Disaster Waste Management Plan template

Developed with assistance from the Ministry of Civil Defence and Emergency Management Resilience Fund
June 2018

Project Partners

BAY OF PLENTY REGIONAL COUNCIL TOI MOANA

Waikato REGIONAL COUNCIL Te Kaunihera a Rohe o Waikato

Environment Canterbury Regional Council Kaunihera Taiao ki Waitaha

Important notes

This planning tool has been prepared by Tonkin +Taylor and its sub-consultants (Rawtec) for Bay of Plenty Regional Council with respect to the particular brief given to us, by reference to applicable standards, guidelines, procedures and practices at the date of issue of this template plan. The purpose of this template plan is to provide generic guidance only. The use, adaptation, modification or distribution of this template plan in specific circumstances is outside the control of the Consultants and is at the sole risk of the user.

Tonkin+Taylor

New Zealand Disaster Waste Management Planning Tool

Working copy June 2018

Document verification

Date	Version	Prepared by	Reviewed by	Approved by
1/06/2018	Revised Draft	K Heinrich	C Purchas, C Brown and M Rawson	M Rawson
27/06/2018	Final working copy	K Heinrich C Purchas	C Bauld, C Brown, M, Rawson	C Bauld

Document status

This document is the first version of the New Zealand DWM Planning Tool. It is intended that this document be updated over time to further refine and expand on the guidance provided.

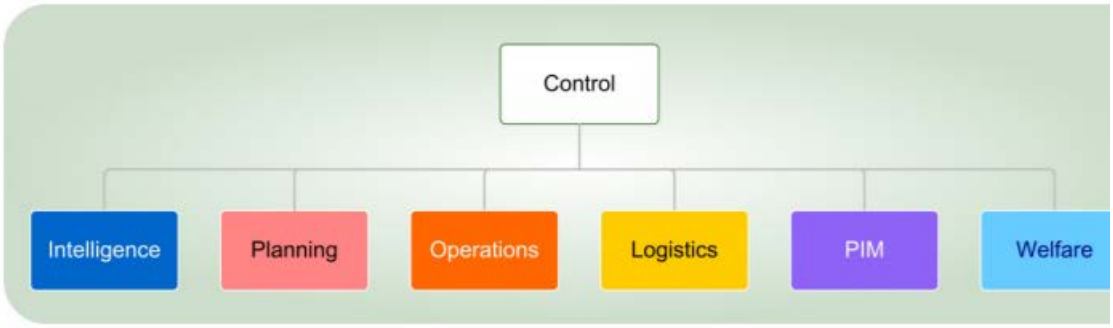
CONTENTS

Acronyms

DWM	Disaster waste management
MSW	Municipal Solid Waste
NZ	New Zealand
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
CIMS	The New Zealand Coordinated Incident Management System

Definitions

CIMS The New Zealand Coordinated Incident Management System (CIMS) describes how New Zealand agencies coordinate, direct, and control incident response of any scale, how the response can be structured, and the relationships between the respective CIMS functions and between the levels of response.
Refer to https://www.civildefence.govt.nz/resources/new-zealand-coordinated-incident-management-system-cims-2nd-edition/. DWM sits within the CIMs structure (see diagram below) with all aspects revelent to effective DWM.



At June 2018 there is no equivalent to the CIMS structure for the Recovery Phase. In this document we have referenced the CIMS structure, however we note that the Ministry for Civil defence and Emergency Management have detailed recovery resources available at https://www.civildefence.govt.nz/cdem-sector/recovery/recovery-resources-and-information/.

4 R's Framework The New Zealand integrated approach to civil defence emergency management can be described by the four areas of activity, known as the '4Rs', including Reduction, Readiness, Response and Recovery (as defined below by Ministry of Civil Defence and Emergency Management).

Reduction Identifying and analysing long-term risks to human life and property from hazards; taking steps to eliminate these risks if practicable, and, if not, reducing the magnitude of their impact and/or the likelihood of their occurring.

Readiness Developing operational systems and capabilities before a civil defence emergency happens; including self-help and response programmes for the general public, and specific programmes for emergency services, lifeline utilities and other agencies.

Response	Actions taken immediately before, during or directly after a civil defence emergency to save lives and protect property, and to help communities recover.
Recovery	The coordinated efforts and processes to bring about the immediate, medium-term and long-term holistic regeneration of a community following a civil defence emergency.

Section A

Introduction

Introduction

Background

New Zealand is prone to natural disasters, such as earthquakes, volcanic eruptions, floods, wildfire, cyclones and tsunamis. Such events can devastate communities and generate thousands or even millions of tonnes of debris. Without adequate planning, disaster waste volumes can overwhelm systems and infrastructure, harm human health, the environment and economic assets, and impede response efforts and recovery. This document has not been prepared to address waste arising from other events (for example pandemic or a major biosecurity response) but may have information and guidance that is relevant for these scenarios.

Planning to manage disaster waste can benefit New Zealand in many ways. It can reduce the response time for mobilisation of resources to commence clean-up activities, ensure that waste management is undertaken in a safe and environmentally responsible manner and help contain recovery costs.

About this document

This document aims to assist regions across New Zealand to plan for and undertake effective disaster waste management (DWM). This Plan is for the management of all forms of solid waste but does not include liquid waste or sewage. Management may involve disposal of material but should include consideration of opportunities to reuse or recycle materials where it is safe to do so.

Readiness activities outside of document scope

A range of readiness activities need to be addressed at the national level to support regions to undertake effective disaster waste management. This includes integrating roles and responsibilities for DWM into the NZ emergency management framework and CIMS structures (where relevant). There is also a need to determine funding and payment mechanisms for DWM. These activities are outside of the scope of this document.

Who should use this document

This document is designed for organisations tasked with leading DWM as well as those who are responsible for waste management and minimisation practices during business as usual. This is likely to include regional and local government authorities, waste contractors and Civil Defence and Emergency Management groups.

How to use this document

Each section in this document deals with a key element of DWM. Users should read the guidance at the beginning of each section and then complete the readiness tasks (during business as usual). Each section includes record-keeping tasks to track readiness progress.

When to use the document

This document can be used at any phase of an emergency; readiness, response and recovery to achieve the objectives set out in Table A-1.

Table A-1: Objectives of using this document during each phase of an emergency

Phase	Objective

Phase	Objective
Readiness	To increase the preparedness and capacity of the regions to manage disaster waste. To create a DWM plan with lead and supporting agencies and stakeholders. To test and exercise the DWM Plan. While not part of the guidance in this document, Readiness activities may lead to activities that reduce the risks associated with disaster waste, for example through improved location of waste facilities or safer business as usual storage of hazardous materials. Normally undertaken by Regional and Local Councils and their contractors.
Response	Guide DWM during the response phase, with a focus on identifying and addressing acute waste issues that threaten human health and wellbeing, the environment and/or economic assets. For natural disasters, CDEM is the lead agency and will be responsible for DWM.
Recovery	Guide DWM during the recovery phase, including identifying and implementing approaches for disaster waste collection, interim storage, reprocessing and/or disposal. For natural disasters, CDEM is the lead agency and will be responsible for DWM. This will be handed over to the Recovery Office (Local Council) post 'Response'.

Accompanying workbook for response/recovery phase

An accompanying workbook (Attachment 1) has been developed to record information and actions for readiness activities and the response/recovery phase. This workbook helps users to identify and evaluate factors that should be considered when developing an event specific DWM Strategy to support the Recovery Phase

Table A-2: provides an overview of each section of the document, including guidance provided and tasks for readiness, response and recovery phases.

Table A-2: Document overview

Section	Guidance	Readiness Tasks	Response/ Recovery Tasks
Section A: Introduction	▪ About this document ▪ Who, when and how to use this document ▪ DWM Principles	NA	NA
Section B: DWM skills	▪ The rationale behind identifying key DWM skills ▪ Identify Lead agency responsible for DWM in each major scenario ▪ DWM Functions and links to CIMS structure. ▪ DWM skills and competencies ▪ Considerations for lines of authority and reporting, backfilling positions, equipment needs and psychosocial considerations	**B1** Identifying key capabilities and gaps **B2** Keep record of actions	**B3** Confirm DWM resources **B4** Keep record of actions and communications
Section C: Key partnerships and stakeholders	▪ The importance of building key partnerships and engaging with DWM specific stakeholders ▪ Key stakeholder groups, their typical involvement in disaster waste management and key objectives of engaging with them (linked to CDEM stakeholder management).	**C1** Identify key DWM specific partnerships and stakeholders include technical experts e.g. GNS for volcanic eruptions/ earthquake **C2** Keep record of actions	**C3** Checklist and record of engaging with stakeholders **C4** Keep record of actions
Section D: Waste composition	▪ Common waste streams and their relative volumes for select disaster events: flood, earthquake and volcanic eruption ▪ Timelines for potential disaster waste risks and considerations for their management	**D1** Identify potential strategies and options to manage likely disasters waste streams and issues in the region **D2** Keep record of actions	**D3** Undertake preliminary waste assessment to estimate waste volumes, identify issues and approaches for managing them **D4** Keep record of actions

Section	Guidance	Readiness Tasks	Response/ Recovery Tasks
Section E: Waste management services and facilities	▪ Equipment needed and potential providers to collect handle, transport, store, recycle and dispose of disaster waste ▪ What to consider when selecting a waste management services and/or facilities	**E1** Create database of waste collection and transporters in the region **E2** Create database of waste reprocessing/ disposal facilities in the region **E3** Identify gaps in local waste service and facility capabilities and capacities **E4** Keep record of actions	**E5** Evaluate disposal/recycling options **E6** Keep record of actions
Section F: Interim waste storage facilities	▪ Conditions when an interim waste storage facility may be needed ▪ Considerations for site selection, operation and closure of an interim storage facility	**F1** Identify potential locations for interim waste storage facilities **F2** Keep record of actions	**F3** Consider the need for an interim waste storage is needed and evaluate potential sites. **F4** Keep record of actions

DWM principles

The following principles for DWM should guide the development of a DWM programme.

