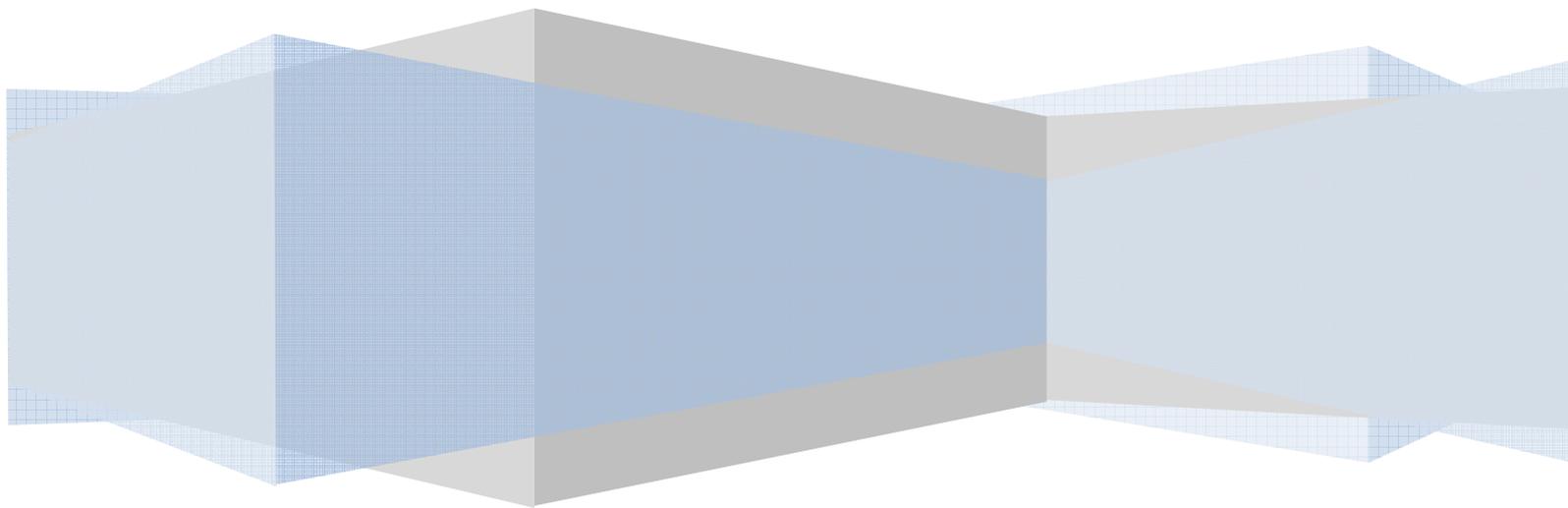


Demolition Waste Management Plan Guidelines

A resource for Western Australian Local
Government, Developers, Property Owners and
Demolition Contractors



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Acknowledgement

These Guidelines have been developed by the WA Local Government Association, with funding from the Waste Authority through the Waste Avoidance and Resource Recovery Account. The Association would like to acknowledge the contribution of a range of stakeholders from Local Government and the recycling and development industries in the development of these Guidelines.

1 Introduction

Why was this Guideline developed?

This Guideline has been developed for two primary reasons, to provide consistent guidance on waste management in relation to demolition activities and to encourage increased diversion of waste from landfill.

In Western Australia, there is limited consistent guidance on and consideration of waste management issues in demolition activities. The absence of consistent guidance in relation to demolition activities has led to a range of different approaches being taken by Local Government and the private sector, potentially increasing costs for development.

The WA State Government, has developed a State Waste Strategy 'Creating the Right Environment' which sets ambitious targets for diversion of Construction and Demolition (C&D) waste from landfill; 60% diversion of material presented for collection by 30 June 2015 and 75% diversion from landfill by 30 June 2020. Given the 2009/10 diversion rate for C&D was 29% a concerted and coordinated effort will be needed to achieve these targets.

This Guideline is part of a project funded by the Western Australian Waste Authority and developed through the WA Local Government Association. This Guideline will be supported by Local Government requirements, as part of the planning approval process. This Guideline is intended as a consistent reference for property owners, builders, developers and Local Government officers.

How should this Guideline be used?

