

# HEALTH PROTECTION EMERGENCY RESPONSE POCKET GUIDE

The purpose of this Pocket Guide is to provide technical advice for statutory officers in the field during the response to an emergency. It is drafted to assist with **natural disasters** but the contents are common to all emergencies. The Guide contains a wide variety of information appropriate to protecting public health during a natural disaster.

This Pocket Guide is not intended for use in the response to Communicable Disease, Radiation, Chemical or Biological Emergencies. The local plan for these emergencies should be implemented instead.

The paragraphs are numbered for easy identification and communication. Please suggest any additions, amendments or changes to:

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Environmental & Border Health  
Public Health  
Ministry of Health

As at 1 June 2014

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## Section One: Arrival on site

### 1. Tasks on Arrival on Site

There are three tasks to undertake on arrival at the Emergency site;

- a. conduct a Situational Risk Assessment,
- b. conduct a Resource Assessment, and
- c. start an Event Logbook, see Table One below.

Table One

### **Event Logbook Template (Log)**

A Log is a written record of events and decisions and the time when they happened. It is useful because the Log;

1. provides a chronological record of what happened when, where, why, and by whom,
2. assists a handover by showing events and decisions to date, and
3. is auditable for a number of purposes after the emergency, e.g. training for future emergencies. Always identify and collate 'Lessons Learnt'.

A link to an electronic Log in the Health Emergency Management Information System (Health (EMIS)) appears on p. 10 below.

An example of a hand written Log appears below to offer an example on an emergency site where there is poor electronic and technological support available.

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### **EVENT LOG OF THE RESPONSE TO A FLOOD AT SITE XXX**

Date	Time	Event/Comment	Action	Incident Controller
14 Apr 14	1430	Arrived at site		Me
"	1435	St John arrived	St John treat casualties	Me
"	1506	Establish ICP/EOC		Fire master
"	1515	Assess the site	Me	Fire master
"	1536	Handover Incident Controller		Fire master to Civil Defence

a. **Situational Risk Assessment** – conduct a physical check for the following hazards and adopt appropriate Personal Protective Equipment before entering the site:

1. **Air Quality** - Vapours, Fumes & Dust. A detailed list of Common Airborne Hazards in Emergencies is in Table Two below.

2. **Volcanic Dust** - dealt with in detail in Section Thirteen, p. 68.

3. **Hazards:**

- a. On site hazards such as rubble, hanging branches, and uncovered holes.
- b. Consider the distances from landslides, floods and the high tide mark.
- c. Stormwater/Floodwater. Consider;
  - i. sanitation,
  - ii. communicable diseases,
  - iii. vector control, and
  - iv. contaminants;
    - a. sewage. A Sewage Spill Notification Form is in Table Three, p. 9, and
    - b. hazardous substances, see Section Six, p. 36.
- d. Electric cables:
  - i. Confirm whether electricity in the area is live.
  - ii. Check for broken lines and short circuits where broken lines are in contact with other points of contact. Short circuits can be seen as sparks or heard as a sharp crack.

4. **Recurrence** - consider the likelihood of a **recurrence** of the emergency.

**Common Airborne Hazards in Emergencies**

Table Two

<b>HAZARDS</b>	<b>TESTING EQUIPMENT</b>	<b>COMMENTS</b>	<b>ADDITIONAL COMMENTS</b>
Volatile and Semi volatile organic compounds (VOCs)	PID/FID/IR,  (Not held by Public Health Units)	Chemical poisoning from contaminated water and affected flora. These should be removed to make them safe.	Mainly a problem around industrial sites. If urgently required for drinking/washing water do a head sample on suspected contaminated water areas.
<u>Gases, Vapours and Dust:</u>	4-Gas detector with Lower Explosive Level (LEL) sensor fitted (Not held by Public Health Units)	Underground cellars could contain a build up of gases/vapours particularly in summer heat	Avoid poorly ventilated areas.

Hydrogen sulphide (H <sub>2</sub> S)	N/A	1 hr average @ 0°C 1 atmosphere Note: Unworkable in geothermal areas	Can collect in low-lying areas and enclosed areas from breakdown of organic matter and animal/human waste.
Carbon monoxide (CO <sub>2</sub> )	4-Gas detector	200ppm 15 min 100ppm 30 min 50ppm 60min	<ul style="list-style-type: none"> <li>Anywhere generators/pump equipment is being used.</li> <li>Be aware of gas entering buildings even when outdoors.</li> </ul>
Carbon dioxide (CO <sub>2</sub> )	IAQ meter	Evacuate area when 27400 mg/m <sup>3</sup> is exceeded	<ul style="list-style-type: none"> <li>If emitted slowly can flow down slope and accumulate at low elevations.</li> <li>High percentage required to cause harm.</li> <li>Soil gas emissions pose a risk.</li> </ul>
Sulphur dioxide (SO <sub>2</sub> )	N/A		<ul style="list-style-type: none"> <li>Found at crater rims and downwind.</li> <li>Detected up to 400km downwind.</li> <li>Can build up to high concentrations in valleys</li> </ul>
Oxygen (O <sub>2</sub> )	4 Gas		Oxygen depletion can occur quickly. Record all O <sub>2</sub> whenever taking readings
Smoke	All equipment	Will contain Particulate Matter, Volatile Organic Compounds, Semi – Volatile Organic Compounds, gases etc	<ul style="list-style-type: none"> <li>Record all readings on all equipment used, as many substances and their interaction will be unknown or not immediately identifiable through a Real Time Digital Simulator. This info may be of use in the future.</li> <li>Record also density and colour of smoke</li> </ul>
Dust including Liquefaction	Dust Monitor		Liquefaction contains silica
Household Chemicals	PID/FID/IR		Including paints, varnishes, pesticides – risk in areas where debris has accumulated.

Ionising Radiation	Radiation Meter		<ul style="list-style-type: none"> <li>• Radioactive sources from hospitals and museums.</li> <li>• Most sources will be small.</li> </ul>
Asbestos or Fibrous Materials	(Not held by Public Health Units)	Personal/area sampling if possible	Can be a hazard in areas where debris has accumulated and dried out away from buildings.



Table Three

Sewage Spill Notification Form			
Notifier		Territorial Local Authority (TLA)	
Date Notified		Time Notified	
Date of Spill		Time Discovered	
Phone 📞			
<b>Location and Cause:</b>			
Estimated Quantity (m <sup>3</sup> )			
Rainfall/Weather			
Tide Conditions			
Proposed Sampling?			

<p><b>TLA Proposed Public Health Risk Advice</b> (PHS to review and discuss with the TLA)</p> <ul style="list-style-type: none"> <li> <b>Contact Recreation: Swimming &amp; Windsurfing</b> (Closure &amp; reopening of areas should be sanctioned by the Medical Officer of Health) </li> </ul>	
<ul style="list-style-type: none"> <li> <b>Shellfish Collection:</b> (From start of spill to 28 days after spill is eliminated [allows for viral depuration] Closure &amp; reopening of areas should be sanctioned by the Medical Officer of Health) </li> </ul>	

- b. **Resource Assessment** - assess;
  - 1. people and resources available to support the response, and
  - 2. the scale of the emergency by walking the emergency site to establish the;
    - a. extent of the affected area, and
    - b. scale of public health problems.
  
- c. **People, Tasks and Resources.** The following tasks need to be supported if enough people are available;
  - 1. **Emergency Operations Centre (EOC).** Establish an **Incident Control Point (ICP)** in accordance with the Coordinated Incident Management System (CIMS). The ICP should contain an **EOC**, see Section 2, p.18 to;
    - a. liaise with other EOCs to;
      - i. provide current information on the emergency, and
      - ii. coordinate support for the emergency.
    - b. coordinate the activities of the onsite teams.

**Note:** Local conditions will dictate any amendment to the model.
  - 2. **Control & Administration Team** to man the EOC and coordinate local support for the other teams.
  - 3. **Reconnaissance Team** to walk the emergency site and;
    - a. assess the scope of the emergency, and
    - b. at the same time note and record via GPS if possible:
      - i. Water sources and in particular drinking water, see Section 3, p. 19.
      - ii. Start to develop a Water Management Plan, see p. 27.
      - iii. Food - local sources of uncontaminated food and how to secure them.
      - iv. Shelter - sites with secure protection against the elements and possible sites for Welfare Centres.
      - v. Sanitation - local resources and waste water.
      - vi. Solid waste.
      - vii. Communication options.
  - 4. **Immediate Response Team** to interact with the community.
  
- d. The **Tasks and Functions** remain unchanged if no one else is on hand. The EOC is established in a compressed structure. It may be just one person with a mobile or satellite phone, see Table Five, p. 14. Walking the ground should precede any immediate response in order to;
  - 1. gain an over view of the situation,
  - 2. assess resources, and
  - 3. allocate a priority to tasks.

e. **Health Emergency Management Information System.**

1. Electronic reporting can utilise the **Health Emergency Management and Information System (Health EMIS)** specifically designed to coordinate emergency management information and documents, available at [www.healthemis.govt.nz](http://www.healthemis.govt.nz).
2. Each District Health Board (DHB) and Public Health Unit (PHU) has their own portal and can run the emergency within their own portal.
3. Log onto Health EMIS via MY LOGON \_\_\_\_\_  
PASSWORD PROMPT \_\_\_\_\_ (remember it and do not record it here).
4. HealthEMIS provides a secure database that includes up to date Ministry documents and forms, including:
  - a. Situation Reports (SitReps),
  - b. Incident Action Plans,
  - c. EOC announcements
  - d. Requests for information and other tasks, and
  - e. Event logs and document repository, e.g. press announcements and contact tracing information.
5. Situation Reports will be filed at pre-determined times. They may be filled out manually using a standard template in the event of a power outage or technological dead spot. A template for a SitRep is in Table Four, p. 13.

f. **Emergency Response Field Communications.** Statutory Officers should establish and maintain voice and data communications when deployed to remote sites or ad-hoc EOCs. They should provide voice communication out of the emergency site without reliance on local infrastructure, via one of the following **communication systems**:

1. **Communications**

Communications Systems	Comments
Satellite Phone	<p>All DHBs and PHUs maintain centrally issued Iridium handheld satellite phones pre-programmed with issued health numbers. CDEM and emergency services also use satellite phones. Satellite phone calls to mobile or land line phones are more likely to succeed because a call to another satellite phone requires <b>both</b> phones to have a satellite signal.</p> <p>Satellite phones offer a resilient network but;</p> <ol style="list-style-type: none"> <li>1. need practice to operate successfully,</li> <li>2. are ineffective in buildings unless mounted on a base set, and</li> <li>3. permit voice communication only.</li> </ol>

	<p><b>Operating Instructions:</b> see Table Five below</p> <p><b>Note - The NZ emergency number 111 cannot be called from a satellite phone. Instead, call the Rescue Coordination Centre 00 64 4 577 8030.</b></p>
VHF/UHF Radio	<p>Provides local communication and may also provide liaison channels with CDEM and emergency services.</p> <p>Need to understand whether the system is line of sight, repeater based or a trunked network. Trunked networks may enable inter -district communication depending on damage to infrastructure.</p>
Satellite Broadband	<p>Provides data access at higher cost. A number of health agencies have systems and high capacity systems are installed on Fire Service command units and some Civil Defence Emergency Management groups.</p>
Laptops & Portable Devices	<p>Configured and able to access the internet and corporate networks via a range of communication systems.</p>
Mobile Phones	<p>Simple and effective within mobile phone cover.</p>

Phonetic Alphabet			
Alpha	Kilo	Uniform	0 Zero
Bravo	Lima	Victor	1 Wun
Charlie	Mike	Whiskey	2 Too
Delta	November	X ray	3 Tree
Echo	Oscar	Yankee	4 Fower
Foxtrot	Papa	Zulu	5 Fife
Golf	Quebec		6 Six
Hotel	Romeo	. Decimal	7 Seven
India	Sierra	. Stop	8 Ait
Juliet	Tango		9 Niner

- 24 Hour Clock.** Emergency Services work on the 24 hour clock for precision. Add twelve hours on to the time after noon, so 3 pm becomes 1500 hrs, for example. The date precedes the time written in full, so 3 pm on 12 August becomes; 1500 12 Aug 2015.
- NATO Phonetic Alphabet.** Communication may be improved by spelling words and numbers using the NATO Phonetic Alphabet below:

Table Four

**Recommended content for a situation report (SitRep)**

Name of field	Comments	Example
CC	CC issuing the SitRep (include agency)	NZFS Mackenzie District EOC
Type of report		SitRep
Report number	Include a hash (#) and include enough digits for maximum required for incident	#002
Incident	Type of incident and location, and time	Tekapo flood April 2013
Date and time issued		2013-04-30 0600
Period covered	Date/time SitRep covers (start and finish)	2013-04-29 0500 to 2013-04-29 1700

**Main body**

Name of field	Comments
Summary of incident	
Actions carried out	
Predicted incident progression	How this situation is anticipated to evolve – causal factors, consequences, and response
Resources in place	
Resources required	These need to be requested on separate “resource request” form
Limiting factors	Anything that is, or is likely to affect the effectiveness of the response
Assessment	Any critical issues or assumptions made
Options	Outline major options for action that are being or have been considered
Intended actions	Outline significant actions intended in current and subsequent operations

**Approval and distribution**

Name of field	Comments
SitRep prepared by	Name (and rank if applicable), response role, signature, and contact details
SitRep approved by	Name (and rank if applicable), response role, signature, and contact details
Distribution	Include CIMS functions, partner agencies and representatives at the CC Consider including partner agencies not represented at the CC and external Liaison.
Next SitRep due at	Date and time

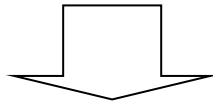
**Operating Instructions for an IRIDIUM 9505 Satellite Phone or similar**

1. The antenna is the black rod at the rear of the phone. Rotate the antennae until it clicks into the vertical position and extend it. The antenna needs to be oriented skyward and fully extended when making a call. It needs a clear view of the sky from horizon to horizon because satellites take approximately 15 minutes to track across the sky.
2. Open the front of the leather carry case to reveal the number pad and LED screen. Press the Red ON/OFF button at bottom left of number pad to turn the phone on. Hold the button down for 2 seconds. The LED screen light should light up and read: IRIDIUM - Welcome – Searching – Registered - Iridium.
3. Go back to Serial 1 above if the LED screen reads ‘Check Signal Location’. The phone may not work inside a building without an auxiliary antenna outside - see kit for the auxiliary.
4. Use the accompanying battery charger to recharge the battery if the LED screen doesn’t light up because the battery is flat, see Table Six, p. 15.
5. Dial the Number: Use the full international dialling code. Start with the International Code which is 0064, then the area code without the “0”, then the desired number, thus Sally Gilbert’s phone in the Ministry of Health becomes: ‘0064 4 8164345’.
6. Then press the green OK button at the top right of the number pad. The Red “C” button at the top left of the number pad clears the last digit or if held down for 2 seconds clears the LED screen.
7. To dial a Speed Dial Number (see table below), hold the desired number for 2 seconds and it will dial automatically.
8. Finish the call. On completion of the call push the green “OK” button.
9. Press the Red “ON/OFF” button to turn the phone off after use.