Table A-3: DWM principles

Principle	Description
Engage and collaborate	Engage and collaborate with stakeholders to ensure that DWM approaches are well-considered and support the needs and expectations of the community and other stakeholders.
Protect human health, economic assets and the environment	Undertake DWM practices that protect human health, economic assets (including agriculture) and the environment.
Undertake sustainable resource management where practical	Undertake DWM practices that reduce, reuse and recycle disaster waste. However, recognise that the ability to undertake sustainable resource management may be limited by the need to act in a timely manner, costs and the availability of skilled labour, equipment and facilities.
Support positive recovery outcomes	Undertake DWM practices that support positive recovery outcomes, as defined by the community.
Good governance	Ensure that roles and responsibilities, lines of authority and reporting for DWM are clearly defined and that good record keeping practices and long-term risk management are undertaken. Make clear links to standard CIMS structure to avoid overlap or gaps.

Section B

Disaster Waste Management Skills

Tonkin+Taylor

DWM Skills

Introduction

Identifying key DWM skills required with clear responsibility within the CIMS and Recovery Structures for strategic management and coordination of DWM is essential to effective disaster waste management. This should be considered during business as usual to allow time to develop skills, knowledge base and stakeholder relationships so that the right skills and relationships are in place when a disaster occurs. Confirming roles and skills required in advance of an event can also reduce the time taken to plan for and deliver effective DWM during response and recovery.

Table B-1: Tasks to be completed in this section

Phase	Activities
Readiness	• Identify lead agency (Local/ Regional Council) • Identify key DWM skills required, potential personnel and assign roles in advance of a disaster • Keep a central record of activities related to DWM functions during the readiness phase
Response / Recovery	• Identify Lead Agency from Appendix 1 National Civil Defence Emergency Management Plan Order 2015 • Mobilise DWM skills • Engage external resources for activities that cannot be delivered in-house • Keep a central record of activities (see Functions below for a list of these) related to mobilising a team following an event

Guidance on DWM activities and skills required

Functions

Effective DWM requires the involvement of a range of suitably skilled, experienced and resourced personnel – for both strategic and operational roles. These personnel will most likely sit across the CIMS structure and may include a solid waste management expert who contributes to planning, intelligence, logistics and communications. The following activities should be undertaken during **readiness**:

1. Develop the capabilities of those involved with (see guidance in this section)
2. Engage with stakeholders and develop key partnerships for DWM (see Section C)
3. Liaise with regulators on the approach to emergency exemptions and/or approvals for waste handling, transport, storage, processing and/or disposal
4. Identify DWM waste types, volumes and risks likely to arise in the region and develop strategies/options for managing them (see Section D)
5. Identify disaster waste management services and facilities available to the region, their capabilities and capacities (see Section E)
6. Identify potential interim waste storage facility locations (see Section F)
7. Establish a DWM policy
8. Develop an indicative or draft DWM programme

DWM is likely to involve the following activities following an emergency event i.e. **response and recovery phase**:

1. Undertake an initial disaster waste management assessment to estimate waste types, volumes and sources (e.g. waste ownership)
2. Identify and manage waste issues that are a risk to human health, the environment and/or recovery efforts
3. Liaise with stakeholders (including insurers) to understand the capacity of the affected community to manage private property waste
4. Evaluate options for managing waste from the specific event, including identifying facilities for waste disposal/reprocessing and whether interim waste storage facilities are needed
5. Liaise with regulators on emergency exemptions and/or approvals for waste handling, transport, storage, processing and/or disposal
6. Undertake more detailed waste assessments in the recovery phase to inform the development of a longer-term programme to manage disaster waste
7. Confirm the DWM policy for the specific event
8. Confirm the DWM programme for the specific event
9. Oversee implementation of the DWM programme, including engaging contractors if/as appropriate and monitoring outcomes
10. Provide timely information to the public and other stakeholders throughout the response and recovery phases, in coordination with civil defence or relevant coordinating body

DWM skills, competencies and links to the CIMS Structure

DWM will draw on planning, intelligence, operations, logistics and public information management functions as well as technical experts in the CIMS structure. It is likely that readiness, response and recovery activities will involve one or more solid waste technical specialists, typically territorial authority waste managers or regional council staff with similar skill sets and local relationships. Depending on scale and complexity waste contractors and consultants could provide technical advice and/or additional resources where needed.

Table B-2: DWM skills, competencies and composition

Skill	Competencies	Composition
Planning and Intelligence	• Strategy development and execution • Expertise in emergency management, understanding the CIMS structure and prior experience responding to emergency events • Large scale project management, including procurement of services and management of a diverse mix of team members • Knowledge and experience in waste policy and regulation	May include suitably qualified and authorised personnel from local and/or central government. DWM implementation will require support from specialists in communication and technical advisors to inform the development and execution of the DWM strategy and programme (see below). CIMS Intelligence and Planning Managers

Skill	Competencies	Composition
Public Information Management (PIM)	• Partnerships and relationships with key stakeholders • Expertise in public consultation and communications	May include suitably qualified and authorised personnel from government or an appointed private contractor, most likely linked to the Public Information Management function of the CIMS structure. CIMS PIM Manager
Waste technical advisors	• Expertise on disaster waste streams, volumes, key issues/risks (environmental and, health and safety) and management options • Understanding of the region's services and facilities for waste collection, storage, reprocessing and disposal. • Experience in setting up and managing waste storage, processing and disposal and facilities • Experience with waste handling, collection and transport • Experience in managing waste contracts • Understanding of OHS considerations for managing waste	May include suitably qualified and authorised personnel from local government (e.g. council waste coordinators), contractors and/or appointed private consultants and experts.

Lines of authority and reporting

It is crucial that DWM is delivered within the context of the overall incident response drawing on the relevant functions in the CIMS structure. This includes considering how detailed technical advice will be provided to responders, and inform planning and delivery of other response activities. Significantly, effective DWM requires the ability to secure funding to meet potentially significant expenditure over extended periods of time covering immediate response and longer-term recovery activity.

The approach to delivering effective DWM should be established during business as usual with clear lines of authority and reporting.

Back-filling positions

It is likely that assigned personnel will hold other roles during business as usual. Consideration should be given to back-filling these roles where necessary.

Psychosocial considerations

Emergency events cause emotional and financial stress on individuals. It's important that those involved with DWM are provided with appropriate training and support to manage their own wellbeing and that of community members who they interact with.

Equipment needs

Effective DWM will likely require ICT equipment and software (e.g. ESRI GIS) and office space. Vehicles, cameras and GPS for site visits and undertaking waste assessments. This equipment will be assembled and available via the CIMS Logistics function.

DWM Skills Workbook Tasks

Readiness phase tasks

TASK B1: IDENTIFY DWM SKILLS REQUIRED

TASK B2: KEEP RECORD OF READINESS ACTIONS

Response and recovery phase tasks

TASK B3: CONFIRM DWM RESOURCES REQUIRED

TASK B4: KEEP RECORD OF ACTIONS

Section C

Key partnerships and stakeholders

Key partnerships and stakeholders

Introduction

Stakeholder engagement is necessary to ensure that DWM approaches consider the needs and expectations of the community and other stakeholders. Partnerships with relevant organisations (such as insurance companies) can improve outcomes for the quality and timeliness of information provided to inform the development of a disaster waste strategy, see Table C-1.

Table C-1: Tasks to be completed in this section

Phase	Key tasks
Readiness	• Add DWM specific stakeholders to existing database of CDEM stakeholder contacts • Identify, document (and subsequently undertake) actions needed to establish and/or further develop relationships with DWM specific stakeholders to enable effective disaster waste management • Keep a central record of stakeholder engagement activities during the readiness phase (linked to CIMS stakeholder engagement management approach). • Ensure key organisations and groups likely to be involved in the response and recovery have been engaged to collect relevant information and consider their needs in the development of waste management approaches.
Response / Recovery	• Ensure key organisations and groups involved in the response and recovery have been engaged to collect relevant information and consider their needs in the development of waste management approaches • Keep a central record of stakeholder engagement activities during the response and recovery phases

Guidance on key partnerships and stakeholder engagement

A range of stakeholder groups are involved in disaster waste management. This includes property owners and tenants, insurance companies, Iwi, local councils, waste management contractors, and emergency services. Table C-2 describes the typical involvement of each stakeholder group in DWM and key objectives of engaging with them. This includes organisations that are inherently local (such as councils) and national stakeholders (such as the Insurance Council). Efforts to engage with national stakeholders should be coordinated across New Zealand. Many of these stakeholders will have a much broader interest in disaster management and it is important that stakeholder engagement occurs within the established CIMS structure.

Ownership of waste by stakeholders affects the way it is managed and thus outcomes for disaster waste management. For example, insurers may have policies that favour demolition over repair, which may add significant volumes of waste needing to be managed and place further demand on waste infrastructure and facilities. There is an opportunity to address some potential issues in discussions during the readiness phase to facilitate improved outcomes for DWM.

