KEY HAZARDS & RISKS SUMMARY

Emergency Management Plan

WESTERN ADELAIDE ZONE

Queens Wharf, Port Adelaide
Image courtesy of South Australian Tourism Commission

Government of South Australia

CONTENTS

councils

City of Charles Sturt

City of West Torrens

City of Port Adelaide (only Port Adelaide as Enfield forms a part of the Northern Adelaide Zone)

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INTRODUCTION

Across South Australia there are a range of hazards including natural disasters such as bushfires, storms, heatwaves and floods that can have significant impacts on peoples' health and wellbeing, along with severe impacts on communities, social, environmental and economic structures.

This is a concise summary of the Western Adelaide Zone Emergency Management Plan (ZEMP) which provides information on natural disasters and hazards identified as having a specific relationship to the Western Adelaide Zone.

Adelaide International Airport

TOP HAZARDS AT A GLANCE FOR THE WESTERN ADELAIDE ZONE AND THEIR IMPACTS

Hazard	People	Economy	Social/ Community	Environment
Flood				
Extreme Weather - Heat				
Extreme Weather - Storm				
Escape of Hazardous material and urban fire				
Earthquake				

The table above gives an indication of the greatest impacts of disaster events on different aspects of the community. The extent of the impact felt is influenced by the intensity of the event, the actions taken to reduce or avoid the effects and the ability of the community, businesses and government to respond and recover.

Flood - Flood is the most costly natural disaster in South Australia. It is important to be aware of flood and severe weather warnings, ensure you have adequate insurance if you live in a flood prone area and never drive in floodwaters.

Extreme Weather (Heat) – Extreme heat causes more deaths in Australia than all other natural hazards combined. Take precautions to keep cool, take shelter from the heat and drink water; even individuals who are healthy can be affected. Never leave children or pets in cars as vehicles can quickly heat up to deadly temperatures even on relatively mild days.

Extreme Weather (Storm) – Extreme storms are more commonly observed than any other natural hazard in South Australia. To stay safe you should move vehicles under cover or away from trees; secure or put away loose items around your property and stay indoors, away from windows, while conditions are severe.

Escape of Hazardous Materials and Urban Fire – Western Adelaide has many places where hazardous materials are manufactured, stored, transported, used and disposed of. Dangerous goods may be corrosive, flammable, explosive, spontaneously combustible, toxic, and oxidising or water reactive. Exposure or contact with some of these substances may cause cancer, skin disease, poisoning and respiratory illness.

Earthquake – Adelaide has the highest prone risk to earthquakes out of all the capital cities in Australia. Earthquakes occurring in urban areas pose a risk to residents and essential societal systems, including critical infrastructure. In an earthquake, it's important that you quickly **DROP** to the ground close to you, where you can avoid injury from flying debris; take **COVER** under something strong, like a sturdy table; and **HOLD** on to it until the shaking stops.

Port Adelaide Lighthouse, Port Adelaide, South Australia.

WESTERN ADELAIDE ZONE IN FOCUS

3 councils

Population **223,423**

SIZE **148.21** square kilometres

employment **113,469**

$17.7b Gross Regional Product

21,450 businesses

59% residential land

23% commercial land

8% open space

62% migrated to Australia in the previous **10 years**

33% population **speak another language**

MAJOR Industries

Retail trade
TRANSPORT
Manufacturing
construction
Professional Services
WAREHOUSING

KEY infrastracture

Adelaide Airport
FLINDERS PORTS
Techport
Pelican Point and Torrens Island power stations
Glenelg Waste Water Treatment Plant
ADELAIDE PARKLANDS TERMINAL
Adelaide Submarine Corporation

HEALTH SERVICES

4 MAJOR health facilities

96 nursing homes and retirement villages

217 educational facilities

Barker Inlet Wetlands
PORT RIVER ESTUARY
Brownhill Keswick Creek
RIVER TORRENS

by 2070

- **2°C** WARMER
- **26-48cm** SEA LEVEL RISE
- **20%** RAINFALL DECLINE
- **11%** MORE INTENSE
- **>2°C** SEA TEMP.

170+ registered South Australian **heritage places**

UNDERSTANDING OUR RISK PROFILE

Disasters are having an increasing financial and social impact on individuals, communities and businesses. There are large upfront costs for response and recovery and long–term impacts on wellbeing. The cost of disasters, both direct and intangible, are expected to rise significantly in the coming years.