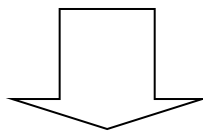
<p><b>Example of a SAT PHONE – PHU 1 008 816 214 338 59</b></p> <p>Free text can be sent to the satellite phone from a computer using Outlook Express. The subject line is not transmitted, only the body of the email. This will reach the officer in the field who will ring back the initiator.</p> <p>Address is: <b><u>881621433859@msg.iridium.com</u></b></p>	<b>Speed Dial Number</b>	<b>PHU Phone Unit Number</b>	<b>SAT PHONE Location</b>
	<b>1</b>	<b>PHU 1</b>	
	<b>2</b>	<b>PHU 2</b>	
	<b>3</b>	<b>PHU 3</b>	

**SATELLITE PHONE  
BATTERY CHARGE CHECK GUIDE USING THE BATTERY METER**

Switch Phone On

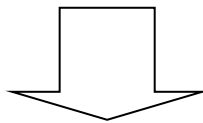


Press MENU



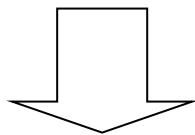
Scroll to - Call Related Features

Press OK

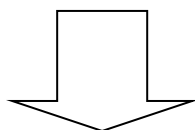


Show Battery Meter

Press OK



Battery Meter Display, dark shading shows amount of charge left.  
If less than 50%, discharge and recharge.



To Quit

Press and Hold "C"

## Public Health Unit Satellite Phone Numbers

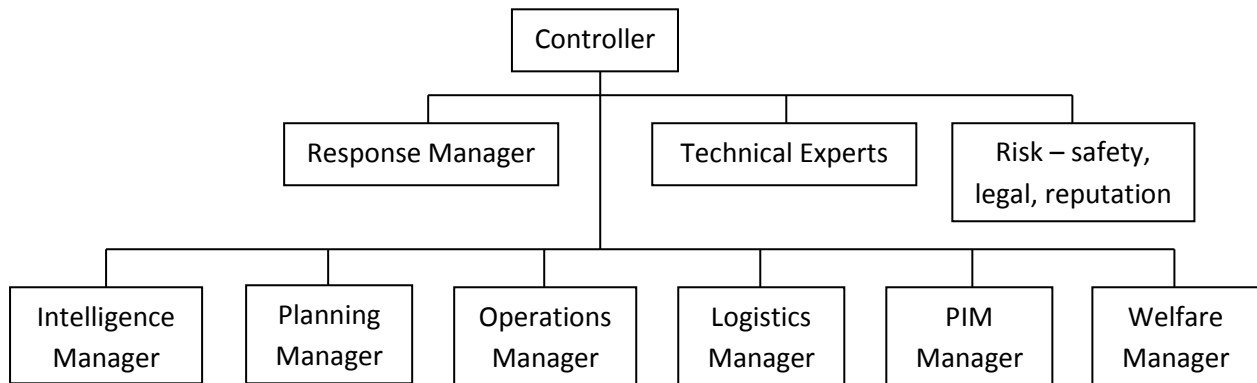
Public Health Unit	Caller Id	Memory location	Full number	Base/ Portable
Auckland Regional Public Health Service (ARPHS)	AKPublicHealth1	146	8816214 33876	Portable
	AKPublicHealth2	147	8816214 33874	Base
	AKPublicHealth3	192	8816 224 32920	Portable
Community & Public Health Canterbury	C&PH Christchurch1	148	8816214 33873	Portable
	C&PH Christchurch2	149	8816214 33871	Base
Community & Public Health West Coast		191	881622 432 619	Portable
Hawkes Bay	Hawke's Bay PHU1	150	8816214 33869	Base
	Hawke's Bay PHU2	151	8816214 33867	Portable
Mid Central	MidCentral PHU1	152	8816214 33865	Portable
	MidCentral PHU2	153	8816214 33863	Base
Nelson Public Health Service	NelsonMarl-PHU1	154	8816214 33859	Wairau Base
	NelsonMarl-PHU2	155	8816214 33857	Portable (Nelson)
	NelsonMarl-PHU3	156	8816214 33856	Portable (Nelson)
	NelsonMarl-PHU4	157	8816214 33853	Portable (Blenheim)



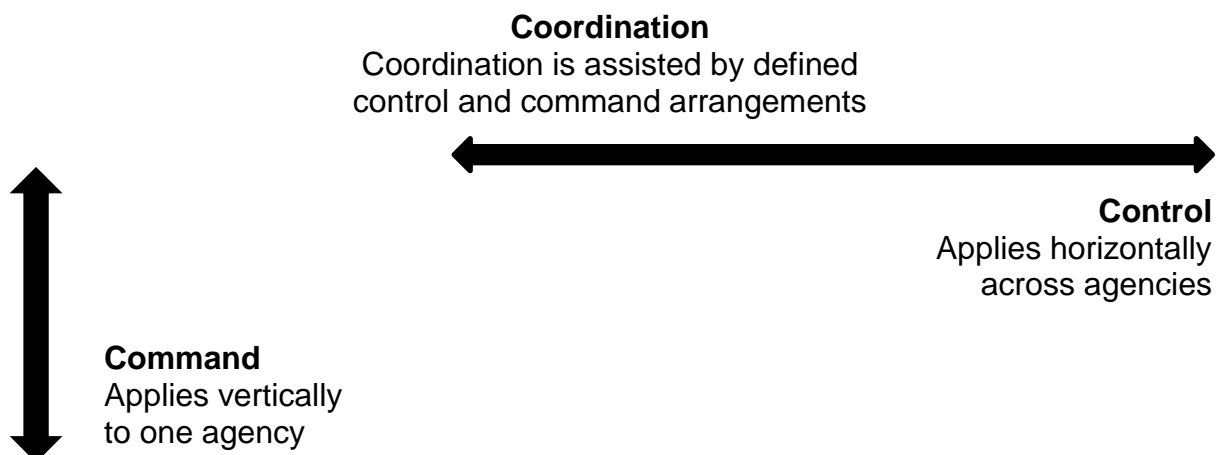
	NelsonMarl-PHU5	190	881622449789	Portable (Blenheim)
Public Health South Dunedin	PubHealSthPHU1	160	8816214 33848	Dunedin
	PubHealSthPHU2	161	881621433847	Queenstown
Regional Public Health, Hutt Valley	RPH HuttValley1	162	8816214 33846	Portable
	RPH HuttValley2	163	8816214 33844	Base
Tairawhiti Gisborne	Tairawhiti PHU1	164	8816214 33843	Portable(with DHB Emergency Planner)
	Tairawhiti PHU2	165	8816214 33841	Base
Taranaki	Taranaki PHU1	166	881621464373	Portable
New Plymouth	Taranaki PHU2	167	881621464368	Base
Toi Te Ora PHS, (BOP & Lakes Health Districts)	Toi Te Ora PHU1	168	8816214 33836	Base (Tauranga)
	Toi Te Ora PHU2	169	8816214 33821	Portable (Rotorua)
Health Waikato	Waikato PHU1	170	8816214 33834	Portable
	Waikato PHU2	171	8816214 33833	Base

## Section Two: Command & Control

2. **Coordinated Incident Management System.** A simple Coordinated Incident Management System (CIMS) model for emergency management appears below along with the functions, derived from CIMS Manual Version 2, [www.civildefence.govt.nz](http://www.civildefence.govt.nz). The function colours are adopted universally for consistency. The explanation of the terms Coordination, Command and Control are shown in the third diagram below.



Function	Responsibilities
Control	Coordinates and controls the response
Intelligence	Collects and analyses information and intelligence related to context, impact and consequences; also distributes intelligence outputs
Planning	Leads planning for response activities and resource needs
Operations	Provides detailed direction, coordination, and supervision of response elements on behalf of the Control function
Logistics	Provides personnel, equipment, supplies, facilities, and services to support response activities
Public Information Management	Develops and delivers messages to the public, directly and through the media, and liaises with the community if required
Welfare	Coordinates the delivery of emergency welfare services and resources to affected individuals, families/whanau, and communities



## Section Three: Water

### 3. Water

#### a. Minimum Requirements for Planning:

The minimum volume of daily water for **all purposes** is:

	<b>Litres</b>
One Person	20
Health Care Facility unit per casualty	40 – 60 per in patient 5 per out patient 100 per surgical case
Civil Defence Centre per person	30
One tap per 250 people	

The volume of drinking water required for one person increases by 4 litres per day in hot conditions or where heavy, manual labour is being undertaken, so these figures are a guide only.

When drinking water is in short supply use alternative sources for non essential purposes (e.g. washing in streams or rivers).

b. **Drinking Water.** Water must be safe to drink. It should be pleasant to drink if possible and it must be available in adequate quantities. People can exist for days without food but cannot live for long without water, especially in hot weather. There are two parts to providing safe drinking water;

1. finding the water and then assessing the risk to the safety at the source, and
2. management of the risk by treatment of the water.

#### c. Water Sources.

1. **Water Authority Reticulations** may be adequate to supply the volume required but they must be checked to ensure the;
  - a. catchment is not polluted,
  - b. treatment plant is working correctly, and
  - c. reticulation system is not broken
2. **Private Systems** may belong to dairies, food plants or private premises and should be checked as above.
3. **Springs and Wells (Ground Water)** are less subject to contamination than surface water and may need no treatment except disinfection. Protect recharge zone and wellhead from human and animal pollution.

4. **All Surface Water** should be treated as contaminated. Draw water from;
  - a. either upstream of likely contamination sources, or
  - b. as far away downstream as possible, and
  - c. protect source water and catchment from human and animal pollution.
- d. **Assess the Risk to the Water** - Find new sources of water if required and record the location on GPS. Assume all water is contaminated until shown to be otherwise and purification will be required. It is unlikely that laboratory services will be useful or even available in an emergency.

See 'Guidelines for the Assessment of Risk to Drinking Water' at Flowchart One, p.24.

- e. **Water Risk Assessment after Volcanic Activity.** A Flowchart for Water Risk Assessment after Volcanic Activity is at Flowchart Three, p. 26.

- f. **Treatment of raw water.**

1. **Remove particulates**

- a. Let sediment settle if time allows, but this will take at least twelve hours.
- b. Coagulate (if chemicals available) – jar test to estimate doses.
- c. Add alkali\* before coagulant.
- d. Add coagulant (e.g., alum).
- e. Stir gently to form flocs.
- f. Stop stirring and allow flocs to settle.
- g. Draw off clear water.
- h. Filter, or
- i. Pass water through fine weave cloth, or
- j. If storage is available, filter the water through a swimming pool pump.

**Note:** \* Alkalis: lime, sodium bicarbonate (baking soda) or, sodium carbonate (soda ash). Optimum pH after coagulant addition is about 7.0.

2. **Chemical Risk** - toxic agents not susceptible to boiling.

- a. Avoid use of untreated water for drinking, food preparation, oral hygiene, bathing, showering.
- b. The untreated water may be acceptable for flushing toilets, washing clothes.

3. **Treatment**

- a. Boil water for 1 minute or until the cut out switch in an electric kettle activates, or
- b. Chlorinate. See below and 'Guidelines for Field Water Chlorination' at Flowchart Two, p.25, or

- c. Individual use of 'sterilising' tablets containing **iodine**. Add two drops of tincture of iodine to 600 ml of water and leave standing for 30 minutes.

**Note:** Tincture of iodine is available from pharmacies. Do not use for more than seven days in case of an iodine overdose.

#### 4. Chlorine Dosing

- a. For 1000 litres the quantities to dose at 5mg of chlorine/L are:

- |                              |                 |
|------------------------------|-----------------|
| i. 4% available chlorine     | 125 ml or 125 g |
| ii. 12.5% available chlorine | 40 ml or 40 g   |
| iii. 65% available chlorine  | 8 ml or 8 g     |

**Note:** 30 ml/30 g = approximately 1 fl oz/1 oz

- b. Read product container labels for available chlorine levels.

- i. Plain household bleach, approx 4% (40,000 mg/l)\*
- ii. Liquid swimming pool or dairy factory chlorine approx. 12.5% (125,000mg/l)
- iii. Granular swimming pool chlorine approx. 70% (700,000 mg/kg)

**\*Note:** Domestic bleaches recommended by manufacturers are;

1. Budget Bleach Regular and Budget Bleach Extra Strength, sold at Foodstuffs' New World and Pak'n'Save supermarkets. Budget Bleach Lemon should not be used because it contains lemon fragrance.
2. Clor-o-Gen bleach sold at most Foodstuffs supermarkets.
3. DO NOT USE Janola as it contains detergents.

#### g. Storage of Treated Water

1. **Containers** for treated water should be;

- a. clean,
- b. have covers,
- c. above ground,
- d. in a cool position,
- e. cleaned periodically, and
- f. mosquito proof.

#### 2. **Advice on Domestic Drinking Water Storage.**

- a. A supply of at least three litres per person per day for three days is recommended.
- b. DO NOT USE plastic milk bottles as the milk protein can't be removed by washing and can cause bacterial growth.
- c. Wash bottles for storing water thoroughly before use. Fill each bottle until it overflows so no air is trapped.

- d. Label each bottle with dates showing when the bottles were filled and when they need to be refilled.
- e. Check the bottles every six months, e.g. at the beginning or end of daylight saving. Throw the water out if is murky and refill clean bottles with clean water and bleach.
- f. Store the bottles away from direct sunlight in two cool, dark places that are unlikely to be flooded.
- g. Alternatively, fill plastic ice cream containers with water, cover, label and keep in the freezer. These can help keep food cool if the power is off and can also be used for drinking.
- h. Keep a supply of ice cubes and fruit juices.
- i. Water treated with bleach can be stored for **12 months**.
- j. Tap water from a reticulated supply without adding bleach can be stored for **6 months**.

h. To **Transport Treated Water** into a disaster area make sure the;

- 1. water is safe, and
- 2. containers (jerry cans, tankers etc) are clean and unlikely to taint the water.