This Guideline should be used as a resource by property owners, builders and developers to assist in calculating waste generation from demolition projects and identifying ways to divert any waste generated from landfill. While these Guidelines can be used on any scale of project, the main focus is those projects which require Local Government Planning Approval. Appendix 1 includes a template waste management plan which provides a framework for waste management issues to be considered in a way which meets Local Government requirements.

This Guideline should be used by Local Governments Officers as a resource when requesting or assessing waste management plans for certain developments. Appendix 3 provides a checklist for assessing waste management plans.

These Guidelines are applicable to any demolition project and will assist in establishing efficient and cost-effective operations.

2 Project Planning

In planning a demolition project, it is important to understand what materials are likely to be generated and then focus on how the generation of those materials can be either avoided or the

material can be diverted from landfill. One approach is to development of a waste management plan. The key objectives of any demolition waste management plan should be:

1. Minimise the amount of waste generated as part of the project;
2. Maximise the amount of material which is sent for reuse, recycling or reprocessing; and
3. Minimise the amount of material sent to landfill.

When developing and implementing the waste management plan the following key elements should be considered:

1. **Waste streams:** identify which waste streams are likely to be generated and estimated amounts of material;
2. **Services:** select an appropriately qualified waste management contractor who will provide services for the waste streams generated and data on waste/recycling generation;
3. **On site:** understand how the waste management system will work onsite, including bin placement and access;
4. **Clearly assign and communicate responsibilities:** Ensure that those involved in the demolition are aware of their responsibilities in relation to the waste management plan;
5. **Engage and educate personnel:** be clear about how the various elements of the waste management plan will be implemented and ensure staff have an opportunity to provide feedback on what is/isn't working;
6. **Monitor:** to ensure the plan is being implement, monitor on site; and
7. **Evaluate:** once the project is complete evaluate your estimates in the Plan against actual waste generated and consider feedback from personnel.

3 Demolition Waste Management

3.1 Pre-Demolition

The pre-demolition stage of the development is the time to put in place a demolition waste management plan in line with the template provided in Appendix 1: Demolition Waste Management Plan Template. Another tool available to assist in the development of the waste management plan is the Master Builders Association is the Master Builders Association Master Builders Waste Reduction Guide 2014. This Guide will be available from their Website in April 2014.

The following activities are suggested at this stage of the project:

- | |
|---|
| <ol style="list-style-type: none">1. Waste streams: identify which waste streams are likely to be generated and the approximate amounts of material. |
|---|

Undertake inventory of materials that can be recycled from the demolition site:

- Specific types of materials: a full list of options is provided in Appendix 1;
- Amount of material expected: some guidance on how to estimate this is provided in Appendix 2;
- Condition of materials: cleaner material is easier to recycle and may affect the contractor price for recycling; and
- Possible contamination by hazardous materials like asbestos or lead: these materials will limit reuse /recycling options and require special disposal.

2. Services: select an appropriately qualified waste management contractor to provide services for the waste streams generated and data on waste/recycling generation.

To maximise the recovery of material – one approach is to use the ‘Recycling Works’ Toolkit for the commercial construction industry in Western Australia – available from <http://www.encycle.com.au/kit.php> This Toolkit provides a different approach to working through the construction process.

3. On site: understand how the waste management system will work onsite, including bin placement and access.

- Determine storage requirements (separate bins or co-mingled), things to consider include:
 - Ease of use: Ensure that containers are easily accessible by workers;
 - Safety: Ensure that the containers and storage can be managed safely, including limiting public access to the site; and
 - Aesthetics: Ensure that the site appears orderly and will not raise concern from local residents or businesses.
- Establish a collection/delivery plan in collaboration with waste contractors for waste and recyclable materials generated on-site.
- Separation of different materials for collection and/or recycling is one way of preventing contamination and increasing resource recovery rates. Source separation is particularly important in minimising damage to salvaged materials, such as window glass, high-value timber and furnishings.
- Offsite sorting using comingled demolition waste bins is another means of recovering demolition waste materials. Offsite sorting is particularly useful on constrained sites as it enables all materials to be placed in the same bin for transport. This material is then collected and delivered to a processing plant where they will be sorted mechanically for recycling, reprocessing or disposal to landfill.

Asbestos

Houses built in Western Australia between mid-1980s and 1990 are likely to contain asbestos-containing products and houses built in WA before the mid-1980s are highly likely to contain asbestos-containing products.