Table C-2: Key stakeholders, their involvement in DWM and engagement objectives

Stakeholder	Involvement in DWM	Engagement objectives
Emergency services (first responders)	First responders' clear debris and other waste in an emergency to make way for search and rescue operations, restore essential infrastructure and contain hazardous substances. They may also deal with human remains including any associated investigative requirements.	• Liaise with emergency services to identify any waste issues posing an immediate threat to human health and/or the environment, and find out whether they need additional resources to contain, remove, transport and/or dispose of the waste volumes
Iwi	Iwi advise on their role in managing waste across disaster-affected locations, which have cultural significance to them.	• Understand what role Iwi will have in managing waste across disaster-affected areas, which have cultural significance to them • Be aware of cultural sensitivities around the management of waste, including collection, stockpiling, transportation and disposal locations.
Property owners and tenants	Property owners and tenants generally clean-up waste generated on their properties (via insurance arrangements or other) resulting from an event.	• Understand the capacity of property owners to manage their own waste following a disaster. This includes their financial capacity (including whether they are adequately insured), emotional state, public health hazards, and the availability of waste services. • Provide timely information and advice to assist landowners and tenants with managing their waste (e.g. issuing information about options available to the community for waste disposal/recycling, and safety considerations when handling waste) • Provide support to landowners who are unable to manage their waste due to various reasons (e.g. financial, emotional distress, safe access to property, potential hazards, other).
Insurance companies	Insurance companies decide on removal and disposal of waste on behalf of insured properties.	• Understand the level of insurance held by property owners and tenants across disaster-affected areas • Enter into MOUs during business as usual for sharing of insurance information, and cost-sharing arrangements between government and insurers.

Stakeholder	Involvement in DWM	Engagement objectives
TerritoriaLocal Authorities	Territorial Local Authorities often provide municipal solid waste (MSW) collections to residents, which may be disrupted by an event. They may also operate a range of waste and recycling facilities such as transfer stations and landfills, which may receive disaster waste volumes. In some cases, local councils may choose to provide additional waste services to assist their community to manage waste following an event.	• Understand what council waste services have been disrupted by the event and how long it will take to re-establish them • Understand the capabilities, capacities and willingness of councils provide services for managing disaster waste • Ensure that councils provide specialised training to their workers to deliver waste services following a disaster (including safety training, and psycho-social training) • MoU's with waste service providers and contractors to understand the level of available resource in terms of truck collection capacity following a disaster event.
Waste management industry	Waste management contractors are engaged by individuals, insurance companies, councils and other stakeholders to collect and dispose of/recycle disaster waste	• Understand what commercial waste services have been disrupted by the event and how long it will take to re-establish them • Understand the capabilities, capacities and willingness of waste management contractors to provide services for managing disaster waste • Ensure that contractors provide specialised training to their workers to deliver waste services following a disaster (including safety training, and psycho-social training)
Regulators (Worksafe, Regional Council, Public Health)	Regulators control worker health and safety, waste handling, transportation, disposal and waste minimisation activities and facilities (noise, land, air, water discharge etc) as well as approving/consenting these practices, monitoring and reporting mechanisms.	• Liaise with regulators on the establishment of interim storage facilities and any emergency provisions necessary for waste handling, transportation, processing, storage, minimisation practices, waste disposal and monitoring.
Volunteer groups	Volunteer groups undertake activities to assist the affected community with recovery. This can sometimes include clean-up activities.	• Understand what volunteer groups are active following a disaster, and any waste management activities they're undertaking • Provide timely information and advice to assist volunteers with managing waste (e.g. safety considerations when handling waste) • Clear links to CIMS or Recovery structure.

Key Partnerships and Stakeholders Workbook Tasks

Readiness phase tasks

TASK C1: CREATE DATABASE OF KEY PARTNERSHIPS AND STAKEHOLDERS

TASK C2: KEEP RECORD OF READINESS ACTIONS

Response and recovery phase tasks

TASK C3: CHECKLIST AND RECORD OF ENGAGING WITH STAKEHOLDERS

TASK C4: KEEP RECORD OF ACTIONS

Section D

Disaster waste composition

Disaster waste composition

Introduction

This section provides an overview of disaster waste types, sources, volumes and potential risks or issues that will likely need to be managed following an event. Table D-1 below lists tasks to be completed in this section.

Table D-1: Tasks to be completed in this section

Phase	Disaster waste composition tasks
Readiness	• Identify likely waste types, sources and volumes generated by an event in the region • Develop strategies and/or options for managing waste issues in advance of an event • Keep a central record of activities related to preparing for likely waste volumes and issues pre-event
Response and recovery	• Complete an initial disaster waste assessment to identify waste streams and order-of-magnitude volumes for select streams • Develop strategies for managing disaster waste issues • Keep a central record of activities related to identifying and managing waste volumes and issues following an event

Guidance on disaster waste streams and volumes

Common waste streams and volumes

Disasters can generate large volumes of waste. Common waste streams and relative volumes for select disaster types are provided in Table D-2 overleaf. Technical guidelines for managing specific waste streams is provided in appendices. This includes guidance for managing:

- Asbestos containing material (Appendix 1)
- Construction and demolition waste (Appendix 2)
- Green (vegetative) waste (Appendix 3)
- Bulky waste (Appendix 4)
- Food waste (Appendix 5)

These technical guidelines are intended to be expanded over time to cover a larger range of waste streams.

Table D-2 notes relative volumes of materials generated for several disaster scenarios. The purpose of the table is to illustrate which materials are likely to be generated in significant volumes to assist in prioritising activity. During drafting of this planning tool in 2018 a proof of concept data tool was developed to illustrate how existing information on disaster waste scenarios can be combined with property information and typical damage factors. At the time of writing (June 2018) the intention was to develop this tool to support readiness phase (scenario development) and response phase (initial disaster waste estimates) activity.

Table D-2: Typical sources of waste, streams and relative waste volumes

Typical sources	Waste stream	Relative waste volumes		
		Earthquake	Flood	Volcanic eruption
Damaged buildings and other structures	Asbestos containing material (depends on age of buildings)	H	L-M	L-M
	Construction and demolition inert waste (bricks, concrete, rubble, etc.)	H	L-M	L-H
	Mixed waste (treated timber framing, interior lining mixed with other materials)	H	L-M	L-H
	Metal	M	L	M
	Bulky waste (including furniture, carpets, etc.)	M-H	M-H	M-H
	E-waste and whitegoods	L-M	L-M	L-M
	Household hazardous waste	L-M	L-M	L-M
Damaged and/or displaced vehicles	Vehicle waste	L-M	L-M	L-M
Fallen trees and/or other damaged vegetation	Green (vegetative) waste requiring removal	L	L-M	L-M
Displaced soil and sediment	Soil and sediment waste, including liquefaction from earthquakes	L-H	M-H	L-M
Ash from volcanic eruption	Ash and volcanic debris	-	-	L-M
Spoiled perishable food from supermarkets, restaurants and households	Food waste	L-M	L-M	L-M
Agricultural properties	Copper chrome arsenate posts	L-M	L-M	L-M
	Agriculture (including greenhouse) waste	L-M	L-M	L-M
	Animal carcass waste	L-M	L-M	H
	Fencing wire	L-M	L-M	L-M

Typical sources	Waste stream	Relative waste volumes		
		Earthquake	Flood	Volcanic eruption
	Chemical (hazardous) waste	L-M	L-M	L-M
	Empty chemical waste drums	L-M	L-M	L-M
Flood prone properties	Sandbag waste	-	L-M	-
Non-profit organisations and welfare centres	Unwanted donated goods, food and drink packaging	L	L	L

Estimate wastes for scenario planning (Readiness)

The volume of waste generated for a scenario can be estimated from projected damage including predictions of:

- The number of properties impacted including number and type (residential, commercial, industrial) of properties damaged.
- Factors for general debris e.g. silt, ash, liquefaction, damaged vehicles, deceased animals.

This information can be used to provide high-level estimates of waste volumes (tonnes). It is important to note that every event is difererent and will result in different quantities of waste and different waste composition. Information gathered about waste generated during an event can be used to improve the quality of estimates used in future readiness phase and/or immediate post event response planning.

Initial quantification of waste volumes (Response)

Following an event, the volume of waste generated can be estimated using historical information for similar events (as for readiness phase above). This information is useful for developing a quick estimate to aid planning but shoud be replaced by real data as soon as possible. Specifically, damage assessments should collect data to inform waste estimates including:

- properties including number and type (residential, commercial, industrial) of properties damaged and extent of damage (minor, major, destroyed)
- number of vehicles damaged
- number and type of deceased animals.

This information can be converted into high-level estimates of waste volumes (tonnes) using the following method.

Number damaged units (e.g. # dwellings, vehicles, etc)	x	Weight or volume of damaged item	x	Extent of damage (%)	=	High-level estimate of waste volumes

From damage assessments or satellite imagery	See Table D-3 overleaf	Based on estimates on % damage if available	In tonnes and/or cubic metres

The purpose of undertaking these high-level estimates is to estimate likely facilities and resources needed to manage waste volumes (waste collection, transportation, processing and disposal), and flag potential issues such as inadequate capacity of infrastructure in the region to handle the volumes.