In 2011, the Australian Government released the National Strategy for Disaster Resilience[1] (the Strategy). The Strategy aims to promote a shared responsibility between governments, business, not-for-profit organisations, communities and individuals. The Strategy recognises that Australians need to focus more on understanding risks relevant to their community and preparing for potential impacts.

Keeping the community informed is a key aspect in building community resilience – before an emergency to help with prevention and preparedness, while responding to the emergency and after, to help with recovery.

This plan is a public version of the Western Adelaide Zone Emergency Management Plan (ZEMP). The ZEMP relies on strong, cooperative, coordinated and consultative relationships among State Government agencies and local governments to work together in disasters. State Government and Local Government have plans to maintain effective service delivery to ensure that an efficient and coordinated response and recovery can be delivered to any disaster.

All sectors of the community have a collective responsibility when it comes to emergency management.

[1]National Strategy for Disaster Resilience: *http://www.safecom.sa.gov.au/site/emergency_management/natural_disaster_resilience_program.jsp*

Semaphore Beach

South Australia's emergency management arrangements involve the following activities:

- **Prevention** – actions undertaken in advance. Sometimes this is referred to as mitigation. Examples include prescribed burning or constructing flood mitigation dams, having back-up generators or alternative communication systems in place. Prevention activities occur prior to disasters.
- **Preparedness** – making arrangements, creating and testing plans, training, educating and sharing information to prepare organisations and communities before a disaster occurs.
- **Response** – the assistance and intervention during or immediately after a disaster. Focus is on saving lives and protecting community assets (buildings, roads and infrastructure) and the environment.
- **Recovery** – the coordinated process of supporting emergency-affected communities in reconstruction of physical infrastructure and restoration of emotional, social, economic and physical wellbeing. Recovery can be required for months and/or years after the disaster.

Henley Beach Jetty.

MAJOR HAZARDS

The Western Adelaide Zone

1. Floods
2. Extreme Weather - Heat
3. Extreme Weather - Storm
4. Escape of Hazardous materials and Urban Fire
5. Earthquake

Risk Assessment Process

The arrangements for the state to manage emergencies are outlined in the State Emergency Management Plan (SEMP).

The SEMP identifies the State's eleven Emergency Management Zones. Each of these Zones has specific characteristics that are vulnerable to disasters, for example different demographics, industry, infrastructure, businesses and economic factors.

Each Zone has a Zone Emergency Management Committee (ZEMC) made up of Local and State Government and emergency management staff. These committees have a risk assurance role and provide regional leadership in emergency management in their Zones. One of their main roles is the development of a Zone Emergency Management Plan. This is important as understanding the potential impact of disasters on the region is essential for planning and preparation.

Zone Emergency Management Plans were produced by conducting risk assessment workshops with stakeholders from government and non-government organisations. These workshops used realistic scenarios about a hazard. Attendees then assessed which risks were the most likely to occur and could have the greatest impacts in the Zone.

The Western Adelaide Zone Emergency Management Plan includes detailed information about the five relevant hazards in the Zone: floods, extreme heat, extreme storm, earthquake, escape of hazardous materials and urban fire and the main risks associated with each. Information about the priority hazards and their likely impacts are detailed in the following pages.

Risk assessments used *The National Emergency Risk Assessment Guidelines* based on ISO 31000 to ensure a consistent and rigorous approach.

EMERGENCY SERVICES

1 SES units
7 MFS stations
3 POLICE stations
6 AMBULANCE stations

History of Emergencies

2016 TORRENS RIVER FLOODING
SOME AREAS REACHING MAXIMUM-RECORDED RIVER LEVELS.

1998 HIGH TIDES AND HEAVY RAINFALL IN PT ADELAIDE
FLOODED LOCAL ROADS AND INFRASTRUCTURE

2016 STORMS

1. FLOOD

The Western Adelaide Zone covers a large metropolitan area. Key riverine and flash flood sources are from Brownhill Keswick Creek, the River Torrens, a small section of the Sturt River and the Port Adelaide catchment.

The Zone is also impacted by stormwater flooding and coastal inundation. Stormwater flooding occurs in urban areas when drainage infrastructure becomes blocked. This is generally localised and occurs in heavy rainfall and is the main source of flooding in the Western Adelaide Zone. Coastal inundation occurs in some sections of the coastline, particularly around the Port Adelaide area.

The Torrens used to frequently break its banks and flood the Zone but the Kangaroo Creek Reservoir and levee banks on lower sections have significantly reduced the risk.