Therefore care should be taken when undertaking renovations or constructing additions on existing structures. A licence is required in Western Australia for the removal of materials that contain asbestos. Only a licence holder or an employee of a licence holder may carry out this type of work.

For more information on the handling and disposal of asbestos containing materials, please visit:

http://www.commerce.wa.gov.au/worksafe/content/Services/Certification_registration_and/Asbestos_removal_licence_No_3.html and

<http://www.der.wa.gov.au/your-environment/contaminated-sites/59-asbestos>

1.3 During Demolition

On-site activities during demolition are critical in achieving the objectives of the waste management plan, these activities include:

4. **Clearly assign and communicate responsibilities:** Ensure that those involved in the construction are aware of their responsibilities in relation to the waste management plan.
5. **Engage and educate personnel:** be clear about how the various elements of the waste management plan will be implemented and ensure staff have an opportunity to provide feedback on what is/isn't working.

Whatever waste management system is in place, it is vital that all personnel using it understand how to use the system and who has responsibility for ensuring it is used correctly. Trying new approaches and systems can be difficult as it expects a change to current behaviour. By providing feedback mechanisms for personnel, you can build on experience.

6. **Monitor:** to ensure the plan is being implement, monitor on site.

Ensuring the system is working is liked to asking personnel for feedback. Another option is to seek feedback from waste management contractors or undertake site inspections to see if the correct material is going into the bin and to understand what waste is being generated that was not expected.

3.3 Post-Demolition

7. **Evaluate:** once the project is complete evaluate your estimates in the Plan against actual waste generated and consider feedback from personnel.

Once the project has been completed, it's time to evaluate how the plan went. Where the expected amounts of waste generated? How did the bin placement on site work out? What feedback was there from personnel onsite? From this evaluation, issues can be avoided in future developments.

4 References

Alameda County (2012) *Construction and Demolition Debris*.
<http://www.acgov.org/sustain/what/greenbuilding/cdd.htm>

City of Chicago (2010-13) *Construction and Demolition Debris Recycling*.
http://www.cityofchicago.org/city/en/depts/streets/supp_info/construction_anddemolitionsites.html

City of Chicago (undated) *Chicago's Guide to Construction & Demolition Cleanliness & Recycling*.
http://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/CandDrecycling/ConstBestMgmtPractices2.pdf

City of Santa Monica (2012) *Public Works Department Resource Recovery & Recycling Division Construction and Demolition (C&D) Waste Management Plan*. Available online:
<http://www.smgov.net/Departments/PublicWorks/ContentRecycling.aspx?id=8130>.

Campbelltown City Council (2012) *Waste Management Plan*.
<http://www.campbelltown.nsw.gov.au/wastemanagementplan>

Department of Environment Regulation (2013) *Controlled Waste*. <http://www.der.wa.gov.au/our-services/compliance-and-response/37-controlled-waste>

Master Builders Association of Western Australia (2008) *Commercial Construction Waste Management Guide*. Available online: <http://www.mbawa.com/wp-content/uploads/2013/08/Waste-Management-Guide.pdf>.

New South Wales Department of Climate Change and Water (2010) *House Deconstruction Information Booklet*. <http://www.epa.nsw.gov.au/resources/warr/1080HouseDeconstruction.pdf>

Encycle Consulting (2010) *Recycling Works: A Toolkit for the commercial construction industry in Western Australia*.

Sustainability Victoria (2013) *How to Minimise Construction & Demolition Waste*.
<http://www.sustainability.vic.gov.au/en/Publications-and-Research/Knowledge-archive/How-to-Minimise-Construction-Waste>

5 Appendices

Appendix 1 - Demolition Waste Management Plan Pro Forma

Outline of Project		
<i>Site address:</i>		
<i>Applicants name and mailing address:</i>		
<i>Phone:</i>		
<i>Fax:</i>		
<i>Email:</i>		
<i>Buildings and other structures currently on site:</i>		
<i>Brief description of proposal (Commercial, Residential, Single Family, Multi-Family, Addition/Alteration, Renovations, Demolition, Repair):</i>		
<i>Estimated Start Date</i> _____/_____/_____		
<i>Estimated Completion Date</i> _____/_____/_____		
<i>The details provided in this form accurately describe the proposed waste management actions to be undertaken as part of this project</i>		
<i>Signature of applicant:</i>		
<i>Date :</i>		
Salvage	Yes	No