Table D-3: Expected weight and volume of typical low-rise dwelling structure, building contents and passenger vehicle

Item	Composition/ key streams	Units	Estimated unit weight	Estimated unit volume
Structure of typical low-rise dwelling (approx. 180 m^2)	Concrete, bricks, stones, footings Asbestos sheeting Fittings Roof tiles Roofing iron Plasterboard Timber (treated and untreated/ native) Polystyrene Glass	Per low rise dwelling	165 tonnes	207 cubic metres
Building contents from typical low-rise dwelling (approx. 180 m^2)	Furniture Carpet Electronic/electrical equipment Whitegoods Household hazardous materials (paints, pesticides, oils) Personal items	Per low rise dwelling	4 tonnes	17 cubic metres
Passenger vehicle	Vehicle waste	Per passenger vehicle	1 tonne	12 cubic meters

Detailed assessment of disaster waste (Response and Recovery)

As the Response proceeds and/or transitions to Recovery, if time and resources permit, a detailed waste assessment can be undertaken to develop a more accurate and complete picture of disaster waste types, sources and volumes. This involves sending out a team of assessors to visit damaged properties/sites and collect the following information where possible and practical:

- waste sources (e.g. destroyed or damaged dwellings, roads, fences)
- location of waste (street address and GPS coordinates)
- waste 'owners' (private property owner, animal owner, local government, state government)

- level of insurance to cover waste management costs
- waste stream types (e.g. vegetative waste)
- potential for presence of hazardous materials in the waste stream
- waste stream nature (e.g. water damaged, mixed, clean) and whether specialist demolition or waste contractors are required to handle waste
- estimated volumes (cubic metres and tonnes) or if deceased animals, the number of animals

Guidance on key risks and timelines for managing them

Waste risks and streams need to be managed to minimise potential harm to human health, economic assets and the environment, as well as, facilitate disaster response and recovery activities. The timeline for managing each risk depends on when it arises and the urgency of addressing it.

The following tables identify potential waste risks across a timeline for when they will likely need attention:

- immediate,
- within 1-2 weeks
- over the course of days, weeks and months

These timelines and the issues noted are intended to highlight potential issues. Actual risks will depend on specific event scale and circumstances. For example cold weather will slow spoilage of food and a smaller scale event is unlikely to result in widespread disruption of transport/access routes.

These tables include information on considerations for management of each waste risk. Following a disaster, those tasked with planning DWM activity (see Section B) should identify whether each risk is present and determine an appropriate strategy to manage it (see Task D3). This strategy should consider available resources to manage the waste (see Section E) and DWM principles (Section A). Readiness activities can be undertaken to identify potential strategies and options of managing waste in advance of an event (See Task D1), which can then be reviewed and revised (if necessary) following an event.

Immediate

The following waste risks and/or challenges may potentially arise immediately following an event. If not appropriately managed, then these issues can impede response activities. Additional resources may need to be engaged to manage waste from a large event. For example, civil contractors with plant and equipment to help remove/transport rubble (see Section E).

Table D-4: Potential waste risks that may arise immediately following an event

Potential waste risk	Waste streams: sources	Considerations for managing waste
Debris blocking road access for first responders, or search and rescue operations	Vegetative waste: fallen trees, displaced branches Metal waste: displaced vehicles, fences, structures and infrastructure C&D waste: fallen building facades (e.g. bricks) or other collapsed structures Ash and ballistic debris: caused by volcanic eruptions Liquefaction silt: caused by earthquakes	First responders to clear debris to the roadside or other location and landowners and/or government to manage resulting waste. Where first responders do not have access to equipment, mobilise contractors to undertake these activities. Volunteers are also likely to emerge to help clear some of this material.
Debris obstructing the restoration/operation of critical infrastructure service	Vegetative waste: trees fallen on powerlines Ash and ballistic debris: volcanic eruption Liquefaction silt: earthquake	First responders to clear fallen trees from powerlines and landowners and/or government to manage resulting waste. Where first responders do not have access to equipment, mobilise contractors to undertake these activities.
Escape of hazardous materials posing risk to human health and/or the environment	Chemicals: farms, industry	First responders to deal with escape of hazardous materials to contain and make safe on-property; landowners then arrange collection and disposal. Where first responders do not have access to equipment, mobilise contractors to undertake these activities.
Storage of materials for investigative proceedings.	Vegetative waste: fallen trees, displaced branches Metal waste: displaced vehicles, fences, structures and infrastructure C&D waste: fallen building facades (e.g. bricks) or other collapsed structures Ash and ballistic debris: caused by volcanic eruptions	Waste material from sites where fatalities have occurred may need to be stored in a separate location while coronial, criminal and other investigative proceedings are taking place.

Within 1-2 weeks

The following waste risks and/or challenges may potentially arise within 1-2 weeks following an event. If not managed, these waste systems have the potential to harm human health, the environment and/or recovery efforts. Additional resources may need to be engaged to help manage waste (see Section E). For example, commercial waste contractors may be engaged to deliver skip bins across public parks so that residents can dispose of their normal household waste where normal systems have been disrupted. Waste services may also be disrupted in areas that are affected and not affected due to resources focusing on the area affected.

Table D-5: Potential waste risks that may arise within days following an event

Potential waste risk	Waste streams: sources	Considerations for managing waste
Prolonged power outages and warehouse/retail/hospitality property damage, leading to spoilt perishable food posing a threat to human health if not removed	Food waste: residential and commercial refrigerators that have faced power outages or building damage.	Ensure that households and businesses that have faced prolonged power outages have access to services to dispose of spoilt food.
Presence of friable asbestos posing a threat to human health if not safely handled	Asbestos-containing materials: potentially present in damaged buildings and structures constructed prior to 1990	Issue information to the public on how to safely manage asbestos. Assess capacity and feasibility of specialist asbestos removal contractors, and disposal facilities to manage asbestos volumes.
Animal carcasses posing a threat to the environment, human health and wellbeing if not appropriately managed	Animal carcass waste: deceased livestock and pets	Ensure that owners of deceased animals have access to services to dispose of animal carcasses. This may include on-site burial and/or collection of carcasses for appropriate disposal. Liaison with Ministry of Primary Industries is likely to be requiredrequired.
Interruption of normal waste collection services across occupied dwellings, with waste posing a threat to human health and the environment if not collected	Municipal solid waste: across occupied homes and businesses Medical waste: across hospitals and medical centres	Where required set up temporary systems for collection of waste, and/or short-term storage, until normal systems can be re-established. This could for example involve setting up skips in public parks where residents can drop-off their waste.
Damaged and/or inaccessible waste and recycling facilities, resulting in reduced options for waste storage, reprocessing and/or disposal	Various waste streams	Set up interim arrangements for waste storage, and/or send waste to alternative facilities.
Burning or inappropriuate	Treated timber posts: wineries, farms and rural	Issue information to building owners, farmers and other stakeholders about how to responsibly

Potential waste risk	Waste streams: sources	Considerations for managing waste
disposal of treated timber	properties, treated timeber structures.	manage treated timber posts.
Volunteers not taking adequate safety precautions when handling waste.	Various waste streams	Provide information to volunteer groups on safely handling waste, including wearing personal protective equipment (PPE). Provide PPE equipment to volunteer groups where possible.
Large volumes of welfare centre waste and unwanted donated goods needing management and disposal	Food waste: unwanted donated food Other: unwanted clothing, toys, food packaging, other	Issue information to the public about what types of donations are needed and set up process for receiving donations. Set up systems for managing waste from welfare centres.
Illegal dumping, particularly on farms and in quarries	Various waste streams	Monitoring of dumping and sanctioning.
Inappropriate reuse or the presence of hazardous substances may lead to improper disposal if waste is not removed promptly.	Food, contaminated soft furnishings, appliances, household orgarden chemicals	Issue information to the public Timely removal of materials put out for collection and disposal. Targeted hazardous materials removal

Days, weeks and months

The following waste issues and/or challenges may arise over the days, weeks and months following a disaster.

Table D-7: Potential waste issues that may arise within weeks and months following an event

Potential waste issue	Waste streams: sources	Considerations for managing waste
Unable to determine or contact owner of waste	Various waste streams	Sometimes it isn't possible to identify the owner of waste streams, particularly if the waste has been displaced by the disaster (e.g. by wind or swept up in flood waters). Where this is the case, the waste may need to be managed using public resources. Where the owner is known, and not contactable, appropriate authority will be needed to manage the waste without owner consent.
Volunteers not taking adequate safety precautions when handling waste.	Various waste streams	Provide information to volunteer groups on safely handling waste, including wearing personal protective equipment (PPE). Provide PPE equipment to volunteer groups where possible.
Inadequate capacity across local facilities to manage types and volumes of disaster waste	Various waste streams	Set up interim arrangements for waste storage/processing, and/or send waste to facilities in neighbouring regions
Unauthorised and/or uncontrolled management of waste (e.g. private operators setting up waste management facilities)	Various waste streams	Issue information that only licenced and/or approved facilities can receive disaster waste. Monitor locations where waste is being managed and shut down unauthorised and/or uncontrolled operations.
Slow removal of waste, hindering return of economic activity and community services	Various waste streams	Pursue strategies to increase the speed of waste removal.

Disaster waste composition Workbook Tasks

Readiness phase tasks

TASK D1: IDENTIFY POTENTIAL STRATEGIES AND OPTIONS FOR MANAGING DISASTER WASTE ISSUES

TASK D2: KEEP RECORD OF READINESS ACTIONS

Response and recovery phase tasks

TASK D3: UNDERTAKE PRELIMINARY WASTE ASSESSMENT TO ESTIMATE WASTE VOLUMES AND IDENTIFY WASTE ISSUES AND APPROACHES FOR MANAGING THEM.

TASK D4: KEEP RECORD OF ACTIONS

Section E:

Waste management services and facilities

Waste management services and facilities

Introduction

This section provides an overview of waste management services and facilities to manage disaster waste types, volumes and issues. The development of interim waste storage facilities is addressed separately in Section F. Table E-1 below lists tasks to be completed in this section.