The assessments showed that the main risks to people were death and injury, of particular concern was for people driving through floodwater or those caught in fast moving water.

Floods also significantly affect the economy through disruption and damage to infrastructure such as roads, transport and loss to businesses. Communities are also affected, as people are unable to return to their homes due to loss or damage to their property.

It is very important to never drive through floodwaters and ensure that you have adequate insurance if you live in a flood-prone area.

For information on how to minimise the impact to you and your family visit: http://www.sa.gov.au/topics/emergencies-and-safety/types/flood

Risk Assessment Scenarios

To understand the impact of flood on the Zone, hypothetical scenarios were considered as part of the risk assessment. Hypothetical scenarios were based on different intensities of storm surge accompanied by different quantities of rainfall. The impacts were:

Hypothetical Scenario 1

- flooding of residential premises, factories and storage facilities
- electricity and phone line breakdowns in some areas
- pollutants entering the Port River from factory sites
- Some residents evacuated temporarily

Hypothetical Scenario 2

- Extensive property damage, people evacuated
- Death and serious injuries to members of public
- Inundation of infrastructure including hospitals, aged care facilities, telephone and communication networks inoperative
- Public transport system inoperative, airport closed
- Long term disruption to business, extensive damage to manufacturing sector
- Floodwaters remaining for 2-3 days before receding
- Contaminants due to sewage overflows and debris, stormwater system inoperative

Flood is the most costly natural disaster in South Australia. For the period of 1967-2013 the cost of flooding was approximate $48 million per year.

The main types of flooding include:

Flash flooding – flooding that occurs quickly from heavy rainfall and can be very localised

Riverine flooding – flooding that occurs in a river catchment or watercourse

Infrastructure failure – including structural failure of pipes, dams or levees

Coastal inundation – that occurs from large waves from storm events

RECENT FLOOD EVENTS

2016	River Torrens flooded with some areas reaching maximum-recorded river levels. Some bridges, paths and levee banks destroyed.
1998	High tides and heavy rainfall in Port Adelaide flooded local roads and infrastructure

2. EXTREME HEAT

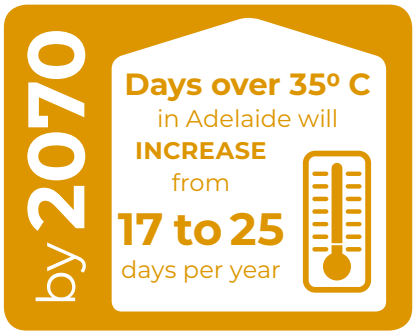
Extreme heat causes more deaths in Australia than all other natural hazards combined.

Extreme heat, also known as a heatwave, is defined as three or more days of high maximum and minimum temperatures that are unusual for that location.

Heatwaves can be the cause of death and significant health issues in people with kidney, heart disease and mental health issues. The risk of death and serious illness is particularly high for the elderly, children and those working or enjoying recreational activities outdoors. People are encouraged to take shelter from the heat, drink water and keep cool. Never leave children or pets in cars as they can heat quickly to deadly temperatures even on relatively mild days. Heatwaves are a particular risk for anyone who does not take precautions to keep cool, even individuals who are healthy.

Animals, the natural environment and infrastructure, such as power, communications, water and transport are also at risk. Heatwaves can also impact the continuity of service provision from businesses and government. Local Government services may also be impacted and experience an increase in demand.

For more information on how to minimise the impact to you and your family visit: www.sa.gov.au/topics/emergencies-and-safety/types/extreme-heat



Risk Assessment Scenarios

To understand the impact of extreme heat on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 - In March 2008 a heat event with 15 consecutive days with a max temp >37.8˚C (in Adelaide), caused at least $150 million in damage and reduced income for South Australia. There was a threefold increase in heat related hospital admissions.

Scenario 2 - The January / February 2009 heat event which ran for 13 consecutive days across South Australia with temperatures up to almost 49˚C recorded and over 34 deaths in South Australia.

Scenario 3 - A hypothetical heat scenario - a combination of the extended period of the 2008 event and the intensity of the 2009 event with expected breakdown of critical infrastructure such as electricity, transport network and communications. Likely impacts included increased demand on ambulance and hospitals, hundreds of deaths, outdoor work ceases and food shortages.