**Note:** The ideal tankers to use are those registered for purpose under the Health Act (1956). AVOID railway tank cars, fire tankers, trade waste tankers and road construction tankers, which may have chemicals added to their tanks when used in their normal roles.

i. **Water Mains/Hot Water Systems**

- 1. A reticulated water system must be flushed and disinfected before reuse if it has been contaminated. The domestic water pipes must also be flushed and disinfected.
- 2. All hot water tanks and other water tanks must be emptied and disinfected if they have received contaminated water.
- 3. Obtain a plan of the reticulation system when flushing the mains to ensure a thorough process and identification of dead ends.

j. A **Water Supply Source Proforma** (Table Eight, p. 23) should be completed for each water source and added into the Water Management Plan, p. 27

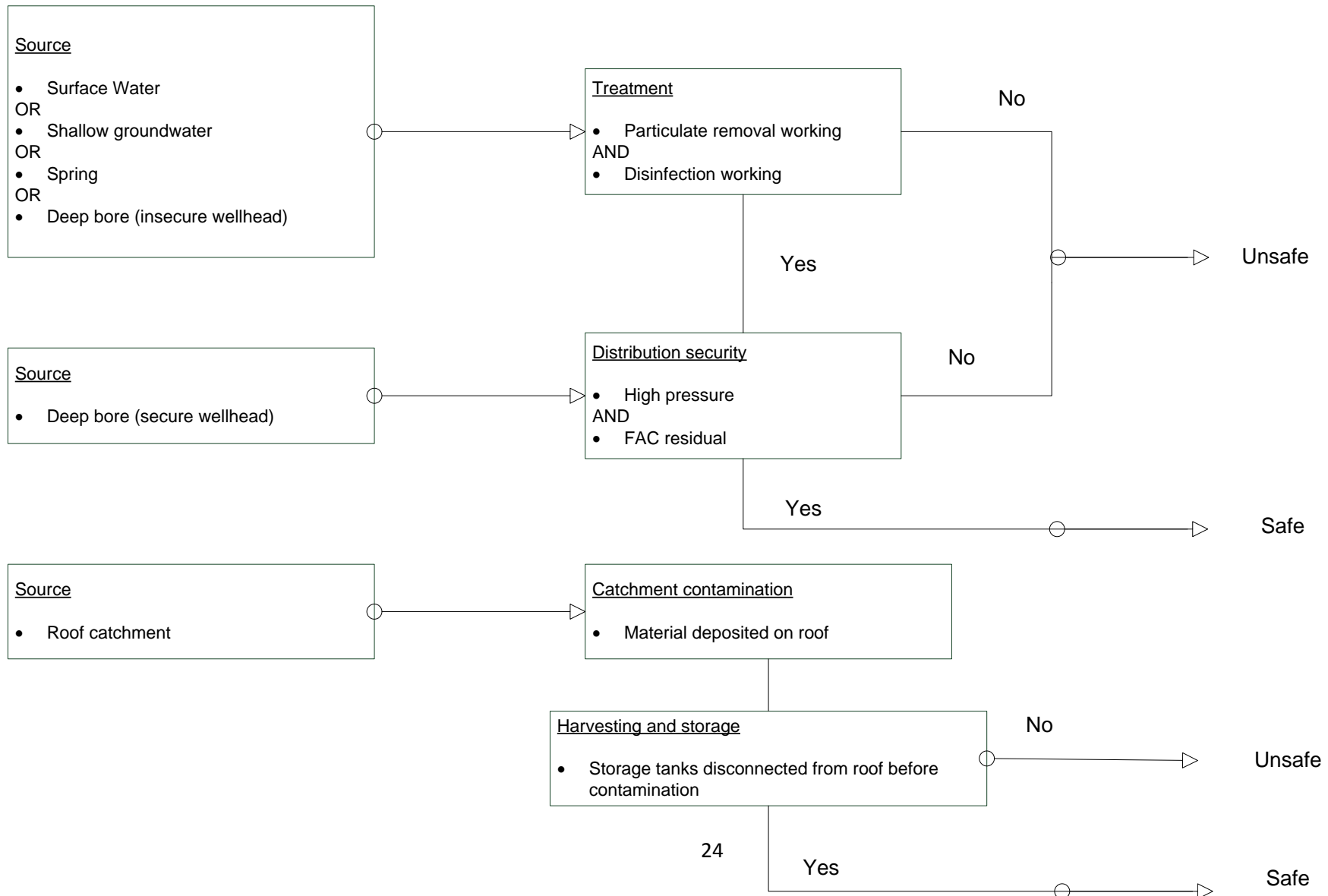
k. **Recreational Water/Shellfish Gathering**

- 1. Water contaminated by human or animal excreta may contain a range of pathogenic microorganisms. Ill health from contaminated recreational water is minor and short lived in most cases, but the potential for more serious gastrointestinal diseases exists.
- 2. The Ministry of Health and Ministry for the Environment National Recreational Water Guidelines for Bathing & Shellfish Gathering provide a guide. An Action and Indicator Table has been adapted from the Guidelines (Table Ten, p. 29).

Table Eight

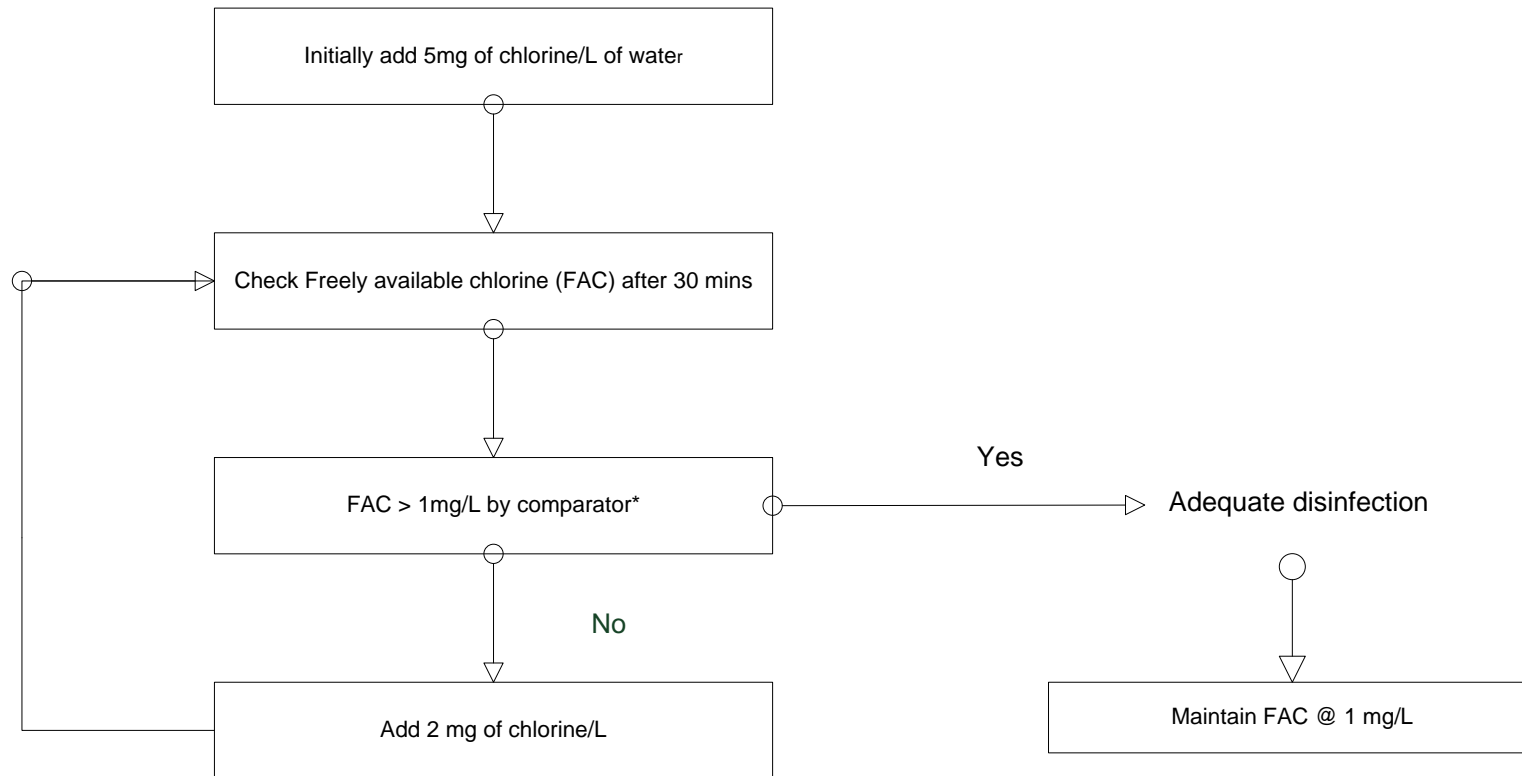
<b>Water Supply Source Proforma</b>	
Types of Premises:	
Address of Premises of Source of Water:	
Owner or Occupant - Name:	
Address:	
Phone:	(A/H)
Purification System:	
Water Treatment:	
Damage to Treatment Facilities:	
Water Cartage Vehicles Available: number and size?	
Stream; Creek; Bore Hole; Well; Tank; Reservoir; Dam:	
Water Polluted (if so how)?	
Remarks:	
Date:	
Inspected By:	

Guidelines for the Risk Assessment of Potable Water

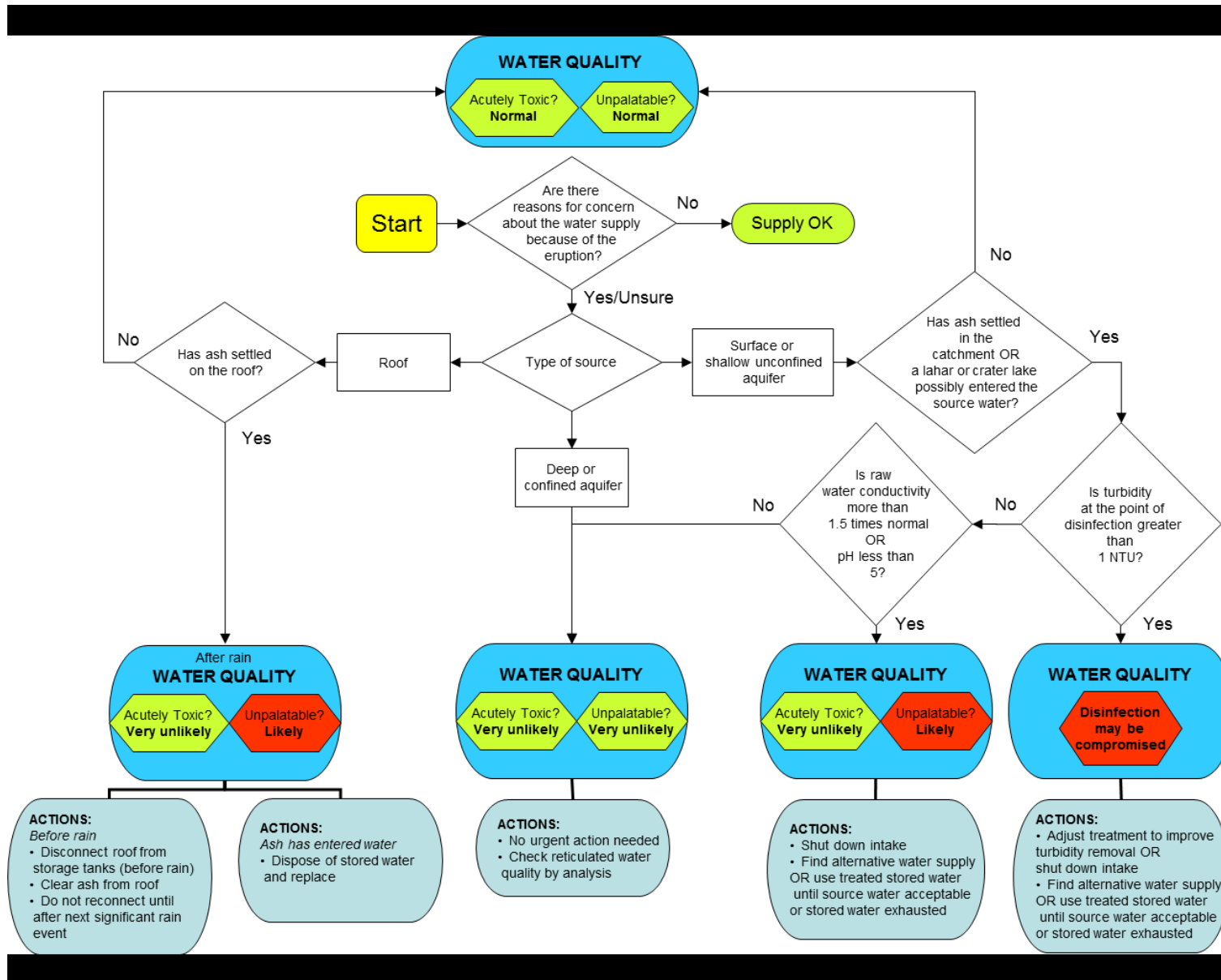




Guidelines for Field Water Chlorination



\*Available at local swimming pool



I. **A Water Management Plan** is a comprehensive record of all the data to hand on water. It may be on a white board, it may be mind mapped, but a written record should be kept for the log. Photographs of a white board Water Plan will suffice for the Event Log. An example of a Water Management Plan appears below at Tables Nine A & B. Please note Table Nine A is supported by Table Nine B, the readily visible snapshot supported by the technical data. Merging the two is ideal.