Table E-1: Tasks to be completed in this section

Phase	Activities
Readiness	• Develop a database of existing waste management facilities in the region, their locations, waste streams they're licensed to receive and capacities. Where relevant facilities outside of the region should also be included. A lot of this information is captured periodically in Waste Assessments prepared to support the development and review of Waste Minimisation and Management Plans. Readiness activities should make use of the available data in light of potential disaster waste characteristics and update where necessary. • Identify if there are any gaps in the types of waste and volumes likely to be generated by a disaster, and the availability and capacities of existing facilities to manage that waste. • Where gaps in local waste infrastructure capabilities or capacity exist, develop strategies to manage expected volumes of disaster waste, such as pre-identifying interim storage facilities (Section E) and/or accessing facilities in nearby regions. • Keep a central record of activities related to identifying and developing services and facilities for management of disaster waste pre-event
Response / Recovery	• Refer to database of existing waste management facilities in the region for list of potential facilities. • Assess each disposal/recycling option against key criteria, including: facility availability and accessibility, proximity to disaster-affected area, time taken to process waste, waste management costs and expected outcomes for the community and environment. • Keep a central record of activities related to selecting and engaging services and facilities for management of disaster waste

Guidance on waste management services and facilities

Waste, handling collection and transport services

Table E-2 provides an overview of potential providers and equipment needed to handle, collect and transport waste. The specific providers and their capabilities and equipment should be identified and confirmed at a regional level during business as usual and confirmed following an event in case of any disruption and/or capacity limitations caused by the event. Where these providers provide business as usual waste minimisation and management services a key readiness activity is ensuring their health and safety management approach is consistent with Council requirements and Worksafe expectations. Where there is potential for new facilities to be established during response or recovery consideration needs to

be given to creating appropriate Health and Safety plan(s) for the new activities. This should be overseen by the lead agency and written in consultation with technical experts.

Table E-2: Waste handling, collection and transport

Waste collection/ transport service	Vehicles and equipment	Potential providers
Vegetative debris	• Chainsaws to cut branches • Mobile shredders to reduce volumes • Waste loaded into skip bins (for collection by front-lift or hook-lift truck) or straight into semi-tipper truck • Waste can also be loaded with bobcat, excavator, and wheel loader or by hand (depending on vehicle)	- Waste collection companies - Civil contractors - Local councils
C&D waste **(bricks, concrete rubble)**	• Waste loaded into skip bins (for collection by front-lift or hook-lift truck) or straight into semi-tipper truck • Waste can also be loaded with bobcat, excavator, and wheel loader or by hand (depending on truck type)	- Civil contractors - Waste collection companies
Asbestos-containing material	• As above for C&D waste, but note restrictive handling requirements and considerations in asbestos guidelines (Appendix 1)	- Specially licensed (WorkSafe) contractors -
Metal waste	• As above for C&D waste	- Civil contractors - Waste collection companies - Scrap metal collectors
Agricultural waste	• Waste loaded into skip bins (for collection by front-lift or hook-lift truck) or straight into semi-tipper truck • Care must be taken to ensure that open topped containers are appropriately covered and do not have holes in them to avoid spillage. • For infectious materials vehicles need to be appropriately scrubbed and disinfected once the load has been tipped to avoid potential spread of biosecurity materials	- Civil contractors - Waste collection companies
Animal carcasses	• Enclosed transport i.e. front, side or rear loaders rather than open top bins, potentially sealed (tub) bins with covers. Refer to Ministry for Primary Industries for specific guidance.	- Civil contractors - Waste collection companies

Waste collection/ transport service	Vehicles and equipment	Potential providers
Interim MSW collection	• Mobile garbage bins emptied and transported by side or rear-lift truck • Skip bins emptied and transported by front-lift or hook-lift truck	- Waste collection companies - Local councils
Food waste collection	• Mobile garbage bins emptied and transported by side or rear-lift truck • Skip bins emptied and transported by front-lift or hook-lift truck	- Waste collection companies - Local councils
E-waste and bulky waste	• Load waste directly into rear-lift or Pantec/tailgate truck or load into skip bin (for collection via front or hook lift truck) • Larger volumes can be loaded into tandem tipper with bobcat or into bin (for collection by hook-lift truck)	- Waste collection companies - Local councils
Liquid waste	• Pump liquid waste into tanker, rigid or articulated vehicles.	- Liquid waste specialists
Chemical waste	• Transport bulk volumes in rigid tanker or in sealed containers on a Pantec/tailgate truck • For smaller volumes in chemical containers (from farms or domestic sheds) transport in bunded vehicle or inside containment.	- Chemical waste specialists

Waste recycling and disposal facilities

Collected waste will need to be deposited at a facility for temporary storage, recycling and/or disposal. This may include:

- Inert landfills: for inert waste streams
- MSW landfills: for putrescible waste such as food and general waste
- Transfer stations: to receive, re-size and aggregate waste materials prior to disposal/recycling
- C&D recycling facilities: to process bricks, concrete, rubble
- Metal recycling facilities: for scrap metal
- Composting facilities: for food waste and vegetative debris
- Chemical waste treatment plants: for chemical waste
- Liquid treatment facilities: for liquid waste

Contractors that have been engaged to collect and transport waste will generally be aware of facilities in the region, however the availability, capacity and accessibility of those facilities may be affected by the disaster. Furthermore, where large volumes of waste are generated by an event, the choice of a facility can have significant impacts on the affected community, such as the speed and costs of recovery. Table E-3 provides an overview of considerations for selecting waste facilities.

Table E-3: Considerations for selecting waste facilities

Consideration	Description

Consideration	Description
Potential recycling and/or disposal methods in the region	Consider what recycling and/or disposal facilities are in the region, including landfills, C&D recycling facilities, composters, mulchers, etc. Map these facilities against DWM waste streams, checking for their potential suitability.
Facility licensing	Check District and Regional consents for facilities to determine their ability to receive and process the waste streams and volumes. Following a disaster, it may be possible for the facility to seek licensing exemptions and/or emergency authorisations from the relevant authority.
Facility capacity	Check the capacity of facilities to receive, store and process waste volumes, including the rate that the waste can be processed (e.g. tonnes per month). This may be limited by licensing, facility size, staff availability, operating hours and other factors. Following an event, processing capacity can potentially be increased by expanding operating hours (e.g. by increasing the number of shifts).
Facility location and accessibility	Consider distances between the disaster affected area and facilities, as this will impact costs of transport. Following an event, access to a facility will be affected by road closures.
Facility willingness and capabilities	Check the willingness and capabilities of facility operators to receive the waste. The facility may have been damaged by the event and require restoration and/or reconnection to utilities. Facility staff may also not be available or be limited because of being personally affected by the disaster. Note that there is a heightened risk of contamination in waste streams during a response and recovery with higher volumes of waste and likely higher numbers of inexperienced waste handlers/contractors. Facilities need to be able to manage this risk.
Sustainable resource management	Consider opportunities for waste reduction, reuse and recycling. For example, untreated timber may be given away or sold as firewood, recycled rubble may can be used in reconstruction.
Waste management costs	Estimate the cost each option for waste disposal/recycling. Make sure to factor transport costs, storage costs, and any pre-processing costs that may be incurred.
Impact on recovery of community(ies)	Consider how the selection of a waste disposal method and/or facility will impact the affected community, including the speed and cost of recovery, and providing employment to process the waste.

Pre-selection of contractors for waste handing, collection and transport

Following a disaster, contractors may need to be engaged as a matter of urgency to address waste issues that threaten human health, the environment and/or impede response activities. Establishing a panel of pre-approved suppliers of waste services during business as usual can reduce the time taken to engage contractors following an event. Contractors on the panel could also be required to undertake training and develop their capabilities in the delivery of DWM services to improve outcomes for the environment, human health and wellbeing. This could include undertaking training and developing capabilities in:

- Emergency communications, including considering alternative modes of communication such as two-way radio when telecommunications are down
- Establishing protocols for safe delivery of waste services when hazards exist because of the event (such as dust on the road, active fires, severe weather)
- Psycho-social considerations to manage the wellbeing of contractors and that of others whom they interact with following a disaster.
- Specialist training, for example with urban search and rescue.

Engaging contractors during response phase

During the response phase, there may be limited information and significant uncertainty on the scope of waste management requirements. In these instances, it is best to set up contracts based on a unit cost basis, for example:

- hourly rate ($/hr) or service fee ($/lift) (excluding disposal/ reprocessing gate fees), plus
- waste disposal/reprocessing gate fee ($/tonne), if applicable.

Simple contracts may be developed that specify:

- Service description (such as removal and disposal of waste from nominated streets)
- Contract length (e.g. a six-week contract with option for renewal at the Principal's discretion)
- Waste stream destination (information about the facility where the collected waste will be disposed/recycled)
- Details of special handling, transport or disposal licensing requirements
- Fees (fee structure, e.g. hourly component and per tonne disposal component)
- Invoicing requirements (i.e. method for issuing invoice and payment terms)
- Reporting requirements (e.g. evidence that collected waste was received at licensed facility)
- Any other contact requirements

Note that unit cost contracts require considerable monitoring.

Waste Management Services and Facilities Workbook Tasks

Readiness phase tasks

TASK E1: CREATE DATABASE OF WASTE COLLECTION AND TRANSPORTERS IN THE REGION

TASK E2: CREATE DATABASE OF WASTE DISPOSAL/REPROCESSING FACILITIES IN THE REGION

TASK E3: IDENTIFY GAPS IN LOCAL WASTE SERVICE AND FACILITY CAPABILITIES AND CAPACITIES

TASK E4: KEEP RECORD OF READINESS ACTIONS

Response and Recovery phase tasks

TASK E5: EVALUATE DISPOSAL/RECYCLING OPTIONS

TASK E6: KEEP RECORD OF ACTIONS

Section F:

Interim waste storage facilities

Interim waste storage facilities

Introduction

Interim waste storage sites can be set-up following a disaster to manage waste volumes. These sites provide an area where the waste can be aggregated and/or segregated before the material will be sent for disposal, further processing eg decontamination or recycling. Waste can be sorted into piles of different materials at these sites and potentially pre-processed (e.g. crushing concrete). The table below lists tasks to be completed in this section.