RECENT EXTREME HEAT EVENTS

Heat Event of 2014

- 38 deaths
- 294 heat-related emergency presentations at hospitals

3. EXTREME STORM

Extreme storms are more commonly observed than any other natural hazard in South Australia and the Zone experiences storms several times per year. Extreme thunderstorms can occur at any time of the year, however in South Australia, they are more common in spring and summer. The Zone experiences storms several times per year. The Bureau of Meteorology has identified two types of extreme storm that can impact the Zone. These are:

Thunderstorm:

- Heavy rainfall leading to flash flooding (>30 mm/h)
- Wind gusts (90 km/h or greater)
- Damaging hailstones (2cm diameter or greater)
- Tornadoes

Synoptic Storm (could include some/all of the above but also):

- Mean wind speed 63 km/h or greater (land gale)
- Storm tide/surge higher than astronomical tide causing damage/destruction to foreshore.

The extreme storm risk assessment identified a number of risks to the Zone. Extreme storms can cause injury or death as well as increased demands on the health services. They may cause houses to become unliveable due to damage or lack of essential services.

Extreme storms also significantly affect the economy through disruption and damage to infrastructure such as electricity and telecommunications, loss of productivity due to employees being unable to work, and damage to, or loss of buildings. Local and State Government agencies may experience service disruptions and damage to maintenance depots. Waterways might be affected because of toxic substances or contaminants entering due to damage/ disruption to waste and waste water systems.

To stay safe people should:

- Move vehicles under cover or away from trees;
- Secure or put away loose items around your property.
- Stay indoors, away from windows, while conditions are severe.

Risk Assessment Scenarios

To understand the impact of storm on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 – Example was 22 January 1991 hailstorm

- $25 million estimated damage
- More than 2000 private insurance claims
- $1million damage to New cars awaiting distribution
- Damaged electricity lines and poles resulting in widespread power outage
- $700,000 damage cost of electricity infrastructure

Scenario 2 - hypothetical storm – synoptically driven extreme storm event, triggering smaller scale, very dangerous supercell thunderstorms. Long-lived and widespread.

- Long term power outages
- Extensive damage to homes
- Large number of deaths and/or injuries
- Roads blocked by trees
- Health and other response agencies overwhelmed

RECENT EXTREME STORM EVENTS

September 2016 - a state-wide extreme storm led to state-wide power outages and flooding in the Zone. The storm cost $367m to businesses state-wide.

May 2016, – King tide and storm surge led to significant damage to some sections of the coastline, damaging the sea wall at West Beach. More than $1.3m was the estimated cost of rebuilding the rock sea wall at West Beach.

For information on how to minimise the impact to you and your family or business visit: www.sa.gov.au/topics/emergencies-and-safety/types/extreme-storm

4. EARTHQUAKE

An earthquake is shaking of the surface of the earth caused by underground movement, such as along a fault line or by volcanic activity. They range in strength from slight tremors to major shaking, lasting from a few seconds to a few minutes and may be followed by aftershocks. Apart from the damage caused by the ground shaking, earthquakes can also lead to liquefaction (soil becoming liquid) which can cause extensive damage to buildings.

Earthquakes are measured on the Richter Scale, with 9.5 being the highest possible magnitude. Australia averages 80 earthquakes per year with a magnitude greater than 3.0. An earthquake of 5.5 is experienced approximately every two years and a 6.0 every five years.

Earthquake was considered for this Zone as there has been recorded earthquake activity in the past.

Earthquakes may cause injury and death. Damage to residential, commercial and industrial buildings, as well as stock and equipment are possible. Airstrips; Port facilities, electricity and communication network; and sewerage and potable water pumping may be impacted and/or damaged.

The social fabric of the community is affected when people are unable to return to community due to loss of houses or businesses, interruption to public services and amenities or access and egress to their properties.

In an earthquake, it's important that you quickly:

- **DROP** to the ground close to you, where you can avoid injury from flying debris.
- Take **COVER** under something strong, like a sturdy table.
- **HOLD** on to it until the shaking stops.

Risk Assessment Scenarios

To understand the impact of earthquake on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 – 5.0 magnitude – hypothetical event based on Kalgoorlie 2010 earthquake

- $1.7 billion damage to residential homes
- $168 million damage to commercial and industrial buildings
- 1 severe injury or death
- 2 light to moderate injuries

Scenario 2 – 5.6 magnitude – hypothetical event based on Newcastle 1989 earthquake

- $2.7 billion damage to residential homes
- $590 million damage to commercial and industrial buildings
- 11 severe injury or death
- 205 minor to moderate injuries

RECENT EARTHQUAKE EVENTS

In 1954, Darlington experienced a 5.5 magnitude earthquake causing 16 injuries and damage to buildings totalling $90 million. Damage is expected to have occurred up to 20kms away and felt up to 250kms away.