Table Nine A

Town A Water Management Plan Map

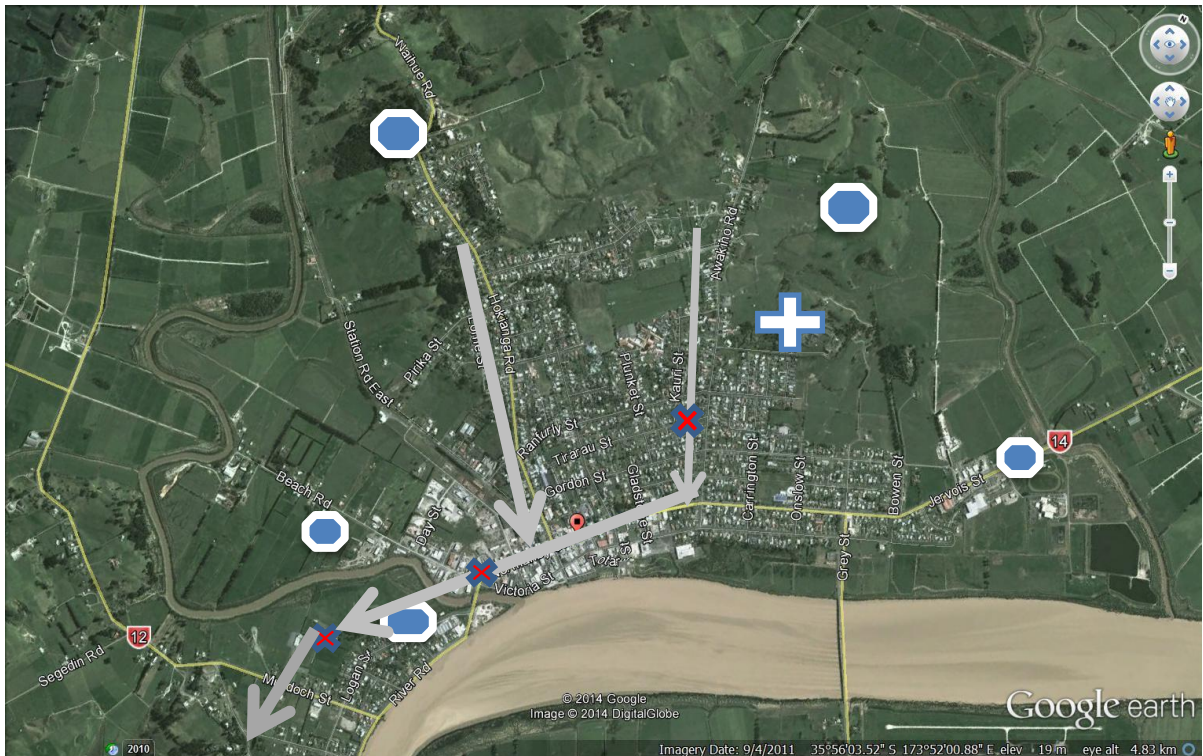


Table Nine B

Waste Management Plan Data

<b>Water Sources</b>					
Serial	GPS	Source	Volume	Status	Remarks
1	12345678	Dairy Factory	20,000	Potable	
2	23456789	Truck Wash Down	2,000	Potable if treated	Available 0900 tomorrow
3	34567891	Town reservoir	100,000	Under test	Results due 0900 today
4	45678912	Farmer's tank	1,000	Potable if treated	Available 0900 tomorrow
5	56789123	Racecourse	10,000	Potable	
<b>Critical for supply</b>					
Priority	11112222	Hospital		42 pax	5,000 litre reserve
<b>Wastewater: direction to treatment shown by grey line. Treatment plant off Map.</b>					
1	98765432	Broken wastewater line			Repaired by 1400 today
2	87654321	Broken wastewater line			Repaired by 1600 today
3	76543219	Broken wastewater line			Repaired by 1900 today
<b>Miscellaneous</b>					
Wastewater treatment plant undamaged					
8 tankers available at Fred's tankers 027123456					

Table Ten

**Recreational Water Guidelines for Bathing & Shellfish Gathering**  
Based on Microbial Water Quality Guideline's for Marine and Fresh Water  
Bathing Areas – MoH & MoE 2003

<b>Fresh Water Bathing Guide: E. Coli/100ml</b>		
<b>GREEN</b>	<b>AMBER ALERT</b>	<b>RED ACTION</b>
<p>No Alert</p> <p>Normal sampling regime</p>	<p>Single sample exceeds 260</p> <ul style="list-style-type: none"> <li>Consider explanation for exceedance.</li> <li>If no obvious explanation re sample asap otherwise continue with normal sampling regime</li> </ul>	<p>Single sample exceeds 550</p> <ul style="list-style-type: none"> <li>Discuss with relevant authorities</li> <li>Implement public health action and warnings</li> <li>Maintain surveillance and sampling until return to green or amber</li> </ul>

<b>Marine Water Bathing Guide: Enterococci/100ml</b>		
<b>GREEN</b>	<b>AMBER ALERT</b>	<b>RED ACTION</b>
<p>No Alert</p> <p>Normal sampling regime</p>	<p>Single sample exceeds 140 but less than 280</p> <ul style="list-style-type: none"> <li>Continue with normal sampling regime</li> </ul>	<p>2 consecutive samples exceed 280</p> <ul style="list-style-type: none"> <li>First red requires immediate resampling and then again the next day</li> <li>Second Red sample Discuss with relevant authorities</li> <li>Implement immediate public health action and warnings. Maintain surveillance and sampling until return to green or amber</li> </ul>

<b>Recreational Shellfish Gathering bacteriological MPN Faecal Coli forms/100ml</b>
<ul style="list-style-type: none"> <li>The median faecal coli form content of samples taken over a shellfish gathering season shall not exceed a Most Probable Number (MPN) of 14/100ml, and not more than 10% of samples should exceed an MPN of 43/100ml (using a 5 tube decimal dilution test).</li> <li>These guidelines should be used in conjunction with a sanitary survey.</li> </ul>

## Section Four: Wastewater

### 4. Wastewater Management

- a. **Introduction.** Wastewater comprises 98% water plus a range of solids from domestic and industrial sources. Waste water should be removed from the emergency site as soon as possible because of the risk it poses to public health. Wastewater is generally referred to as;
1. **grey water**, which comprises waste water from baths, showers, washing machines, but not kitchen waste water,
  2. **black water** from toilets and urinals,
  3. **storm water** - surface runoff from rain, and
  4. **flood water** - overflow from local waterways.
- b. **Grey Water Management.** A modern portable pump weighs around 90 kg and pumps 2,000 litres/minute. This type of pump is usually held by the New Zealand Fire Service, or may be available from a local Hire Centre. Grey water may be;
1. pumped to an existing water course if does not contain toxins, or
  2. removed via tankers.
- c. **Black Water/Sewage Management.** Sewage management presents several challenges in an emergency;
1. disposal of sewage to prevent disease and the development of nuisance conditions at the emergency site,
  2. provision of enough toilets to meet local demand when many may be damaged, and
  3. establishment of temporary latrines, and supporting ablutions if possible.
- d. **Sewage** may be;
1. taken away by tanker, or
  2. stored in suitable containers if available, or
  3. pumped to temporary settlement ponds at least five hundred metres away and downwind from the emergency site. The ponds should have capacity to hold adequate sludge, and enough run off for the dissipation of fluid. The system should be fenced off to stop passersby accidentally damaging the system or falling in.
- e. **Storm & Flood Water Management.** The challenge in the management of storm and flood water is having enough fall for the water to escape to existing water courses. Pull back from the low lying water to a secure area well above the site if the emergency is escalating, and wait for the storm and flood water to subside.
- f. **Provision of Latrines to meet Local Demand.** Possible solutions to meet local demand for toilets in an emergency include;
1. existing **septic tank systems** from destroyed houses. The installation of a toilet above the inlet together with a water supply and suitable screening will provide a perfectly adequate toilet. Mark the site of existing septic tanks,

effluent lines and transport beds before reconstruction so they can be avoided. Septic tank systems in camp areas may fill quickly. Regular pumping out of the tank is necessary.

2. **chemical or portable toilets.** Provision must be made for the;
  - a. collection, storage and disposal of wastes, and
  - b. appointment of people to maintain and clean portable toilets.
3. **temporary household latrines** can be made using buckets and plastic bags, or long drops dug in the back garden. Instructions and diagrams are on Table Eleven, p. 32. People should be encouraged to pass liquid waste into urine pits dug away from the temporary toilets so only faeces and sanitary material goes into the plastic bags. Plans must be implemented for the collection and removal of these rubbish bags in the emergency site.

**g. Considerations for the Establishment of Temporary Latrines for Groups of More than 20 People:**

1. Latrine management is a full time EOC function!
2. Latrines should be sited so that they cannot pollute water supplies, including ground water. They should be 50 m from a water source.
3. Identify critical sites for latrines to support;
  - a. residents requiring disabled access, or
  - b. local latrines because they cannot access community facilities,
  - c. residential care providers, and
  - d. primary care providers.
4. It is difficult to re-locate portaloos once distributed.
5. Portaloo suppliers will work street to street unless directed otherwise.
6. Latrine locations need to be recorded via GPS and integrated with CDEM run fault reporting / issues line.
7. Hand washing / sanitation
8. Outbreak protocol, especially for shared street latrines.
9. Consider provision of lighting and security
10. Portaloo vs personal toilets vs other arrangements
11. Each latrine must be provided with dry toilet paper and facilities for hand washing. Ensure that the hand washing system is not wasteful and does not create litter. Best practice at present is to use Alcohol Gel.
12. Use soap and water only in the absence of Alcohol Gel, not antiseptics. Antiseptics kill the bacteria that break down the faeces. Plan how to dispose of the used water.
13. Latrines must be maintained and serviced regularly to maintain good sanitation.
14. Planning data for Temporary Latrines appears below;

<b>Planning for Temporary Latrines</b>	
Number	1 per 20 people
Distance	Maximum distance from dwelling to latrine is 30 meters Maximum distance from water to latrine is 100 meters
Short stay	Max 3 days

Longer stay	Over 3 days
Latrine waste	1 disposal site per 500 people measuring 2 x 5 x 2 metres
Urine disposal	Urinals and soak pits
Soap	Two and a half bars of soap per person per month
Alcohol Gel	One 500 ml bottle per person per week

Table Eleven

### **How to Make a Temporary Latrine**

- a. Line a bucket or rubbish bin with a strong, leak-proof plastic bag.
- b. Put half a cup of liquid bleach in the bag.
- c. Make a seat from two planks of wood or use a toilet seat on top of the container.
- d. Keep the bin completely covered when not in use, to prevent attracting flies.
- e. Tie the top of the bag firmly when full and place it inside another bag.
- f. Dig a hole well away from the vegetable garden and downhill from any water source and bury the bag.
- g. Make sure the bag is well covered with dirt.
- h. Wash your hands thoroughly after going to the toilet or handling human waste.

### **How to Make a Long-Drop Latrine**

- a. Dig a hole up to 1 metre deep well away from the vegetable garden and any water source.
- b. Make a seat out of planks of wood.
- c. Cover the waste properly with dirt after each use.
- d. Throw in a little garden lime, insecticide or disinfectant to reduce smells and flies.
- e. Use the long-drop until it is full to within 300 mm of ground level.
- f. Cover completely with soil and dig a new long-drop.
- g. Wash your hands thoroughly after going to the toilet.



## Section Five: Waste

### 5. Waste Management

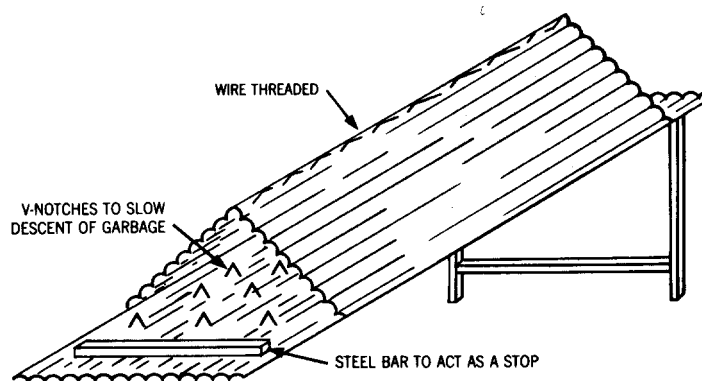
a. **Rubbish Collection.** Poorly managed rubbish attracts vectors and pests. The key to rubbish collection is to make it obvious and accessible.

b. **Rubbish Collection Points** should be;

1. clearly identified with signs,
2. well lit,
3. located where the need is great and they will be used,
4. away from accommodation, food preparation and water points,
5. down wind,
6. large enough to contain an adequate number of skips on a hard surface, and
7. serviced by a covered vehicle to remove the rubbish.

c. **Rubbish Disposal.**

1. Rubbish should be removed to the usual rubbish depot and covered.
2. Separate and handle separately biodegradable waste and indestructible waste to minimise disposal requirements.
3. Make sure fridges, freezers and gas cylinders have been degassed and doors and locks have been removed.
4. If the existing rubbish depot is unavailable, rubbish should be buried in a pit one metre deep, or burned in an incinerator. A diagram of an inclined plane incinerator appears below.



**Inclined Plane Incinerator  
1 per 75**

d. **Appropriate Disposal of Dead Animals** is important because;

- a. decomposing animals are a source of bacteria and other organisms, salmonella, streptococcus and tuberculosis,
- b. decomposing animals attract vermin,

- c. poor carcass disposal can result in contamination of groundwater and waterways, and
- d. the sight and smell of dead animals will distress the victims of the emergency.
- e. **Dead Animals** can be disposed of by;
  - 1. burial, or
  - 2. offal pits, or
  - 3. composting can be used in areas with a high water table with little risk of contamination. Carcasses are completely broken down within months, including bones. The high temperatures (around 70°) generated by the composting process destroy pathogens and prevent fly incubation, or
  - 4. removal off site, or
  - 5. incineration is the last resort method of disposal. Use an incinerator if possible or otherwise use a shallow pit with wood in the bottom and the carcass on top. It may be necessary to use an accelerant to get the fire up to the very high temperatures required to burn a carcass. Do not use tyres as a fuel to burn the animal, as it will produce a dark and toxic smoke.

**Note:** The advantages and disadvantages of each method of disposal except removal off site are explained in Table Twelve, p. 35.

- f. The **Principles of Dead Animal Management** are:
  - 1. dispose of the animal as soon as possible to reduce risk of disease spread,
  - 2. utilise dead stock collection services if available - there is a collection fee for this,
  - 3. remove dead stock from public view where possible.
  - 4. the carcass must not be left within either 45 m of accommodation or 50 m of a water source, and
  - 5. keep dead animals out of waterways.

Ask for an agent from the Ministry of Primary Industry to attend the emergency site if at all in doubt, or a local veterinarian.