Do you intend to salvage material from this project as part of demolition works?				
If "yes," please list the items that will be salvaged (e.g. doors, windows, jambs, casing, toilets, sinks, other fixtures, hardwoods, wood siding, cabinets and shelving, carpet and pad, bricks, acoustical ceiling, lights, fans, ceramic roof tiles, structural materials, reusable lumber, etc.)?	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
Waste and/or Recyclable Materials				
Materials Generated On-site		Destination		
		Reuse & Recycling	Disposal	
	Estimated Volume (m ³) or Area (m ²) or weight (t) (refer to Appendix 2- Typical House Composition)	On-site (How will materials be reused and/or recycled on-site?)	Off-site (Specify the contractor and recycling facility)	Specify the contractor and landfill site/transfer station
Timber (specify type)				
Wood waste (e.g. MDF, plywood)				
Cardboard				
Ferrous metals (e.g. iron, steel)				
Nonferrous metal (e.g. copper wiring)				
Concrete				

Roofing Tiles				
Ceramic Tiles				
Gravel				
Gypsum board (e.g. drywall)				
Plaster				
Paint				
Plumbing fixtures and fittings				
Carpet and underlay				
Stone				
Asphalt				
Glass				
Sand/fill				
Topsoil				
Green waste				
Asbestos				
Florescent Light Tubes				
Hazardous materials (e.g. fluorescent light tubes and fittings, lead roof flashing, lead-based paint)				
Plastics				
PVC				
Comingled recyclables (e.g. paper, cans, glass & plastic bottles, cardboard) from workers				

General waste (e.g. food waste, contaminated food packaging, non-recyclable plastics) from workers				
Mixed Waste				
How will materials be stored onsite for reuse and recycling? E.g. in skip bins.				
How will site operations be managed to ensure minimal waste creation and maximum reuse and recycling? E.g. Staff training, selected deconstruction vs. straight demolition, feedback from waste management service provider, on-going checks by site supervisors, separate area set aside for sorted wastes, clear signage for waste areas etc.				
How will this plan be evaluated, and who is responsible for the evaluation? E.g. feedback from staff collected by the site supervisor.				

Appendix 2- Typical House Composition

Error! Reference source not found. Table 1 provides indicative figures for the amount of construction material generated through the demolition/deconstruction of typical houses. These figures may be used to assist property owners and their contactors in estimating the amount of waste material which must be catered for during the demolition process (these figures should be used as a guide only, and demolition contractors should be engaged to assist in estimating likely material yields). The conversion figures provided in Table 2 may then be used to calculate the estimated volume of this waste material, which may be useful when ordering skip bins.

Material	House Type			
	Asbestos fibro (t)	Weatherboard (t)	Brick veneer (t)	Full brick (t)
Asbestos sheeting	1.8	-	-	-
Fittings	1	1	1.5	1.5
Roof Tiles	5	5	12	8
Plasterboard	2	2	2.5	1
Timber	5.3	7.2	9.6	6.9
Concrete, Bricks, Footings	20	50	120	180
Total	35	65	146	197

Table 1: Demolition waste yields (from NSW Department of Environment, Climate Change and Water *House Deconstruction Information Booklet*, 2010).

Material	Tonnes/ m2
Timber	0.5
Plasterboard	2.4
Concrete	1.0
Bricks	0.75
Tiles	2.4

Table 2: Converting volumes to tonnage (from NSW Department of Environment, Climate Change and Water *House Deconstruction Information Booklet*, 2010).

Appendix 3- Local Government Officer Checklist

Section	Key element	Adequately addressed in WMP (Yes/No)	Comments / Feedback	Modification required?
Outline of project	Is all of the contact information and project outline completed?			
	Is the declaration of accuracy completed?			
Waste & Recycling material	Are estimates given for the approximate amounts of waste expected be generated?			
	Is it clear what the destination of these materials will be once they leave the site?			
Storage	Is it clear how materials will be stored on site?			
Site operations	Is it clear how waste will be managed on site?			
	Are the methods of communicating this waste management method identified?			
Evaluation	Is the approach and responsible party for evaluation identified?			