Table F-1: Tasks in this this section

Phase	Tasks
Readiness	• Identify potential sites for the establishment of an interim storage facility. This is likely to focus on existing waste facilities, land designated for waste activities and local government owned sites e.g. depots, existing waste facilities and potentially closed landfills or similar land holdings. • Keep a central record of activities related to identifying interim waste storage facilities pre-event
Response / Recovery	• Refer to database of potential interim waste storage facilities (where developed during readiness phase) • Assess potential interim waste storage facility sites against key criteria. • Be aware of key considerations for setting up, operating and closing an interim waste storage facility • Keep a central record of activities related to selecting and engaging services and facilities for management of disaster waste

Guidance on interim waste storage facility

When an interim waste storage facility is needed

An interim waste storage facility may be needed when one or more of the following conditions exist:

1. Waste reprocessing and disposal facilities cannot be accessed due to damaged roads and/or other transport infrastructure.
2. The volume of waste generated is greater than the capacity of local facilities to process the waste within a reasonable timeframe, or existing facilities are not suitable for managing the particular disaster waste.
3. To centrally control the flow of disaster debris and other waste, prior to recycling or final disposal.
4. To segregate wastes away from impacted properties.
5. More time is needed to examine the waste to determine the appropriate reuse, recycling or disposal method. For example, to identify the presence of heritage materials in a pile of rubble, which would need to be removed for reuse before sending the remaining rubble for recycling or disposal.

Selecting sites for interim waste storage facilities

Sites that may be suitable for interim waste storage include closed landfills, currently operating landfills or resource recovery facilities, large vacant land or vacant industrial sites. A number of criteria should be

considered when selecting a site, including planning approval, human health and environmental impacts, heritage/cultural considerations, proximity to the disaster-affected area, storage capacity, business model and site facilities and design. These are described in Table F-2.

Table F-2: Site selection criteria for interim waste storage facilities

Consideration	Site selection criteria
Planning approval	• Establish site at location that minimises potential impacts and loss of amenity associated with noise, dust, odour and traffic volumes. • Locate in an industrial zoned area where possible. Sites should be away from sensitive land uses such as residential and mixed-use zones and/or areas of significant natural and cultural heritage. • Consider ownership of the land and locate on public land where possible. • Release information to the community about the facility's establishment.
Environmental impacts	• Ensure that risk of water contamination is minimised by: ▪ locating at a suitable distance from groundwater, potable water wells and rivers, lakes and streams ▪ not locating in a floodplain or wetland, coastal environments ▪ near sensitive populations eg schools, marae, residential areas etc.
Heritage/cultural considerations	• Consider heritage and cultural issues, including the site's significance to Iwi.
Proximity to disaster affected area	• Locate close to disaster-affected area to minimise travel distances for transport of waste • Consider impact on neighbouring properties, particularly those affected by the disaster. • Ensure there are suitable transport networks from the disaster-affected area, as well as, to end disposal and recycling facilities
Storage capacity	• Check there's enough space for storage of expected waste volumes, considering maximum stockpile heights, as well as sufficient operating space (gate, weigh station, site offices, roads/manoeuvring areas, buffer zones, firefighting/protection etc)

Consideration	Site selection criteria
Business model	• Consider how the facility will be operated and funded. This includes who can use the facility, who will pay for facility's operation (e.g. fully government funded or private disposal fees), how the gate fees will be determined and waste ownership (particularly of personal items recovered) • When establishing site operation and ownership model consider management of short and long-term risks. There are significant risks involved in the receipt of disaster waste (unknown quantity, composition and contamination), which is difficult to price for and holds significant long-term risks if inappropriately managed.
Site facilities and design	• Ensure that the site has access to water and electricity (for lighting, firefighting, administration and staff amenities) • Ensure the site has fencing and is secure • Provide an undercover area for storage of potentially hazardous materials (if applicable) • Preference for paved sites. Semi-paved or large parking lots paved in stone dust or gravel is the next best option. Meadows are least desirable because they may be inaccessible because of saturated soils after extended and heavy precipitation. • Provide storm water management, to appropriately manage contaminated water.

Operating interim waste storage facilities

A range of factors should be considered for responsible operation of an interim waste storage facility, including workplace health and safety, environmental controls, record keeping, traffic management and site security. These are described in Table F-3.

Table F-3: Considerations and practices for operating an interim waste storage facility

Consideration	Practices
Health and Safety	• Induct all staff and visitors on health and safety at the site • Ensure staff and contractors have adequate training to operate equipment and fulfil their responsibilities • Ensure workers and visitors wear suitable personal protection equipment (PPE)
Environmental controls	• Obtain relevant consents and approvals • Undertake environmental sampling in line with requirements of the relevant authority before waste is received. • Develop an Environmental Management System that identifies environmental hazards and how the risks will be monitored and controlled at the site • Undertake monitoring of groundwater, temperature of stockpiles, dust levels and litter • Implement environmental controls, such as stockpile height management, dust suppression, litter management, fire prevention and management equipment and procedures
Record keeping	• Record incoming waste volumes, streams and sources via weighbridge and/or volume estimations and visual inspections of loads • Monitor stockpile heights and volumes • Record outgoing waste volumes, types and destinations • Ensure proper accounting procedures are followed for management of fees, income and expenses • Document and report any safety or environmental incidents that occur
Traffic management	• Maximise one-way traffic flow throughout the site • Have separate access points and roads for small and large vehicles where possible • Use signage to direct traffic on site
Site security	• Secure the site with fencing and limit site access to permitted personnel • Install cameras and other security provisions where possible • Provide 24/7 supervision of the site

Closing interim waste storage facilities

A number of considerations should be given regard to for closure of interim waste storage facilities, such as removal of disaster debris, decommissioning of plant and equipment, environmental sampling, site rehabilitation, notification to authorities, public communication and post-closure monitoring. These are described in Table F-4.

Table F-4: Considerations for the closure of interim waste storage facilities

Consideration	Activities
Removal of disaster debris	• Remove all disaster related waste and debris by the expiration of the consent
Decommissioning of plant and equipment	• Decommission all infrastructure utilities and services
Environmental sampling	• Undertake environmental sampling in line with requirements of the relevant authority
Site rehabilitation	• Where applicable, undertake site landscaping to make the site safe and protect the surrounding environment
Notification to authorities	• Notify relevant authorities about the site's closure
Public communication	• Release information to the community about the facility's closure, intention for the site post-closure and appropriate alternative disposal facilities.
Post-closure monitoring	• Implement an appropriate post-closure programme to monitor environmental factors

Interim waste storage Workbook Tasks

Readiness phase tasks

TASK F1: IDENTIFY POTENTIAL LOCATIONS FOR INTERIM WASTE STORAGE FACILITIES

TASK F2: KEEP RECORD OF READINESS ACTIONS

Response and recovery phase tasks

TASK F3: CONSIDER THE NEED FOR AN INTERIM WASTE STORAGE FACILITY AND EVALUATE POTENTIAL SITES

TASK F4: KEEP RECORD OF RESPONSE/RECOVERY ACTIONS

Appendix 1:

Asbestos waste guidelines

Asbestos waste guidelines

Responsibilities

Under the New Zealand Asbestos Regulations[1], Persons Conducting a Business or Undertaking (PCBU) have responsibility to identify if asbestos is present in a workplace. People instructing waste clearance work during and after an emergency are likely to be classified as a PCBU.

Sources of asbestos waste

Asbestos and asbestos-containing materials (ACM) may potentially be found in buildings and structures constructed before 2000. As the majority of New Zealand buildings were constructed prior to 2000, it would be prudent to assume asbestos products are present in any damaged building until proven otherwise.

Typical sources of asbestos in the built environment include (note this list is not intended to be exhaustive):

- Externally:
    - corrugated asbestos cement roof sheeting and fencing
    - cladding materials
- Internally:
    - textured ceilings and ceiling tiles
    - vinyl tiles
    - fire doors
    - sprayed asbestos insulation/fire retardant
    - electrical switchboards
- In the ground:
    - sewer or water pipes, gaskets and fittings (heat resistant)
    - surface soils beneath the drip line of asbestos roofs/cladding
    - uncontrolled/nonengineered fill across sites (even on sites where the buildings don't contain asbestos)

Key hazards

There are no health limits set for non-occupational exposure to asbestos in air in New Zealand. For occupational settings, WorkSafe provides guidance. Several control measures can be taken to minimise risk:

- A suitably qualified and experienced person should assess the waste and confirm whether asbestos is present in the waste
- Keep the wastes damp to prevent dust generation (but not so wet that run-off contaminated with asbestos fibres is generated)
- PPE is likely to be required and may include respiratory protective equipment, overalls that that are impervious to dust and appropriate footwear or disposable boot covers

[1] Health and Safety at Work (Asbestos) Regulations (2016)

- Persons supervising work with asbestos need to be competent. Dependent on the risks, a licensed Removalist may be required.
- Asbestos signage and monitoring should be in place across asbestos storage and disposal locations

Identifying the presence of asbestos

Identification of whether asbestos is present should be undertaken by a suitably qualified and experienced person, such as an environmental consultant or occupational hygienist with asbestos experience or a licensed asbestos assessor. Asbestos has been used extensively in the past and can be covered by other materials, so that even the most thorough assessment can miss areas where asbestos is present, meaning that areas previously classified as free from asbestos could potentially require reclassification as asbestos waste at a later date.

Guidance for managing asbestos waste

Community Liaison

Asbestos is an emotive subject and can cause significant concern in the local community around exposure during an emergency and during the recovery. Concerns can be out of proportion to the actual risk presented.

The communications plan should consider employment of a health specialist with experience with asbestos to assist with community liaison. It is also worth considering air monitoring before, during and after the works to provide evidence that precautions taken have resulted in negligible asbestos in air (even if such air monitoring is not required by the regulations).