**Dead Animal Disposal - Advantages and Disadvantages of Different Options**

<b>Disposal option</b>	<b>Advantages</b>	<b>Disadvantages</b>
Burial	<ul style="list-style-type: none"> <li>• Simple</li> <li>• Cost effective</li> <li>• Out of sight</li> </ul>	<ul style="list-style-type: none"> <li>• Do not use if water table is high</li> <li>• Predator and vermin control necessary</li> <li>• Not within 50 m of a waterway</li> </ul>
Offal Pits	<ul style="list-style-type: none"> <li>• Simple</li> <li>• Cost effective</li> <li>• Easy to manage</li> <li>• Out of sight</li> </ul>	<ul style="list-style-type: none"> <li>• Do not use if water table is high</li> <li>• Most efficient with small numbers often</li> <li>• Predator and vermin control necessary</li> <li>• Not within 50m of a waterway</li> </ul>
Composting	<ul style="list-style-type: none"> <li>• Can use in a high water table</li> <li>• Useful product generated</li> <li>• High compost temperatures destroy pathogens and disease</li> <li>• Recycle calf shed sawdust</li> </ul>	<ul style="list-style-type: none"> <li>• Reliable source of sawdust required</li> <li>• Requires an understanding of composting</li> <li>• Must fence off compost heap</li> <li>• Do not spread product on grazed pasture</li> </ul>
Cremation	<ul style="list-style-type: none"> <li>• Carcass destroyed quickly</li> <li>• Pathogens and bacteria destroyed</li> </ul>	<ul style="list-style-type: none"> <li>• Requires high temperatures to burn</li> <li>• Do not burn with rubbish such as tyres because toxic fumes are released</li> <li>• Causes smoke and smell nuisance</li> <li>• Bones remain after burning</li> </ul>

**Dos and Do Nots of Burial and Offal Holes**

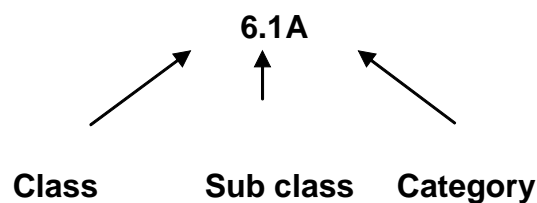
<b>Do</b>	<b>Do not</b>
<ul style="list-style-type: none"> <li>• Open the stomach to allow the intestines out for faster decomposition</li> <li>• Puncture the rumen on its left side to release the gases to prevent the build up of toxic gases</li> <li>• Add a small amount of bacteria such as animal effluent to speed up decomposition</li> <li>• Cover offal holes with a secure lid at all times</li> </ul>	<ul style="list-style-type: none"> <li>• Bury or site offal holes near waterways or areas with a high water table</li> <li>• Add lime because it slows down decomposition</li> <li>• Throw rubbish into an offal hole</li> <li>• Dispose of chemicals in an offal hole</li> <li>• Light fires near offal holes</li> </ul>

## Section Six: Hazardous Substances

6. **Hazardous Material, Substances & Products.** Consider the following on discovery of hazardous material at an emergency site;
- identify the material from available documents. Use the check list of Hazardous Classification labels to aid identification, see Table Thirteen below,
  - contact the owner if possible and arrange for security of the items,
  - obtain medical assistance for people exposed to the hazardous material,
  - adopt the appropriate Personal Protective Equipment (PPE),
  - do not enter floodwaters that may be contaminated without PPE,
  - work upwind of the items and avoid inhaling gases, fumes and smoke,
  - assume unwrapped substances and products are hazardous,
  - remember many gases are heavier than air when cold so may be at higher concentrations nearer the ground,
  - decontaminate all equipment including PPE as close as possible to the site to avoid transfer of substances and products, and
  - replenish used and damaged equipment.

Table Thirteen

### Hazardous Substance Classification Scheme



**Hazard classification.** The combination of class, subclass and category constitutes the hazard classification of a substance (e.g. 6.1A= acutely toxic substance of a high hazard)

**Class** - a unique identification number that indicates an intrinsic hazardous property (e.g. class 6 for toxicity)

**Subclass** - Indicates the specific type of hazard within a class (e.g. subclass 6.1 for acute toxicity)

**Category** - A letter which indicates the degree of hazard (e.g. category A for the highest degree of hazard)

### Class 2 Flammable Gasses & Aerosols



**Class 3 Flammable Liquids**



**Class 4 Flammable Solids**



**4.2A Spontaneously Combustible Solids**



**4.3A Dangerous When Wet Solids**



**Class 5 Oxidisers**



**Class 5.1.1 Liquids and solids**



**Class 5.1.2A Gases Organic Peroxides**



5.2G Organic Peroxides



**Class 6** **Toxics**



6.3A Substances that irritate the skin



6.5A Substances that are respiratory sensitizers



**Class 8** **Corrosives**



8.3.A Eye Corrosive



**Class 9** **Ecotoxic**



## Section Seven: Care & Disposal of the Dead

### 7. Care & Disposal of the Dead

- a. **Remember the living take priority over the dead.** Providing assistance to surviving victims takes precedence unless the position of the dead impedes this assistance.
- b. **The National Civil Defence Emergency Management Plan Order 2005, Section 24(9), states:** As a general rule the Police will accept overall responsibility for the recovery and identification of human remains in a state of emergency. Emergency mortuary facilities will be arranged as required. Police will liaise closely with the agencies and individuals involved because of the legal, moral, cultural, and health implications that can arise in the disposal of human remains. These agencies and individuals include the coroner, iwi authorities, health authorities, funeral directors, and the regional councils and territorial authorities that have power to undertake the emergency disposal of the dead under section 85(1)(g) of the Act.
- c. The issue will always be Police availability. If the Police are not available, identify the dead and isolate them to an area where they are not in public view. Cover at least the face and as much of the body as possible. Allow space for immediate relatives to remain with the dead and to grieve.
- d. The Civil Defence Emergency Management Act Section 85 (1) (g) enables local authorities to undertake emergency measures for the disposal of dead persons if it is satisfied that the measures are in the interest of public health.
- e. Immediate burial may be necessary where putrefaction is advanced and where refrigeration or embalming facilities are limited.
- f. Isolate the dead to a facility with a refrigerated area if one is available.
- g. The public health role in the care and disposal of the dead is to;
  1. ensure any advice given to Police is to effect the safe and hygienic storage or burial of bodies,
  2. mitigate the spread of disease, and
  3. mitigate the creation of nuisance conditions.
- h. Advice to the Police may extend to advice on the suitability and availability of emergency or other mortuary and burial facilities. The design and layout of emergency morgues should consider:
  1. A reception room located away from storage and identification areas.
  2. An area for storage and examination.
  3. A screened viewing area.
  4. Records and personal effects storage area.
  5. Ventilation and lighting.
  6. Hygiene facilities.

## Section Eight: Pest & Vector Control

### 8. Pest & Vector Control

- a. **Pests** on an emergency site may include dogs, cats, possums, pigs and rodents. Monitoring will include target specific traps followed by chemical control if need be.
- b. **Vectors** are by definition 'transmitters of human disease'. Most vectors are insects, especially flies, cockroaches, ticks, fleas and mosquitoes.
- c. Table Fourteen, p. 40 targets specific pest and vector's for control.
- d. Goods **contaminated** by pests and vectors should be condemned when;
  1. inner packaging has been penetrated,
  2. faeces are found inside inner packaging, and
  3. there is external contamination of waterproof containers, unless the container can be washed with water and detergent.

Table Fourteen

The following chart shows prevention, control and treatment measures to use with different pests.

<b>Pest</b>	<b>Prevention</b>	<b>Control</b>	<b>Treatment</b>
<b>Mosquitoes</b>	Empty and remove unnecessary containers of water. Screen or cover any cisterns or water tanks.	Drain and fill boggy areas and depressions. Repair damaged septic tanks, introduce top-feeding fish into ornamental ponds.	Use a light oil or insecticide on ponds or still water. Spray residual insecticide, eg diazinon or malathion, on outside breeding sites.
<b>Flies</b> A fly's reproduction cycle takes approximately one week.	Get rid of all rubbish and manure. Fit doors and windows with screens.	Use knockdown sprays, eg Raid®, Mortein®, for immediate control.	Spray walls and vegetation, especially near rubbish containers, with diazinon, malathion. For seasonal treatment use pyrethroid sprays, eg alpha-cypermethrin, deltamethrin, on ceilings and window frames.
<b>Cockroaches</b> Cockroaches live and breed in moist dark	Clean everything frequently, especially kitchens and dining rooms	Remove potential breeding sites. Treat any infestation promptly.	Spray diazinon, propoxur, dichlorvos, or malathion into places where



places, eg under refrigerators, in cupboards and pantries. Outdoors they live in piles of debris or rubbish.	where food is handled.		cockroaches hide. Employ a trained, qualified operator to apply baits. Use aerosol sprays of pyrethrum or dichlorvos to flush the insects from their hiding places in heavy infestations.
<b>Fleas, lice, ticks</b>	Cut grass frequently and get rid of weeds. Keep carpets and furnishings clean. Check and treat pets regularly.	Use diazinon, pyrethroids and carbaryl for infested areas inside and outside, infested clothes, blankets, mattresses and other bedding.	Fumigate clothing and bedding or sterilise by dry heat or steam using commercial equipment. Treat bed springs and supports with powder or liquid organophosphate, carbamate or pyrethroid insecticides.
<b>Bed bugs</b>	Inspect beds and bedding regularly.	Apply an insecticide to baseboards and mouldings, wall crevices, bedsteads, springs and mattresses. Do not soak mattresses or treat infant bedding or cribs.	Use residual sprays containing pyrethroids, organophosphates or carbamates.
<b>Rodents</b> Rats and mice carry disease, eat and contaminate food and cause structural damage.	Store food carefully and get rid of all rubbish. Proof all holes and accesses to buildings.	Use traps and anti-coagulant baits because of their low level of toxicity for humans and domestic animals, eg brodifacoum, bromadiolone, diphacinone active baits. Remove sources of food and water.	If required, employ a trained, qualified operator to advise and monitor toxic tracking powders and baits.

## Section Nine: Accommodation

### 9. Accommodation

- a. **Welfare Centres** may be established under the Civil Defence Emergency Management Act 2002. Statutory Officers will have a liaison and advisory role at Welfare Centres which are set up to house displaced people. They are also a source of advice and support for people still residing in the community.

The primary public health role for Statutory Officers is to stop the spread of disease, especially in the Welfare Centre itself. Assessments should be undertaken using the assessment form at Table Fifteen, p. 45, to cover the key areas of:

1. utilities and security,
2. sanitation facilities,
3. food supply and preparation,
4. health and medical,
5. communicable disease control,
6. solid waste, and
7. liaison. Statutory officers should:
  - a. be visible – wear a high visibility Public Health vest,
  - b. make themselves known to key people, managers and medical staff, and
  - c. be available at all times, either on the ground in the Welfare Centre or mobile phone. Ensure key people have the mobile phone number.

### b. Emergency housing and shelter

1. Suitable emergency housing and shelter should be identified in the local emergency management plan. Emergency Housing should be inspected prior to occupation using the Proforma at Table Sixteen, p. 55. The list below is not restrictive but the points for consideration include:
  - a. Capacity - allow about one hectare to 250 people.
  - b. Does the site have utilities:
    - i. kitchens,
    - ii. toilets,
    - iii. ablutions and
    - iv. drainage - are local watercourses adequate?
  - c. Infrastructure – are the following handy to the site:
    - i. water supply,
    - ii. power,
    - iii. communications,
    - iv. sewage systems,
    - v. roads,
    - vi. public transport services,
    - vii. shopping centres.

- d. Surroundings:
  - i. does the site face north for maximum sun?
  - ii. is the site close to:
    - a. a wetland?
    - b. overhanging rock?
    - c. potential mud slide?
    - d. high tide mark?
    - e. unfenced water courses including under runners?
    - f. electricity stations?
    - g. thermal sites?
    - h. liquefaction?
    - i. dust sources?
  - iii. Climate - is there a need for cooling or heating?
  - iv. Prevalent diseases - what are they and what must be done to counter them?
  - v. Expansion – is there capacity for the site to grow?

**c. Showers**

1. Avoid the provision of showers or other bathing facilities in short term camps unless waste water can be disposed of without causing a nuisance.
2. The selected site should be graded and a drain or herringbone trench to a soak pit or grey water pond established at the lowest point.
3. Place plastic sheeting on the ground and add raised non slip mats for safety.
4. Segregate shower use by separate times for females and males if there are limited facilities.
5. Establish a maintenance team to keep the showers clean.

- d. **Storage Ponds** - may be useful for providing storage for grey water where absorption is inadequate. Ponds should be less than 1 metre deep so they do not become anaerobic. They must be fenced to keep young children out. Ponds can be emptied by tanker for final disposal.

- e. **Flooded & Damaged Housing** - a checklist is at Table Seventeen, p. 56.

**f. Advice for Owners/Occupants:**

- a. **Before returning home** - contact local utility providers to check power, gas, sewage systems are safe.

- b. **To restore a flooded house** as fast as possible –

- a. Drain, clean and dry out the buildings.
- b. Remove everything that is wet and can be moved out of the house to dry, carpets, bedding, clothing and furniture, in the sun if possible.
- c. Check for trapped water and mud under;
  - i. shower trays,
  - ii. baths,
  - iii. benches,
  - iv. bottom shelves,

- v. and in wall cavities, and
- vi. lower drawers.
- d. Remove underlay.
- e. Increase airflow under houses with hot air blowers.
- f. Remove hollow doors.
- g. Ignore mould growth until area is completely dry then remove with bleach.
- h. Disinfect where necessary.
- i. Get rid of contaminated clothing, carpets, upholstered furniture, bedding and toys unless they can be cleaned and disinfected.
- j. Arrange for the removal of damaged goods placed outside in the street.

**c. To clean out a basement after flooding –**



- a. Check floor drains in the basement to see that they are clear of debris and drain away water under the house. Try to increase the airflow to speed drying.
- b. Drain any surface pools by pumping or bailing.
- c. Wash or flush down walls, shelves and floors with clear water and sweep to remove contaminated water and sediment.
- d. Use a solution of 1 litre of household bleach in 10 litres of water to rinse down walls, floors and other equipment. Leave solution on for 30 minutes before rinsing with clear water. Keep windows open during this treatment.
- e. Use plenty of hot water and soap or dishwashing detergent for the final cleanup of walls, floors, cupboards etc.
- f. Ventilate area by opening all windows or use fans, if power is available.
- g. Use a commercial deodoriser to remove any remaining **smells**.