For information on how to minimise the impact to you and your family or business visit: https://www.sa.gov.au/topics/emergencies-and-safety/types/earthquake

5. ESCAPE OF HAZARDOUS MATERIALS AND URBAN FIRE

Escape of hazardous materials is identified as a priority hazard for the Western Adelaide Zone due to a large number of industries in the Zone and a large number of vehicles (trucks, ships etc) carrying dangerous goods through the region. Some identified hazardous materials include ammonium nitrate, nitric acid and liquid petroleum gas (LPG).

These substances have the potential to cause a range of impacts to Western Adelaide Zone, if they are incorrectly handled or involved in an accident, which causes them to be released into the environment. These materials can cause explosions and fires, with associated impacts including interruption to the business and industry sector, damage or destruction of properties and business, closure of roads and transport routes and damage to telecommunication infrastructure.

Some of the most important risks associated with escape of hazardous materials include death and injury of people exposed to these materials or caught in subsequent explosions or fires, and people unable to return to their houses in the short and long term, while the situation is brought under control. Such events have potential to significantly affect the businesses in the Zone and have a wider impact on the State's economy.

For information on what can be done to minimise the impact to you and your family visit: http://www.sa.gov.au/topics/emergencies-and-safety/types/chemical-emergency

These substances have the potential to cause a range of impacts to the Western Adelaide Zone if they are incorrectly handled or involved in an accident which causes them to be released into the environment.

Risk Assessment Scenarios

To understand the impact of escape of hazardous materials and urban fire on the Zone, the following hypothetical scenarios where considered as part of the risk assessment:

Hypothetical Scenario 1 – involving nitric acid spill on Port Road from vehicle accident

- 4 people transported to hospital with minor injuries
- 8 people treated by SA Ambulance

Hypothetical Scenario 2 – an incident at M Berth in the inner Port Adelaide harbour

- Ship tanker with unleaded fuel, diesel and aviation gas accident
- Massive fire resulting in destruction of ship, refuelling facilities at M Berth
- Exclusion zone of 15 km enforced around M Berth
- 2 people killed in initial explosion and fire, several injured
- Environmental impacts to landscape, contamination in wetlands, mangroves and storm water drains.

Hypothetical Scenario 3 – Chlorine gas leak in treatment plan

- All levels of government requiring to divert resources
- Food shortage, medical supplies and disturbance to public transport identified as main concerns

ARE YOU PREPARED?
Checklist

Are you prepared?

- [ ] Do you know what types of emergency and disaster might affect you?
- [ ] Does your household have an emergency plan? (more details on this page)
- [ ] In the last year, have you done anything to protect your home? (e.g. clear gutters or vegetation)
- [ ] Do you have appropriate and adequate insurance cover?
- [ ] Have you prepared an emergency kit? (visit sa.gov.au/emergencies/ and look up emergency preparation for more information)

To assist in your Emergency Management Planning, the following list provides questions to consider:

- [ ] Who will you include in the plan? Family, pets, neighbours, grandparents, children etc
- [ ] What will you do if some of you are not home?
- [ ] Consider when to evacuate during flood, storm, bushfire or other emergencies
- [ ] Where will you evacuate to? Meeting place near home, meeting place away from home?
- [ ] Can you keep your business going during and after disasters? (go to sa.gov.au/emergencies-and-safety/ for more information)

Think about the different kind of emergencies that could affect you.

Have you considered making a plan? For help with making a plan:

- **Red Cross**: redcross.org.au/prepare
- **CFS Bushfire plan**: cfs.sa.gov.au/site/prepare_for_a_fire/5_minute_bushfire_plan.jsp
- **Emergency plans**: sa.gov.au/topics/emergencies-and-safety/prepare-for-an-emergency/emergency-plan

Equipment connected over the nbn™ access network will not work during a power blackout.

Make sure you have a battery powered radio and your mobile phone is fully charged.

Disasters happen - don't think if, think when!

Government of South Australia

Thebarton Theatre, Thebarton.

Warnings and advice can be obtained from a number of sources:

sa.gov.au/topics/emergencies-and-safety

ABC 639am ABC 891am

bom.gov.au for Bureau of Meteorology (BoM) weather and warnings updates including local seven day forecasts.

Government of South Australia