional and district plans
- District bylaws.

Links, resources and contacts

- Resource Recovery in the Building and Related Industries (REBRI) www.rebri.org.nz
- Yellow Pages (www.yellowpages.co.nz)
- The Waste Exchange www.nothrow.co.nz
- Sustainable Business Network www.sustainable.org.nz
- Waste Management Institute of New Zealand (WasteMINZ) www.wasteminz.org.nz
- Enviro-Mark® NZ www.enviro-mark.co.nz
- *Guide to Best Practice at Resource Recovery and Waste Transfer Facilities* www.zerowaste.sa.gov.au/upload/transfer-station-design-guidelines/guide_waste_transfer_resource_recovery_station.pdf

## Other guidelines in this series

**All Waste Types**

- Collection and Transportation
- **Centralised Sorting and Storage**

Timber

- Collection and Transportation
- Processing into Mulch and Chip

Plasterboard

- Collection and Transportation
- On-site Sorting, Storage and Processing
- Centralised Sorting, Storage and Processing

Concrete

- Collection and Transportation
- Processing and Storage

Metal

- Collection and Transportation

# ALL WASTE TYPES – Centralised Sorting and Storage – Audit Sheet

Use this sheet to check the practice of your service provider against the good practice guidelines in this guide. If you are a sorting or storage facility, you can use this sheet to do your own checks of your performance against the guide. Just consider each point and put a tick for compliance, cross for non-compliance or NA for not applicable. Put any comments at the bottom of the sheet, then sign and date it. Keep these sheets for your records and any discussions between you and your clients or suppliers.

## Sorting and storage

1. A list of specifications is obtained from clients and provided to waste suppliers. This includes such things as: ❑
   - material type and sizes
   - contamination tolerances
   - minimum and maximum quantities
   - material handling requirements on site and during transportation to maximise recovery
   - sorting or grading requirements.
2. The REBRI Waste Transfer Form is used to trace the source and destination of waste to and from the sorting facility. ❑
3. A designated central tipping and sorting area is provided. ❑
4. Each consignment is inspected prior to tipping and accepted or rejected based on: ❑
   - meeting specifications
   - meeting skills and operating capacity of the sorting facility
   - matching the description on the REBRI Waste Transfer Form.
5. Records are kept of waste accepted, sorted and sold. ❑
6. Waste is sorted into material types according to recycling operator specifications. ❑
7. Clear signage is provided for all waste storage areas. Signage should include the type of waste and any instructions for product protection (for example, “Keep dry”). ❑
8. Different types and grades of waste material are stored separately to avoid cross-contamination and damage. ❑
9. Plasterboard and timber are stored under cover or covered with canvas, plastic or other material where necessary to protect from weather. ❑
10. Procedures for operating and maintaining equipment are documented and staff are trained. ❑
11. Contaminants are recycled or otherwise disposed of to disposal facilities that are consented by the regional council or have met permitted activity status in regional plans. ❑

## Internal procedures and compliance

In addition to the procedures above, consider whether the following apply to the operation:

12. Documented emergency procedures, including spill responses. ❑

13. Documented health and safety procedures. ❑

14. Documented quality and environmental monitoring. ❑

15. Current resource consents or other approvals for land use and discharges to the environment. ❑

16. External accreditation (for example. Enviro-Mark® NZ). ❑

17. Prefer clients and suppliers that work to good environmental standards by using the REBRI guides and/or have external accreditation. ❑

18. Licensed under district bylaw. ❑

## Comments

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Signed .....

Person, company and responsibility .....

Date .....

Signed .....

Person, company and responsibility .....

Date .....