Consenting

The Building Act and the WorkSafe Health and Safety Act have provisions for emergencies. District Council Building Compliance and WorkSafe Officers should be able to advise on whether these provisions apply. If emergency provisions do not apply, then building consent may be required for demolition works.

Consent under the Resource Management Act may be required to disturb asbestos wastes in the ground during recovery, dependent on the volume of wastes being disturbed. District Council Health Officers should be able to advise on whether consent is required.

Class of works

The measures required to minimise exposure of people to dust generated during works involving asbestos depend upon the volume and type of asbestos involved. In summary, the different classes of work are:

Asbestos removal work

- Class A – most restrictive class of works, involving friable asbestos
- Class B – works involving non-friable asbestos (and associated dust containing asbestos)
- Unlicensed asbestos removal works – least restrictive class of works, involving small amounts of non-friable asbestos (defined as less than 10m2 of non-friable asbestos and associated dust)

Asbestos-related work

- Work involving responses to emergencies, demolition, laundering. Precautions required need to be commensurate to risks.

On-site handling

Asbestos only presents a risk to human health if fibres are inhaled. There are no health limits set for non-occupational exposure to asbestos in air in New Zealand. For occupational settings, WorkSafe provides guidance. Undisturbed, asbestos rarely generates quantities of fibres above what the regulations define as a trace level in air (<0.01 respirable asbestos fibres per millilitre of air). Disturbance of materials containing asbestos, e.g. during clearance work can generate significant quantities of asbestos fibres, exceeding health limits.

The main measure to prevent dust generation is keeping the wastes damp (but not so wet that run-off contaminated with asbestos fibres is generated).

Works involving asbestos require supervision by a competent person and need to be undertaken by appropriately trained workers. For the most high risk works (e.g. where friable asbestos is present) the supervisor will need to be a Class A Licensed Removalist. For minor works involving non-friable asbestos (< 10 m^2 in area plus associated dust) the competent person does not need to be a licensed.

Works are also likely to require an Asbestos Removal Control Plan to ensure that all workers are aware of the precautions required during works.

Ensure that wastes containing asbestos are kept separate from other wastes wherever possible. Mixing increases the volume of asbestos waste to be handled.

PPE

PPE must be worn when asbestos is or may be present. The type of PPE depends on the risks involved and will likely include as a minimum, respiratory protective equipment (P2 dust mask), disposable overalls that that are impervious to dust and appropriate footwear or disposable boot covers. PPE requirements increase for works involving friable asbestos, or high concentrations in soils. PPE requires proper disposal (double bagged).

Decontamination

Decontamination of plant and people leaving an asbestos work site is required. The level of decontamination depends on the type of asbestos present. For people, this ranges from a designated area to remove PPE, through to a three-stage airlocked shower facility. For plant, this generally involves wash down followed by inspection (samples being taken by an independent assessor after cleaning where significant asbestos is present, to demonstrate the efficacy of the cleaning).

Waste water will need to be confined to the work area and either filtered before disposal, or taken to an approved facility.

Clearance

On completion of asbestos removal works, a clearance inspection is likely to be required by an independent assessor before the area can be reoccupied for ordinary use.

Transporting wastes

Asbestos must be double wrapped in minimum of 200-micron thick plastic and clearly labelled when transported. For trucks transporting asbestos wastes, this usually means lining trays with 200-micron thick plastic and covering. Wrapping may not be required for soils containing low concentrations of asbestos, a competent person should assess soil wrapping requirements.

Interim storage

The Asbestos Regulations do not permit temporary storage of asbestos wastes at an unapproved location such as a trucking yard. Avoid stockpiling wastes on site where possible. Where wastes are stockpiled, they should be covered with 200 µm plastic sheeting (adequately secured against the weather, i.e. weighted down), in a secure and appropriately signed area.

Reuse and recycling

Asbestos is not recyclable. However, construction wastes containing asbestos can be recycled providing the asbestos can be economically removed (e.g. by hand picking) and the resultant materials shown by testing to be free of asbestos (experience after the Christchurch earthquakes has shown that appropriate removal of asbestos is very difficult to achieve in practice).

Disposal

Asbestos waste must be disposed of at a landfill site approved for the purpose by a territorial local or territorial authority under the Resource Management Act 1991.

Further information and resources

Ministry of Health

- Information about identifying asbestos-containing materials in your home, the health risks of asbestos and what you can do about asbestos is available at https://www.health.govt.nz/your-health/healthy-living/environmental-health/hazardous-substances/asbestos

Worksafe

- Information about conducting asbestos surveys is available at https://worksafe.govt.nz/topic-and-industry/asbestos/working-with-asbestos/conducting-asbestos-surveys/
- Information about removal of asbestos is available at https://worksafe.govt.nz/topic-and-industry/asbestos/management-and-removal-of-asbestos/
- Information about where to dispose of asbestos is available at https://worksafe.govt.nz/topic-and-industry/asbestos/where-to-dispose-of-asbestos/
- Information about PPE when working with asbestos is available at https://worksafe.govt.nz/topic-and-industry/asbestos/ppe-when-working-with-asbestos/
- The WorkSafe Approved Code of Practice is available at https://www.sitesafe.org.nz/globalassets/guides-and-resources/best-practice-guides/approved-code-for-asbestos.pdf
- Information for asbestos in soil is available at https://www.branz.co.nz/cms_show_download.php?id=6005c4222bf1b018e9c966facb1c99c4120c31e0&collect=true

Appendix 2:

Construction and demolition inert waste guidelines

Construction and demolition (C&D) inert waste guidelines

Sources of C&D inert waste

C&D inert waste, including concrete, bricks and rubble, metals and timber can arise from damaged buildings, roads and structures. Further volumes of C&D inert waste are generated during the recovery phase from the demolition of these damaged buildings and infrastructure.

Key sources of C&D waste include damaged:

- roads and bridges
- residential buildings (including low rise, multi-rise and high-rise)
- commercial and public buildings (such as offices, factories and shopping precincts)

Guidance for managing C&D waste

Key hazards

Potential hazards involved with managing inert C&D waste include:

- Danger involved with entering structurally unsound buildings to remove waste
- Inhalation of asbestos fibres, which may be mixed with the C&D inert waste and/or be present at the site
- Injuries associated with manual handling of the heavy material
- Inhalation of dust particles that can affect vision and cause breathing difficulties
- Unstable stockpiles and structures that may fall after the event

Table 2 below provides control measures for reducing and/or removing each of these hazards.

Table 2: Hazards and control measures for C&D waste

Hazard	Control measure
Danger involved with entering structurally unsound buildings to remove waste	Engage structural engineers to complete a risk assessment of damaged buildings and do not enter the buildings have been deemed safe. Ensure that utilities (such as water, gas and electricity) have been properly disconnected from the site.
Inhalation of asbestos fibres, which may be mixed with the C&D inert waste and/or be present at the site	Building constructed prior to 1990 are known to potentially contain asbestos. If asbestos is suspected, then treat the material using the asbestos waste guidelines.
Injuries associated with manual handling of the heavy material	Waste removalists should use appropriate equipment to move the waste such as grabble excavators, pulverisers and wheel loaders. Waste removalists should use PPE including high-visibility clothing, hard hats and steel-capped shoes.

Hazard	Control measure
Inhalation of dust particles that can affect vision and cause breathing difficulties	Waste removalists should use PPE such as dust masks and eye masks.
Unstable stockpiles and structures that may fall after the event	Do not stand or work next to or underneath walls or stockpiles that may topple.

Waste avoidance

Additional and unnecessary volumes of C&D waste can be generated due to insurance policies that favour demolition and rebuild over repair. Consideration should be given to strengthening/stabilising damaged buildings with a focus on safety and salvaging materials that are of cultural or heritage significance.

Where demolition is the preferred option, opportunities should be considered for the recovery of materials. See section below on reuse and recycling.

On-site handling

Unless there is a site imperative to remove waste from site quickly (e.g. to enable economic activity in surrounding areas) C&D waste should be managed by demolition contractors on-site. Equipment such as excavators with a grapple, hammer, pulveriser or similar can be used to break up the material for easier transport. In regional areas, mobile crushers and contracted labour can be used to process the material onsite. Measures should be taken to reduce dust.

Collection

C&D waste should be transported in steel-bodied trucks to an appropriate facility for interim storage, recycling or disposal. Transport vehicles should be fully enclosed where there is risk of run off for wet materials, and dust.

Opportunities to coordinate activity across adjacent or nearby sites should be considered to manage materials flows, logistics and markets for recoverable materials.

Interim storage

C&D inert waste is a low risk material that can be stockpiled for extended periods before being moved to a facility for recycling or disposal.

Reuse and recycling

There should be an initial focus on re-saleable items (e.g. native timber/hardwood, specific furniture/trimmings), materials that can be recovered as tradable commodities (e.g. aluminium, copper), then sorting inert from other materials for recovery. C&D waste (including concrete, bricks and rubble) can be crushed and blended to a specification to make road bases, which can be used for reconstruction efforts after the event. Alternatively, it can be used as a material for construction fill or quarry rehabilitation.

The suitability of reusing or recycling the material will depend on a range of factors including the:

- level of contamination in the waste with unsuitable items (e.g. plastics, asbestos)
- availability of facilities and resources in the region to process the waste

- demand for the recovered/recycled products

Disposal

C&D inert waste should be disposed of at a suitable landfill where it is not practical to reuse or recycle the material. Landfills should demonstrate that they have appropriate consent to accept specific materials.