## HEALTH ASSESSMENT FORM FOR WELFARE CENTRES

During an emergency welfare centres may be set up to house displaced people and also depending on the location of the centre, to provide advice and support to people still residing in the community. The primary public health function is to stop the spread of disease, especially in the welfare centre itself.

This form has been designed for the initial assessment and any follow-up assessments of a Welfare Centre (not a Recovery/Day Centre) set up in response to an emergency.

*For the initial assessment complete all sections in full. For follow up assessments only page 1 (Initial Detail & Section 1 Critical Summary Information ) is required to be completed in full. For the remaining sections (2-9) just mark the text box where there has been a change from the previous assessment and expand on this in the comments space at the end of that section.*

Welfare Centre Name & Address		Duty Manager	Duty Manager Phone
		1.	
		<b>Rostered Managers</b>	
		2.	<b>Email:</b>
3.			
<b>Date:</b>	<b>Time:</b>	<b>Assessment</b> Initial Assessment <input type="checkbox"/> Follow up Assessment <input type="checkbox"/>	
<b>Assessment Completed by:</b>			
<b>1. CRITICAL SUMMARY INFORMATION for DAILY EOC BRIEFINGS</b>			
<b>Does this Welfare Centre currently have:</b> <ul style="list-style-type: none"> <li>• Mains electricity operational    <input type="checkbox"/> yes    <input type="checkbox"/> no</li> <li>• Reticulated gas (to parts of the Centre) operational    <input type="checkbox"/> yes    <input type="checkbox"/> no</li> <li>• Reticulated water operational    <input type="checkbox"/> yes    <input type="checkbox"/> no    <b>Is this water potable</b>    <input type="checkbox"/> yes    <input type="checkbox"/> No</li> <li>• Reticulated sewerage operational    <input type="checkbox"/> yes    <input type="checkbox"/> no</li> </ul>			
<b>Overnight Occupants:</b> How many occupants stayed overnight last night <input style="width: 50px; height: 20px;" type="text"/> Estimated maximum number of overnight occupants this Centre can hold <small>(Base this on such factors as the number toilets, showers, sleeping space and water available)</small> <input style="width: 50px; height: 20px;" type="text"/>			
<b>Disease Surveillance:</b> Have there been any cases of gastroenteritis since the last inspection <input type="checkbox"/> yes <input type="checkbox"/> no Any other cases of suspected infectious disease (since the last inspection) <input type="checkbox"/> yes <input type="checkbox"/> no Are there currently any occupants in isolation <input type="checkbox"/> yes <input type="checkbox"/> no			
<i>If the answer to any of the above questions is "yes" please give full information under Section 5 (Health/ Medical) in the "Comments" space</i>			

## 2. WELFARE CENTRE UTILITIES AND SECURITY

Any obvious structural damage	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Reticulated hot water operational	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Reticulated <i>potable</i> cold water operational	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Reticulated cold water operational but requires <i>boiling</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Bottled water available (commercial product)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Mains power operational	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Generator being used to supply Centre	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Reticulated gas (to parts of the Centre) operational	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Do indoor temperatures appear satisfactory	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Any obvious environmental / occupational hazards noted	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA

### Public Entry Point to the Centre

Centre has only one public Entry Point	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Entry point has signage requiring hand sanitising before entry	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Entry point has "Essential Hygiene" handout ( <b>attachment 1</b> )			
Full time security at Entry Point to ensure hand sanitising	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Is there a procedure to ensure adequate hand sanitiser supply	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA
Smoking not permitted in Centre	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unk/NA

### Comments:

## 3. SANITATION FACILITIES

### Permanent Facilities at Welfare Centre

- Reticulated sewerage operational Yes No Unk/NA
- Total number of bathroom areas (Do not include Isolation area or separate child diaper changing facilities area) 1 2 3 4 5 6
- Can all these bathroom areas be used Yes No Unk/NA
- Total number of female toilets available for use
- Total number of male toilets available for use
- Total number of disabled toilets available for use
- Total number of showers available for use
- How many times a day are all the bathrooms cleaned 1 2 3 4
- Is there a separate child changing/diaper area & toilet? Yes No Unk/NA
- Can the child changing/diaper area be used Yes No Unk/NA
- Are commercial cleaners cleaning bathroom areas Yes No Unk/NA
- "Clean Your Hands" poster in all bathrooms (**attachment 2**)

**Temporary Facilities at Welfare Centre**

- Total number of porta loos available for use
- Are there separate male/female porta loos Yes No
- Do all porta loos have hand sanitiser Yes No Unk/NA
- How many times a day are porta loos cleaned 1 2 3 4
- How often are porta loos emptied 1 daily 2 daily 3 daily
- Mobile modular restrooms (with flush toilets & basins) Yes No Unk/NA
- Total number of mobile modular restroom male toilets  Unk/NA
- Total number of mobile modular restroom female toilets  Unk/NA
- How many times a day are modular restrooms cleaned 1 2 3 4
- Are mobile modular showers available Yes No Unk/NA
- Total number of modular male showers
- Total number of modular female showers
- How many times a day are modular showers cleaned 1 2 3 4
- Are commercial cleaners being used in these areas Yes No Unk/NA

**Comments:**

**4. FOOD SUPPLY & PREPARATION**

**Kitchen Facilities**

- Permanent commercial type kitchen Yes No Unk/NA
- Temporary kitchen setup Yes No Unk/NA
- Reticulated *potable* cold water to kitchen Yes No Unk/NA
- Reticulated cold water requires *boiling* Yes No Unk/NA
- Reticulated hot water to kitchen Yes No Unk/NA
- Unreticulated water requires *boiling* Yes No Unk/NA
- Commercial dishwasher operational Yes No Unk/NA
- Electricity to kitchen Yes No Unk/NA
- Gas to kitchen Yes No Unk/NA
- Adequate refrigeration Yes No Unk/NA
- Adequate bain maries/ovens for hot food storage Yes No Unk/NA

### Safe Food Handling

- |   |                              |                             |                                 |
|---|------------------------------|-----------------------------|---------------------------------|
| • Off site catering (specify caterer)                         | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • On site preparation of perishable food                      | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Any time temp abuse issues noted                            | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Adequate food protection                                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Is ice being used for consumption (safe source)             | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Hand-washing facilities                                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Hand sanitiser being used                                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Does supervisor have good food hygiene knowledge            | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Supervisor shift rotations? (expand under comments section) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Is their need for basic staff training (If yes do it now)   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Staff sickness policy in place                              | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |

**Comments:**

## 5. HEALTH / MEDICAL

### Medical Area

- |  |                              |                             |                                 |
|--|------------------------------|-----------------------------|---------------------------------|
| • Medical care services on site  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • GPs, primary care nurse (circle)   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • St Johns, Red Cross, Army medics (circle)  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Medical care liaison with mental health counsellors  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Separate bathroom facilities in medical area   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • Suspect ID cases are recorded  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • System in place to advise EOC of suspect cases (assist Medics in adapting a system that works for HPO/Medic/EOC) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |
| • System in place for ID suspects to be isolated   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unk/NA |



**Isolation Area**

- Separate isolation area for suspect gastro cases only Yes No Unk/NA
- Area has full bathroom facilities Yes No Unk/NA
- Hot and cold reticulated water Yes No Unk/NA
- Hand sanitisers in use Yes No Unk/NA
- Washable mattress (disposable pillows) Yes No Unk/NA
- Infectious waste container/bags inside isolation area Yes No Unk/NA
- Cleaners (chlorine base), mops buckets in isolation area Yes No Unk/NA
- Cleaning advice Fact Sheet available (attachment 3) Yes No Unk/NA
- Full protective equipment located outside isolation area Yes No Unk/NA
- Infectious waste container/bags outside isolation area Yes No Unk/NA
- Has HPO given all cleaners infection control training  
(including cleaning advice for staff fact sheet - **attachment 3**) Yes No Unk/NA

**Comments:**

## 6. SOLID WASTE

- Is rubbish bin waste removal from the Centre satisfactory Yes No Unk/NA
- Number of waste skips available for rubbish bin & other waste
- How often are the skips collected
- Is there a problem with putrescible waste or smell from skips Yes No Unk/NA
- Is the overall waste disposal system satisfactory Yes No Unk/NA

### Comments:

## 7. CHILDCARE AREA

- Plan in place for cleaning/sanitising this area Yes No Unk/NA
- Safe toys Yes No Unk/NA
- Adequate toy hygiene Yes No Unk/NA
- Adequate supervision of children Yes No Unk/NA

### Comments:

## 8. SLEEPING AREA

- Adequate number of mattresses (and cots) Yes No Unk/NA
- Adequate supply of bedding Yes No Unk/NA
- Adequate space Yes No Unk/NA
- Contingency in place for cleaning up vomit/diarrhoea Yes No Unk/NA

### Comments:

## 9. COMPANION ANIMALS

- Companion animals present Yes No Unk/NA
- Contingency in place for cleaning up animal faeces/urine Yes No Unk/NA

### Comments:

This Welfare Centre Assessment form is based on a form originally developed by Thersa Te Whati from Hawkes Bay DHB. It has been modified by Geoff Cameron SHPO NMDHB following his work experience in Welfare Assessment Centres during the Christchurch earthquake response in February 2011

## ESSENTIAL HYGIENE MEASURES

### Attachment 1 - Communal Accommodation Settings For people on Arrival

Public Health Service



- Good personal hygiene is essential when living in communal accommodation settings to avoid outbreaks of gastroenteritis disease such as norovirus
- Gastroenteritis disease may be **highly** infectious and causes vomiting and/or diarrhoea

#### Preventing Gastroenteritis

- Always clean (wash/sanitise) hands before preparing food and after using the toilet

#### Hand cleaning:

- conventional hand washing (soap and water) for 20 seconds followed by hand drying for 20 seconds, **or** alcohol GEL sanitiser (no water required)
- If someone has gastroenteritis they can still pass the disease onto others for up to 48 hours after their symptoms have stopped

**PLEASE notify the accommodation office IMMEDIATELY  
if someone at your group is unwell with gastroenteritis symptoms**

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if someone at your group is unwell with gastroenteritis symptoms**

7

## **DON'T LET THE DREADED STOMACH BUGS RUIN YOUR STAY!**

Gastroenteritis disease may be **highly** infectious and causes vomiting and/or diarrhoea which are definitely no fun for anyone!

In a communal accommodation setting you share toilet and bathroom facilities with a lot of other people!

## **HERE'S AN IMPORTANT TIP TO HELP KEEP YOU WELL**

### ***KEEP YOUR HANDS CLEAN***

#### **ALWAYS**

**Thoroughly clean your hands after using the toilet and before preparing or eating food**



Conventional hand washing (soap and water) for 20 seconds followed by drying for 20 seconds using paper towels or air dryer (don't use a shared towel)

OR

Alcohol GEL sanitiser (use only if no visible dirt on hands) - no water required, allow hands to air dry



#### **REMEMBER**

Someone who has had gastroenteritis can still pass the disease onto others for up to 2 days after their symptoms have stopped

#### **SO PLEASE**

If someone in your group is unwell with gastroenteritis notify the Manager immediately for further information and advice

## GASTROENTERITIS (usual cause Norovirus)

### Attachment 3 - Communal Accommodation Settings - Cleaning advice for Staff

Public Health Service



#### **Reasons for cleaning**

Gastroenteritis is commonly caused by norovirus. Viruses such as norovirus (and rotavirus) are **highly infectious** and can be spread by contamination of the environment. They can be spread via contaminated surfaces whether visibly contaminated or not. For this reason it is particularly important that any vomit or diarrhoea is promptly cleaned up, then disinfected with bleach solution, and that all hard contact surfaces are kept clean. Norovirus has been reported to survive for up to 12 days in carpets.

#### **Staff safety**

All staff cleaning a contaminated environment must use disposable gloves and isolation gowns or plastic aprons. In addition staff should wear a mask if aerosols are likely to be present particularly if cleaning is undertaken within 1 hour of the incident. (Vomiting in particular confers a significant risk of infection to those exposed to aerosols).

#### **Cleaning and disinfecting equipment**

The following protective gear and equipment are recommended for clean up purposes:

- Disposable gloves
- Disposable isolation gowns or plastic aprons
- Disposable face masks
- Disposable bags for waste
- Soiled linen bags as needed
- Sick bags (V Bags)
- Chlorine (bleach) disinfectant (only cleaning agent known to kill viruses) - see table below
- Multi-purpose detergent cleaner
- Paper towels
- Disposable cloths
- Mop & bucket
- Trigger operated spray bottles (optional)

Make up bleach solution. Bleaches are sold in different strengths. The strength is written on the label as g/Litre of sodium hypochlorite or some times as a percentage (%). The recommended strength of bleach for disinfecting contaminated surfaces is 0.1% hypochlorite. The following table shows how to make up **5 litres** (approximately half a household bucket) of dilute bleach to give a final strength of 0.1%.

Original strength of Bleach on the label in g/L or % sodium hypochlorite	Use this amount of Bleach (millilitres)	Use this amount of Water (millilitres)	You will end up with this amount (Litres)	Final strength
Approx 10g/L or 1%	500	4500	5	0.1%
Approx 20g/L or 2%	250	4750	5	0.1%
Approx 30g/L or 3%	170	4830	5	0.1%
Approx 40g/L or 4%	130	4870	5	0.1%
Approx 50g/L or 5%	100	4900	5	0.1%

If the bleach solution is to be used in trigger operated spray bottles:

- Make up a new solution **24 hourly** (bleach can lose its strength quite rapidly)
- Label the spray container “Keep out of reach of children – 0.1% bleach solution”

The following table shows how to make up **500mls (0.5 Litre)** of bleach solution

Original strength of Bleach on the label in g/L or % sodium hypochlorite	Use this amount of Bleach (millilitres)	Use this amount of Water (millilitres)	You will end up with this amount (millilitres)	Final strength
Approx 10g/L or 1%	50	450	500	0.1%
Approx 20g/L or 2%	25	475	500	0.1%
Approx 30g/L or 3%	20	480	500	0.1%
Approx 40g/L or 4%	15	485	500	0.1%
Approx 50g/L or 5%	10	490	500	0.1%

### ***Cleaning & disinfecting of area immediately after vomiting/soiling***

**Step 1:** Put on protective gear.

**Step 2:** Use paper towels to soak up excess matter then use disposable cloths.

**Step 3:** Place any contaminated material directly into a waste bag.

**Step 4:** Clean the immediate area with hot water and detergent using mop and/or disposable cloths.

**Step 5:** Disinfect by applying bleach solution to the contaminated area and surrounds - at least 3 metres in all directions. Do not apply to carpets (see section below on carpet).

**Step 6:** Cordon off and thoroughly air the area for at least 30 minutes afterwards if practical to do so.

**Step 7:** Dispose of protective clothing, cloths etc into a disposable bag (or soiled linen bag).

**Step 8:** Sanitise hands thoroughly. You have been handling **highly infectious** material.

### ***Cleaning of surfaces during an outbreak***

#### ***Hard surfaces***

All hard surfaces in the vicinity of any contamination (vomiting or soiling) must be wiped down with a bleach solution (as above) eg work surfaces, washable floors, taps, telephones, banisters, furniture, waste bins, door handles and bathroom/toilet areas (see below).

#### ***Carpets***

The area to be cleaned should extend at least 3m around the contaminated area. Carpets should be steam cleaned using a steam cleaner which reaches a minimum of 60 degrees centigrade, unless the floor covering is heat sensitive and fabric is bonded to the backing material with glue. If this is the case, clean with detergent (do not use bleach as it will discolour the carpet), and thoroughly air the area until dry before allowing people back into the area.

#### ***Cot/Bed linen***

Contaminated bed linen should be placed in separate soiled linen bags and washed separately at a minimum temperature of 60°C on a full wash cycle. Ideally put in a half load of linen but use full load setting (ie high water level).

### ***Extra cleaning of bathroom/toilet areas during an outbreak***

During an **outbreak**, check and clean shared toilet facilities at least 4 hourly and after any incident of vomiting or soiling contamination.

All hard surfaces must be cleaned first then disinfected with bleach solution e.g. wash hand basins, washable floors, taps, toilet rails, waste bins, door and toilet flush handles, window frames and bathroom fittings. Ensure that separate disposable cloths are used for ‘dirty’ areas such as toilet bowls.

Table Sixteen

<b>Emergency Housing Venue Proforma</b>					
Address of Venue:					
Type of Premises:					
Owner or Occupant – Name:					
Address:					
Phone:		(A/H)	E-mail:		
Available Camping Area (m <sup>2</sup> ):					
Hard standing:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Vehicle Access to Site:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Power Available:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Sanitary Facilities:	W/C	Urinals	Basin	Troughs	Showers
Male	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Female	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laundry Facilities:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Wholesome Water Available:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Sewer System:					
Does Septic Tank require desludging (Yes/No):					
Facilities:	Hall	(area, size)			
	Kitchen	(capacity)			
Structural Soundness of Building:					
Remarks:					
Date:					
Inspected By:					

Table Seventeen

<b>Flooded &amp; Damaged Housing Checklist</b>				
Date:	Time:	am/pm		
Address of Premises:				
Name of Owner/Occupant:				
Living at Premises:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Brief assessment of damage:				
Power available:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Toilet available:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Sewerage system:				
OR is septic tank visible:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Water supply available?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
	<input type="checkbox"/>	Main	<input type="checkbox"/>	Tank
	<input type="checkbox"/>	Other:		
Is there any rotten material or dead animals?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Freezer/refrigeration contents need to be removed:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Dangerous trees or other objects:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Has anyone advised to visit Council information centre?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
If yes, name of person?				
Any debris to be removed?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
How much? (m <sup>3</sup> ):				
Any sign of looting?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Inspection marker placed:	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Inspected by:				



## Section Ten: Food

### 10. Food – Assessment, Quality Assurance, Food Safety & Emergency Food Handling

#### a. Food Quality Assessment in a Natural Disaster - Statutory Officers will:

1. Determine the status and suitability of food storage, service and manufacturing premises, and transportation.
2. Determine the need for mass catering facilities and liaison required with civil defence welfare agencies.
3. Ensure basic food safety advice is provided through civil defence sector posts, welfare centres and to the media.
4. Examine food supplies – be decisive in determining whether food is fit for use or should be disposed of.
5. Ensure disposal of unfit food and appliances to avoid further public health nuisance or disease risk by burial or incineration. Officers should supervise disposal for accountability purposes. For similar reasons records of food required by Officers to be destroyed, seized or detained should be kept by the Officer and claimant. Liaison with insurance companies at the early stages of procedure will save time and eliminate disputes. The Officer should ensure the priority is to remove the public health hazard as opposed to waiting for the insurance agent to sight and approve of food to be discarded.
6. Determine the food resourcing needs of welfare agencies, advise on and assess the suitability of facilities and food practices. This may mean regular assessment at catering sites of the need for refrigeration and of the food storage and preparation capacity.
7. Determine the availability of refrigeration and food storage units (static/portable) within and outside the emergency area.
8. Determine how the status of water and power supplies, sewage facilities and waste collection/disposal may affect decisions on food safety.
9. Determine the conditions of food premises and their ability to function without prejudicing the safety of food. Consider the limitations to be placed on them.
10. Control food borne illness by:
  - a. Increasing the frequency of the review of disease notifications and the surveillance data.
  - b. Afford priority to food safety procedures at mass feeding sites, and any illness states within mass accommodation facilities.
  - c. Control the risk of food borne illness spread by removing people suffering illness from catering duties.
11. Provide food safety advice to temporary accommodation/mass feeding sites through briefing meetings with key welfare personnel.

#### b. Food Quality – control of food quality in emergencies becomes difficult because:

1. Floods often create the most widespread spoilage and contamination problems. Pathogenic organisms and filth are carried by flood waters from ground surface, septic tanks, sewage systems and the like. Foods in contact

with the contaminated water should with few exceptions be destroyed. The exception may be undamaged hermetically sealed containers.

2. Laboratory facilities may not be available so food assessment must be based on appearance, physical conditions, taste and smell against normal characteristics and keeping quality, see pp.59-61 below for guidance on meat and fish.
3. Condition of containers – especially those which are perishable or breakable like paper, cardboard, sacking or glass gives a guide as to the contents' fitness for use, see pp.62-63 below for guidance on tinned foods).
4. Food retailers and distributors should co-operate fully to prevent the sale of damaged foods, and underwriters have a part to play too.
5. Relief feeding – proper sanitary practices must be adopted for food storage, preparation and distribution along with other services such as water supply, waste disposal and vector control so food quality is not adversely affected.

### c. **Maintenance of Food Quality**

1. Ensure:
  - a. Appliances/packages for preparing and cooking foods neither impart, taint nor introduce spoilage micro-organisms.
  - b. Storage facilities protect food from pests and vectors and absorption of toxic materials.
  - c. Relief kitchens are supplied with fresh foods on a daily basis because of limited storage facilities.
  - d. Regular disposal of rubbish (incineration/burial) so pests are not attracted to food stores.
  - e. Treated water is available to wash fresh vegetables and fruit.
2. **Emergency Food Assessment:** Consider the following:
  - a. Consideration must be given to the situation when assessing food quality. The need for sustenance is more important than quality if circumstances dictate food cannot be brought into the disaster area for a number of days and acceptable foods are scarce. A decision to pass a foodstuff as 'fit for use' must be influenced by the circumstances that dictate that decision but in no case should the decision undermine the health of the public through consumption of the food. Decisions can be harsher on the suitability of food when there is plentiful food about or it can be supplied readily from outside the disaster area.
  - b. Statutory Officers should utilise available microbiological, physical and sensory standards and guidelines to assess foods.
  - c. The assessment must take into account the fitness for purpose of the food i.e. how soon will it be used, what normal preparation is required before use e.g. cooking or none, and the physical state of any container.
3. **Product Disposal:** Orderly disposal of contaminated food is influenced by people and agencies interested in the merchandise for different reasons, e.g. owners, insurance firms, and government officials:

- a. Suspect material must be either seized, detained or destroyed. This may be achieved voluntarily or by the exercise of Officers' powers.
  - b. Storage or disposal facilities must be arranged so decayed food can be discarded before creating a nuisance, but food within shelf life is preserved. Supervision in storage and transportation is required.
  - c. It is good practice to document and confirm the fate of the food.
4. **Segregation** is the function of the owner or their agent. Statutory officers should determine the release of food or otherwise after this. Categories may be acceptable, non-acceptable, or questionable, based on circumstances. Confirmation of their fate should be supported by laboratory tests using **International Commission on Microbiological Specifications for Foods** guidelines, or those found in 'Microbiological Guidelines for Foods', together with Food Regulations standards. Legal powers to make, seal, or secure food is available to Authorised Officers only.
5. **Destruction** - Landfill (if water table permits) and incineration are the most reliable methods.
6. **Reconditioning**
- a. The type of product, container, intended use, extent and kind of contamination will determine the kind of reconditioning necessary.
  - b. The process and confirmation of the effects of reconditioning must be supervised.
  - c. The commercial sale of reconditioned foods should not take place if label requirements cannot be met for that food in addition to the other requirements of Food Regulations/Standards such as container integrity.
7. **Perishable Foods** are liable to microbiological spoilage unless the environmental conditions are controlled.
- a. As a general rule the following goods cannot be reconditioned:
    - i. perishable foods affected by flood waters,
    - ii. frozen products that have thawed, show evidence of decay or have been exposed to fluctuating temperatures.
  - b. They can be reconditioned if:
    - i. Contamination has not occurred.
    - ii. Frozen products may be refrozen if they have partially thawed but retain some ice crystals and show no decomposition.
    - iii. Food has been held at temperatures sufficient to limit growth of spoilage organisms.
8. **Frozen Fish & Meat which has undergone Temperature Fluctuations**
- a. Should be suitable for consumption if there is no discernible degradation in the quality of the product. The size of the package of food will affect the speed at which rises in temperature occur; smaller packs with greater surface area will increase in temperature more

quickly. Product will rise in temperature faster at the edges/corners than the centre of the product.

- b. Officers may have to sample the product to determine if the food is fit for use and therefore the site from which the samples are taken is important. The first sites chosen should represent the worst possible result, i.e., outside packages or cartons. If they fail the test criteria the lot should not be rejected, only those packages representing the sample should be. A second sampling of the remaining cartons/packages should be undertaken to determine their acceptability.

9. **Testing. Fish & Meat** are quite different in their storage characteristics. Fish are high in unsaturated fats and will oxidise more quickly than meat. Temperature fluctuations in cold storage have a marked effect on the texture of fish where the effects take longer to manifest in meat.

- a. **Fish.** Taste testing is the most reliable method to determine the suitability of fish. A fish sample is thawed in air or a plastic bag under running water, then placed in a steamer for 10-15 minutes (depending on sample size). Use the cooked score sheet below to grade for odour, texture and flavour. D grade or below is deemed unacceptable.

Score Sheet - Fish

Attribute	A	B	C	D
Cooked Odour	Seaweedly /Boiled milk	Neutral/ very little	Slightly Off-Odours/ Burnt/Fishy	Considerable Off-odours/ Ammonia/Sour
Cooked Texture	Firm/ Juicy	Crumbly/ Less juicy	No Juice/ Becoming Chewy	Dry/Chewy/Like Chewing Paper
Cooked Flavour	Sweet/Meaty flavour	Neutral Flavour	Slight Off Flavour/ Slightly Sour	Considerable Off-Flavours/ Very Sour & Bitter/ Difficult to Taste

- b. **Meat.**
  - i. Physically examine the meat. There should be no visible slime, mould, yeast, excessive desiccation or discolouration.
  - ii. A boiling test should be conducted if a flavour change or taint is suspected. Samples of fatty tissue are taken and boiled in a test tube for 3-5 minutes after which the water is smelt. The water is tasted and a small piece of fat is chewed. There should be no discernible taint.
  - iii. The table below may be used to determine the safety of the meat for use where the history of the meat is known. The table is based on carcass meat or large cuts that have been frozen. Some allowance needs to be made where the meat is in cartons or other packaging.

Suggested action – Meat

Max product temp	Max period	Frozen/Thawed	May Be Used As
-12C		Frozen	Frozen Meat
-5C	1 month 2 months >2 months	Refrozen Thawed	Frozen Meat Meat Not Suitable (for sale)
-2C	5 Days 2 Weeks >1 month	Refrozen Thawed	Frozen Meat Meat Not Suitable (for sale)
+5C	24 Hours 5 Days >5 Days	Refrozen Thawed	Frozen Meat Meat Not Suitable (for sale)
+13C	12 Hours >12 Hours	Thawed	Meat Not Suitable (for sale)

10. **Plastic, Paper, Cardboard, or Cloth Containers** which have been water damaged mean the food they contain usually cannot be reconditioned. Food in these containers can be reconditioned if the:

- a. Product is not contaminated.
- b. If the exterior container is damaged but an interior liner (e.g. polyurethane, saran, cryorac, aluminium, metal, glass) is intact and can protect the food from damage.
- c. If the container can withstand simple cleaning.
- d. Food can be repacked where it is considered product hasn't been exposed to or likely to absorb contaminant.
- e. Exterior pack can be replaced without damage to contents e.g. wine casks.
- f. Generally foods stored in such packs are hygroscopic grain, flour, sugar and cannot be reconditioned. Fire or smoke damage may not affect contents however the end user is an important consideration.

11. **Screw Top, Crimp, Cap & Similar Containers** - include twist tops and plastic seals for liquor bottles and other beverage. Fire and smoke may not affect contents if heat has not been excessive however re-labelling is probably necessary.

- a. Can be reconditioned if:
  - i. Product is not contaminated.
  - ii. If there is no soil on cap lip or thread or snap ring.
  - iii. If rust is superficial only and not on rim seal.
  - iv. If dents in lid don't affect rim seal.
  - v. Closures or seals are not defective.

- b. Cannot be reconditioned if:
  - i. Product is contaminated.
  - ii. If water damaged for sediment may lodge under cap lips, threads etc.
  - iii. Evidence of exposure to high temperature or pressure.
  - iv. Soil around the closure.
  - v. Submerged in water, chemicals or other liquids.
  - vi. Rust; closure surface is pitted.
  - vii. Defective closure or container.
  - viii. Cap or crown dents effect rim seal.