Further information and resources

Resource Efficiency in the Building and Related Industries

- A comprehensive set of guidelines for on-site sorting, storage processing, centralised sorting and storage, collection, recycling C&D waste streams (including concrete, metal, plasterboard, timber) are available for download at https://www.branz.co.nz/cms_display.php?sn=105&st=1&pg=12643
- A case study for a housing removal and demolition project that diverted 90% of potential waste from landfills, through salvaging, recycling and reuse can be found at https://www.branz.co.nz/cms_display.php?sn=108&st=1&pg=12478

WasteMinz

- Landfill Guidelines can be found at https://www.wasteminz.org.nz/pubs/technical-guidelines-for-disposal-to-land-april-2016/

Completed Readiness Activities

- Information on potential facilities, interim storage sites and contractors may be available for your region where readiness activities have been completed using worksheets in the New Zealand DWM Planning Template Tool.

Appendix 3:

Green (vegetative) waste guidelines

Green (vegetative) waste guidelines

Sources of green (vegetative) waste

Large volumes of green (vegetative) waste can be generated by an event. This includes trees, shrubs and other vegetation, which can be found across:

- roads
- private, commercial and public properties
- plant or wood transport vehicles
- distribution centres

Guidance for managing vegetative waste

Key hazards

Potential hazards involved with managing vegetative waste include risk of a manual handling injury, the waste becoming a home for vermin and other wildlife, and airborne pathogens from breakdown of vegetative materials during storage/stockpiling or composting. Table 3 below provides control measures for reducing and/or removing each of these hazards.

Table 3: Hazards and control measures for vegetative waste

Hazard	Control measure
Risk of a manual handling injury	People handling vegetative waste should wear PPE, including gloves, safety glasses and steel capped boots.
Waste becomes a home for vermin and other wildlife	Care should be taken when handling the waste to minimise this risk of receiving a sting or bite. Do not place hands and feet in holes or other areas that cannot be seen. Move waste using bobcats and tippers where possible. Use gloves when manually handling waste.
Airborne pathogens from breakdown of vegetative material during storage/stockpiling or composting.	Care should be taken working with mulch, soils or compost where dust or airborne droplets can be generated.

On-site handling

Green (vegetative) waste should be separated from contaminants and piled onsite where safe and practical. Where appropriate vegetative waste can left to break down naturally. This can be enhanced by chipping large branches and periodic aeration. Large quantities of material will be difficult to handle on site but there may be benefits in chipping on site to optimise transport of materials to a processing or stockpiling site.

Collection

This waste stream should ideally be transported in a fully enclosed vehicle to present leakage or items blowing off piles.

Interim storage

Stockpiles of vegetative waste will start to breakdown. Aerobic degradation produces significant heat and with the right conditions can result piles catching fire. This can be managed through careful monitoring and ensuring materials are not stockpile for extended periods of time without monitoring.

Reuse and recycling

Green (vegetative waste) can be processed into several valuable products such as compost, mulch or woodchips. Logs may be also used as firewood. The suitability of reusing or recycling the material will depend on a range of factors including the:

- level of contamination in the waste with unsuitable items (e.g. plastics)
- availability of facilities and resources in the region to process the waste
- demand for the recovered/recycled products

Disposal

Green (vegetative) waste should be disposed of at a putrescible landfill where it is not practical to reuse or recycle the material.

Further information and resources

Worksafe

- Guidance on working safely with soil, compost and potting mix can be found at worksafe.govt.nz/topic-and-industry/legionnaires-disease/working-safely-with-soil-compost-and-potting-mix/

WasteMINZ

- Landfill guidelines can be found at www.wasteminz.org.nz/pubs/technical-guidelines-for-disposal-to-land-april-2016/

Completed Readiness Activities

- Information on potential facilities, interim storage sites and contractors may be available for your region where readiness activities have been completed using worksheets in the New Zealand DWM Planning Template Tool.

Appendix 4:

Bulky waste guidelines

Bulky waste guidelines

Sources of bulky waste

Large volumes of bulky waste may be generated by disasters including:

- furniture, bedding, cabinets, tables, sofas lounges and chairs
- mattresses, carpet and textiles
- toys, bikes, old tins, empty clean paint tins (with lids removed), scrap iron and car rims (not tyres).

This waste may arise from damaged single or multistorey dwellings, high-rise apartments and office blocks.

Guidance for managing bulky waste

Key hazards

Potential hazards involved with managing bulky waste include risk of a manual handling injury. People handling bulky waste should wear PPE, including gloves, safety glasses and steel capped boots.

There is the potential for contamination of the waste stream with hazardous materials/chemicals, mould (flooded properties) and sewage. Where this is the case, the material should be treated as hazardous and these guidelines do not apply.

Stockpiled bulky waste can be at risk of vandalism including delivberately set fires if accessible to the public.

On-site handling

Some items may be salvageable and can be used again. However, this will be limited by the degree of damage to the item, including whether it has been water-damaged, fire-affected and/or damaged by impact. Remaining items should be piled onsite and separated from contaminants where practical for reuse, recycling or disposal (see sections below).

Collection

If the waste is being collected, where possible it should be clearly marked with a sign post for waste collectors. Bulky waste may be transported in a variety of vehicles including a car, van, utilities vehicle, trailer or truck. The suitability of a vehicle will depend on the volume and state of the waste.

Interim storage

Interim storage facilities may be set up for this waste as it can be stockpiled for extended periods if not contaminated.

Reuse and recycling

Items that are not damaged beyond repair may be suitable for reuse or repair. In the first instance, owners of the items should be given the opportunity to reclaim their property. If the owner does not want the item (or if the owner cannot be identified or contacted), then bulky waste items may be donated or sold via second hand shops. Items that are broken beyond repair may suitable for scrap (such as damaged bikes).

Disposal

Where reuse or recycling is not practical, bulky waste may be disposed to landfill. Landfills should demonstrate that they have appropriate consent to accept specific materials.

Further information and resources

WasteMINZ

- Landfill guidelines can be found at www.wasteminz.org.nz/pubs/technical-guidelines-for-disposal-to-land-april-2016/

Completed Readiness Activities

- Information on potential facilities, interim storage sites and contractors may be available for your region where readiness activities have been completed using worksheets in the New Zealand DWM Planning Template Tool.

Appendix 5:

Food waste guidelines

Food waste guidelines

Sources of food waste

Large volumes of food waste can be generated by a disaster due to power outages and damage to equipment. Potential sources of food waste include:

- damaged food transport vehicles, packing sheds or cold stores
- refrigerators and freezers at residential and commercial properties used to store food, where loss of power has resulted in spoiled food
- packaged or containerised food in supermarkets, shops, markets etc. that is no longer safe to eat. Guidance for managing food waste

Hazards

Potential hazards involved with managing food waste include poorly managed food leading to spread of disease or pathogens, odour from decomposing materials, spillage resulting in slippery working areas, and encourage vermin. Table 5 below provides control measures for reducing and/or removing each of these hazards.

Table 5: Hazards and control measures for food waste

Hazard	Control measure
Poorly managed food waste can create odour and encourage vermin that are capable of spreading disease..	The following safety precautions reduces transmission of disease and pathogens: • Always wear dry, breathable gloves to avoid direct contact with the skin, and to protect yourself from injury while using gardening tools and implements. • Wear protective footwear that covers your skin adequately to avoid direct contact with rotting vegetation and compost, and do not wear them anywhere except outdoors. • When collecting and removing rotting food, always wear a nose and mouth guard or dust mask (e.g. a P3 mask) to avoid inhaling the various spores that can become airborne. • Wash your hands after dealing with rotting food (while this may sound obvious, many forget the potential dangers from poisoning). • If you develop a severe cough or infection of the skin (especially if there is an open sore or puncture wound), seek medical attention immediately, as you may require antibiotics, or a tetanus shot.
Odour from decomposing materials, resulting in potential for amenity impacts and unpleasant for staff handling the waste	Locate composting facilities away from residential areas and other sensitive land uses. Where volumes of food waste cannot be processed in a timely

Hazard	Control measure
	manner leading to health risks, the material should be disposed of to an appropriate landfill.
Spillage with resulting slippery working area, particularly in areas where materials are being de-packaged	Clean up spills immediately, and use signage indicating hazard in working areas.
People taking food that has not been correctly sorted with resulting public health impacts (increased level of disease)	Issue public information on the health risks of spoilt food. Undertake active management of access to unsafe food prior to disposal or processing.

On-site handling

Food waste should be separated from contaminants such as packaging where safe and practical. Generally, commercial fridges and freezers can be commercially cleaned following exposure to spoiled food, residential fridge/freezers, however, cannot be salvaged.

Collection

Food waste should be moved offsite or to an appropriate onsite/nearby composting or disposal location as soon as practical. Ensure that the waste is transported in a fully enclosed vehicle to prevent leakage or items blowing off piles during transport. It may be appropriate to use mobile garbage bins (MGB) and appropriate collection vehicles to allow collection of materials from fridges/cool rooms and then roadside collection for transport to disposal or processing.

Interim storage

Interim storage is not an option for this waste unless it is taken through the conventional composting process. Poorly managed stockpiles or composted waste can lead to rotting and the spread of dangerous pathogens. Seek advice from a composting expert on the requirements for composting.

Reuse and recycling

Food waste can be sent to commercial composting facility.

Disposal

Where recycling is not practical, food waste may be disposed to landfill. Landfills should demonstrate that they have appropriate consent to accept specific materials.

Further information and resources

WasteMINZ

- Landfill guidelines can be found at www.wasteminz.org.nz/pubs/technical-guidelines-for-disposal-to-land-april-2016/

Completed Readiness Activities

- Information on potential facilities, interim storage sites and contractors may be available for your region where readiness activities have been completed using worksheets in the New Zealand DWM Planning Template Tool.