## **12.Reconditioning Hermetically Sealed Tinned Foods-**

- a. Tinned products exposed to heat and smoke may be cleaned and relabelled.
- b. Tinned foods subjected to flood waters should not be reconditioned as a general rule. Any fault to the tin could allow contaminated water to be drawn in, especially if the temperature of the flood waters is lower than background levels.
- c. The following procedures should be carried out when it has been decided to allow reconditioning of tins that may have been inundated with flood waters:
  - i. Inspect the cans for damage
  - ii. Wash in detergent and clean water
  - iii. Rinse with potable water
  - iv. Immerse in 100ppm chlorine or water at 100 degrees Celsius for at least 5 minutes
  - v. Dry
  - vi. Re-label
- d. Tins may also suffer physical damage in the event of an earthquake storm or fire. Tins should be inspected and sampled randomly if necessary to confirm the suitability of the product where this has occurred. All tins need to be inspected if the sample proves suitable for human consumption. Tins should be rejected if the tin;
  - i. is leaking,
  - ii. has damaged seams,
  - iii. shows rust pitting
  - iv. is swollen,
  - v. has been exposed to high temperatures, or
  - vi. is badly dented
- e. Recondition if:
  - i. Product is not contaminated.
  - ii. Rust is superficial only.
  - iii. Contamination is on surface only and there are proper sterilising facilities (100 ppm chlorine solution).

- iv. Physical damage has not affected seal and there are no obvious defects.
- v. Excessive temperatures have not affected integrity of can seam.
- vi. No signs of can bulging or being a flipper.

**d. Food Safety**

1. Identify safe food premises. A Food Premises Proforma is at Table Eighteen, p. 65.
2. Protect food from heat, dirt, insects, pests and pets.
3. Get rid of food which is smelly, slimy, mouldy or discoloured.
4. Cover pots to save fuel and cook food thoroughly.
5. Wash dishes immediately after eating and keep clean ones covered.
6. Throw out any food contaminated with glass, dirt, chemicals or sewage.
7. DO NOT eat garden produce if the soil has been flooded.
8. DO NOT eat shellfish from the river mouth or harbour after an earthquake or flood.
9. DO NOT use any tinned food with split or swollen seams.
10. Always wash your hands before and after handling food.
11. Be prepared to advise on:
  - a. **Menu** - foods chosen should be nutritious, filling and not potentially hazardous.
  - b. **Storage** - keep it cool, keep it clean and keep it covered.
  - c. **Utensils and storage containers** - store clean and dry, wash thoroughly between uses and keep separate utensils for general use in the kitchen and for use in the mess area.

- e. **Emergency Food Preparation.** The rules for kitchens must be rigidly enforced in order to avoid gastroenteritis.

**1. Food preparation**

- a. Plan for increased output but be sure any plans comply with sound public health practice.
- b. Do not take shortcuts or neglect hygiene measures.
- c. Establish;
  - i. a supervisor to ensure proper hand washing and drying, and
  - ii. a separate squad to handle jobs other than food preparation. These people must not handle the food.

**2. Construction of Kitchens and Mess Halls** should be;

- a. flyproof,
- b. at least 50 m from latrines, and
- c. with well designed drainage.

### **3. Kitchen Rules**

- a. Always wash your hands before and after handling food.
- b. Establish a regular roster of kitchen staff to ensure adequate rest periods are taken to reduce the risk of failing hygiene standards.
- c. Only healthy and clean people should work in the kitchen.
- d. Food handlers should not be involved in other jobs likely to expose them to pathogenic organisms.
- e. Kitchens are out of bounds to all except those with a job to do.
- f. Clean clothing should be provided and used where possible.
- g. No animals are permitted in the kitchen.

### **4. Frozen Goods**

- a. A large food freezer should be locked and guarded, even if it is the local supermarket.
- b. Food storage sites should be identified as a priority for power restoration in the event of a power cut.
- c. Issue food in the following order if power cannot be restored;
  - i. Ice cream and similar frozen milk products.
  - ii. Fish and vegetables.
  - iii. Fruits and poultry.
  - iv. Meat in the order: pork, lamb, beef.
  - v. Keep generators on hand as an alternative power source where food requires refrigeration.
  - vi. Cereal foods are convenient as they do not require refrigeration.



Table Eighteen

<b>Food Premises Proforma</b>	
Address of Premises:	
Owner or Occupant – Name:	
Address:	
Phone:	(A/H)
Type of Food Premises:	
Type and Condition of Food:	
Ease with which product can be handled and transported:	
Provision of Food Transport Vehicles (Number) and whether:	
• Insulated:	
• Refrigerated or Deep Freeze:	
Availability of “Safe” Food (type and quantity):	
Power interruption (how long):	
Power restored:	<input type="checkbox"/> Yes <input type="checkbox"/> No
State of Cool Rooms, Freezers and Refrigeration Cabinets:	
Structural condition of premises:	
Remarks:	
Date:	
Inspected By:	

## **Section Eleven: Personal Hygiene & Sanitation**

### **11. Personal Hygiene & Sanitation**

#### **a. Hand washing and sanitation:**

1. Wash your hands often.
2. DO NOT touch your face with your hands without first cleaning them, when they have been in floodwater. It may carry materials which are dangerous to health.
3. DO NOT smoke or eat in a contaminated area.
4. Wear rubber gloves and wash hands thoroughly with soap and water after handling contaminated food and other material.
5. See a doctor as soon as possible if you receive a puncture wound or have any other sort of accident.

#### **b. Bathing and personal hygiene:**

1. Make sure all those helping with the clean-up wear rubber gloves and wash their hands thoroughly before eating, drinking or smoking.
2. Disinfect any cuts and cover with a waterproof dressing.
3. Keep small children away during the clean-up phase.
4. Take precautions against insect bites by using repellents and wearing trousers and long-sleeved tops.
5. Wash any clothing, bedding and other contaminated materials, such as curtains, using detergent. Rinse in clean water with added household bleach to kill any bacteria.
6. Get rid of contaminated clothing so that people do not find it and put it on.
7. Go back to normal showering, bathing and clothes washing as soon as there is spare clean water.

## Section Twelve: Control of Communicable Diseases

### 12. Control of Communicable Diseases.

#### a. Facts

1. Communicable Diseases e.g. salmonellosis, campylobacteriosis, norovirus etc that are endemic in a community are more likely to spread when water, sewerage and electricity are seriously disrupted.
2. Poor emergency accommodation and overcrowding can lead to the spread of;
  - a. other communicable diseases, e.g. influenza, measles, meningococcal disease,
  - b. vector borne conditions and diseases e.g. pediculosis (lice), scabies (mites).
3. Some diseases can occur through the use of contaminated foods, e.g., salmonellosis, campylobacteriosis, chemical food poisoning, bacterial food poisoning.
4. Lack of medicines, including usual prescription medicines can increase the risk of illness, e.g. not having inhalers for asthma, spray or tablets for angina, insulin for diabetes.

#### b. Control

1. Keep accurate records of any complaints or allegations of illness during a disaster. Ensure accurate details are taken of onset, symptoms and history prior to illness.
2. All reports should be investigated and trends established early.
3. The Ministry of Health and Medical Officer of Health must be kept informed of prevailing conditions and will assist with technical enquiries.
4. Local doctors, hospitals and pharmacies should be contacted early to alert them to the possibilities of communicable disease outbreaks.

- c. **Contact Tracing** - Keep accurate records of the patient's immediate past contacts and movements over the incubation period, approximately four days. The Ministry of Health may move to establish a telephone help line to assist in contacting patients' contacts, and to answer frequently asked questions from the wider public.

- d. **Disinfection** – See pp.53 & 54.

- e. **Terminal Disinfection** is the disinfection of articles within premises following the end of an isolation period or special circumstances such as a sudden death. These may include;

1. flooring or floor coverings,
2. furniture and curtains,
3. bed linen and mattresses, and
4. cutlery, dishes and other utensils used by patients.

## Section Thirteen: Air Quality

### 13. Section Thirteen: Air Quality

**Risks to Air Quality** include:

- a. **Airborne particulates including dust, silt and dry liquefaction** - wear appropriate protective clothing and equipment.
- b. **Gases**, dealt with in Table Two, p.6,
- c. **Volcanic Ash and Gas** is acidic and can cause eye, skin and breathing problems, as well as property damage. For further information:
  1. on volcanoes go to [www.ivhhn.org](http://www.ivhhn.org),
  2. on ash forecasts and alert levels go to [www.geonet.org.nz/volcanoes](http://www.geonet.org.nz/volcanoes),
  3. ash management posters [www.aelg.org.nz/volcanic-impacts](http://www.aelg.org.nz/volcanic-impacts),
  4. additional points under volcanic ash and gas include:
    - a. it reduces the efficiency of chlorination of water supplies,
    - b. health risks relate to:
      - i. grain size,
      - ii. presence of crystalline silica minerals, and
      - iii. pre-existing vulnerability.
    - c. >20cm ash on roof may cause roof collapse.
- d. **Advice for the Public in a Volcanic Emergency** is to:
  1. Stay indoors or in a car as much as possible.
  2. Have a first aid kit handy.
  3. Wear goggles to protect eyes when outside.
  4. Protect skin with suitable clothing, e.g., headgear, footwear, gloves.
  5. Breathe through a fine-particle mask or damp cloth.
  6. Save water in the bath or other containers in case the water supply becomes polluted or is cut off.
  7. Keep as much ash out of the house as possible. Close all windows and doors properly and cover cracks under doors with damp towels.
  8. DO NOT use exhaust fans or clothes dryers.
  9. Leave outdoor clothing outside.
  10. Stay indoors if visibility is difficult because of thick ash conditions. A hand torch is only effective at very close range.
  11. Clear tephra (solid matter from an eruption) build-up from roofs and guttering to prevent the roof from collapsing and drains getting blocked.
  12. Keep all food clean and protected.
  13. Wash all vegetables carefully.

## Section Fourteen: Problem Solving

a. **Introduction.** Always expect the unexpected in the chaos of the early part of an emergency. Be aware some of the unexpected events will exceed previous experiences. It is therefore important to have a logical problem solving process to work through to find a solution. Try this:

### Purpose and Aim Factors Courses Open Plan

b. **Purpose and Aim.** Identify the problem and what must be done about it. This is the Purpose. What must be done first is the Aim. The Purpose will usually be the desired endstate.

c. **Factors** – include;

1. Assumptions - list what you know
2. Tasks - what are the intermediate tasks to achieve the endstate
3. Time - critical timings, time now, time for completion
4. Terrain - distances, obstacles
5. Meteorology - weather, day or night
6. Resources - people and tools available, food, water
7. Constraints - limitations in any of the above
8. Freedoms - usually an abundance of any of the above

d. **Courses open** – generate, analyse and compare possible solutions. Consider combining some of the possible solutions.

e. **Plan** – make a decision and implement it.

**Example:** Problem – you want to go to work but the car won't start. Your Purpose is to get the car to start. You try everything you know but it doesn't work, so help is needed. The Aim is therefore to get help to start the car.

#### Factors:

- |                |  |
|----------------|--|
| 1. Assumptions | The mechanic at the garage can help        |
| 2. Tasks       | Contact the garage                         |
| 3. Time        | Do it fast                                 |
| 4. Terrain     | Not an issue                               |
| 5. Meteorology | Not an issue                               |
| 6. Resources   | A mobile phone                             |
| 7. Constraints | It is 7.30 and the garage opens at 8.00 am |
| 8. Freedoms    | The phone battery is fully charged         |

**Courses Open:**

1. Catch the bus to work now and contact the garage after work.
2. Push the car to the garage around the corner.
3. Wait for the garage to open at 8 am and then ring it.

**Plan:** "I will sit in the car and read the paper until 8 am when I will ring the garage to seek advice or assistance starting the car."

## Section Fifteen – Miscellaneous

### 15. Important Contact Numbers, Metric Conversion Charts, and Personal Notes

#### Important Contact Numbers

*(After Hours, Mobile, Pagers etc)*

Ministry of Health:

National Emergency Services:

Regional and Local Emergency Services:

- Police
- Local Civil Defence (Emergency Management)
- Fire Service
- Red Cross
- Water Authority
- Power Authority
- Regional Civil Defence (Emergency Management)

Municipal (Local Authority) Staff:

- CEO
- Civil Defence (Emergency Management)
- Recovery/Welfare Officer
- Health Staff

Adjoining Municipalities (local authorities):

Others:

## METRIC CONVERSIONS

To convert	multiply by
<b>AREA</b>	
Square inches into square millimetres	645.16
Square inches into square centimetres	6.4516
Square feet into square centimetres	929.03
Square feet into square metres	0.0929
Square yards into square metres	0.8362
Acres into square metres	4046.8
Acres into hectares	0.4046
Square miles into square kilometres	2.5899
<b>VOLUME &amp; CAPACITY</b>	
Cubic inches into cubic centimetres	16.389
Cubic inches into litres	0.0163
Cubic feet into cubic metres	0.0283
Cubic feet into litres	28.316
UK pints into litres	0.5682
UK quarts into litres	1.1365
Cubic yards into cubic metres	0.7645
UK gallons into litres	4.5460
UK gallons into cubic metres	0.0045
UK fluid ounces into cubic centimetres	28.413
<b>POWER</b>	
Foot pounds-force per second into watts	1.3558
Horsepower into watts	745.7
Foot pounds-force per second into kilowatts	0.0013
Horsepower into watts	0.7457
Horsepower into metric horsepower	1.0138
<b>MASS</b>	
Grains into milligrams	64.798
Grains into grams carats	0.6479
Ounces into grams	28.349
Ounces into kilograms	0.0283
Pounds into kilograms	0.4535
Stones into kilograms	6.3502
Hundredweight into kilograms	50.802
Tons into kilograms	1016.0
Tons into metric tonnes	1.0160
<b>LENGTH</b>	
Inches into millimetres	25.4
Inches into centimetres	2.54
Inches into metres	0.0254
Feet into millimetres	304.8
Feet into centimetres	30.48



Feet into metres	0.3048
Yards into metres	0.9144
Chains into metres	20.116
Furlongs into metres	201.16
Miles (land) into kilometres	1.6093
Miles (nautical) into kilometres	1.852

#### TEMPERATURE

Fahrenheit to Centigrade add 40 multiply by  $\frac{5}{9}$  subtract 40

Centigrade to Fahrenheit add 40 multiply by  $\frac{9}{5}$  subtract 40

**NOTES:**