

# Review of cyclone and storm tide sheltering arrangements

## Report 3: 2014-15



This report considers how local government sheltering arrangements match the risks associated with cyclone and storm tide. Good practice examples are identified, with opportunities to improve risk assessment, community engagement and assessments in exposed local government areas.

## Document Details

<b>Security Classification</b>	Public
<b>Security Classification Review Date</b>	27 August 2015
<b>Author</b>	Inspector-General Emergency Management
<b>Authority</b>	Office of the Inspector-General Emergency Management
<b>Version control</b>	V1.01

## Information security

This document has been classified using the [Queensland Government Information Security Classification Framework](#) (QGISCF) as PUBLIC and will be managed according to the requirements to the QGISCF.

## Copyright

Copyright protects this publication except for purposes permitted by the Copyright Act 1968. Reproduction by whatever means is prohibited without the prior written permission of the Inspector-General Emergency Management. Reference to this document is permitted only with the appropriate acknowledgement.

© The State of Queensland, Office of the Inspector-General Emergency Management (2015).

## Contact details

All enquiries regarding this document should be directed to the Office of the Inspector-General Emergency Management:

- Email: [info@igem.qld.gov.au](mailto:info@igem.qld.gov.au)
- Tel: 07 3227 6588
- Mailing Address:  
Mail Cluster 15.7  
GPO Box 1425  
Brisbane Qld 4001

## Queensland Emergency Management Assurance Framework

**Principles**

**Leadership**  
Leadership at all levels is demonstrated through a commitment to a shared culture of disaster management excellence. Strategic planning, within the context of resources and risk, underpins clear decision making and planning to achieve outcomes.

**Public safety**

Queensland's disaster management arrangements are delivered through effective disaster management groups where policy, procedure and practice all focus on safety of the public, engaging stakeholders and sharing responsibility.

**Partnership**

Everyone has a role to ensure Queensland is the most disaster-resilient State. Strategic partnerships are well-governed, drive clear roles and responsibilities, and promote true collaboration.

**Performance**

Productivity and effectiveness are measured by a combination of quality, quantity, cost, time or human relationships. Performance is monitored and analysed against standards and good practice across the spectrum of prevent, prepare, respond and recover.

**Standard for Disaster Management in Qld**

**Shared responsibilities**

Hazard Identification & Risk Assessment	Hazard Mitigation & Risk Reduction	Preparedness & Planning	Emergency Communications	Response	Relief & Recovery
---	------------------------------------	-------------------------	--------------------------	----------	-------------------

**Key outcomes**

<b>Good practice attributes</b> The attributes that enable and indicate the quality of the outcome	Solutions, programs or systems are <b>scalable</b> and can be applied in any size or type of event Systems and solutions are <b>interoperable</b> and able to operate seamlessly Solutions, programs or systems are <b>adaptive</b> and flexible to the needs of the stakeholder Solutions, programs or systems can demonstrate <b>value for money</b> Solutions, programs or systems are <b>comprehensive</b> and consider all phases of disaster management
<b>Accountabilities</b> The area assessed against the ability to deliver the outcome	<b>Governance</b> arrangements support local needs <b>Doctrine</b> is in place that embeds common language, creates unity and clear purpose The required <b>enablers</b> such as systems, resources, information and technologies are developed and maintained The required <b>capability</b> is established, tested and maintained <b>Performance</b> is measured, reported and managed to drive continuous improvement

**Assurance Tiers**

<b>Assurance activities</b> The activities undertaken to validate performance	<b>Tier One activities</b> e.g. Self-assessment	<b>Tier Two activities</b> e.g. Peer review, exercise evaluation	<b>Tier Three activities</b> e.g. IGEM-led review or post event analysis
--	--	---	---

## **The purpose of our papers**

All papers and reports produced by the Office of the Inspector-General Emergency Management (IGEM) provide independent assurance and advice about the effectiveness of emergency management arrangements in Queensland. The Office of the IGEM bases all publications on the Emergency Management Assurance Framework, which encompasses the Standard for Disaster Management in Queensland.

### **Briefing paper**

A briefing paper provides the decision-maker with a summary of facts about an issue, or an overview of a situation or arrangements. The briefing paper may address opportunities for improvement or highlight exemplary practice. The briefing paper provides the decision-maker with the next steps to consider which may include advice to entities.

### **Discussion paper**

A discussion paper provides greater analysis of an issue, situation or arrangements than a briefing paper, considering trends, other sector or jurisdiction approaches or current best practice research. The discussion paper may address opportunities for improvement or highlight exemplary practice. The IGEM may suggest improvements to entities through advice, or more formally through professional practice considerations.

### **Review report**

A review report provides a comprehensive analysis of the effectiveness of a particular disaster management issue, situation or set of arrangements. The review report is based on evidence, and may include discussion of underlying themes, contributing factors and root causes of issues. The review report includes findings, and bases recommendations for improvement on lessons identified, research and good practice.

### **Research paper**

A research paper may be produced as a result of a review report, or initiated by the IGEM. A research paper explores an issue, generates discussion and seeks best practice solutions.

# Contents

---

Contents .....	5
Executive summary.....	6
Background .....	6
Findings.....	7
Conclusion.....	8
Recommendations .....	8
Context .....	10
Purpose .....	12
Scope .....	12
Methodology .....	13
Risk.....	15
Risk modelling for storm tide and cyclones.....	15
Identifying community characteristics .....	16
Identifying and transferring residual risk .....	17
Arrangements .....	19
Individual sheltering arrangements .....	19
Arrangements for vulnerable persons.....	20
Arrangements for pets.....	22
Disaster management guidelines.....	23
Public sheltering facilities .....	24
Disaster management priorities inform land-use and town planning.....	29
Community engagement .....	30
Communities understand their storm tide and cyclone risk .....	30
Communities are encouraged and supported to make their own sheltering arrangements .....	31
Community education .....	32
Conclusion .....	33
Recommendations .....	34
Bibliography .....	37
Appendix A: Doctrine .....	40
Appendix B: Queensland's public cyclone shelters .....	42
Appendix C: Queensland cyclone shelter map.....	43
Appendix D: Queensland local government areas exposed to cyclonic wind & storm tide ...	44
Appendix E: Contributors .....	45
Appendix F: Expectations .....	46
Appendix G: Case study of Tropical Cyclone Marcia.....	48
Appendix H: Summary of feedback .....	52

# Executive summary

---

## Background

Queensland is highly exposed to cyclone and storm tide events. Our coastal population is growing and ageing. There are thirteen public cyclone shelters, as well as a number of places of refuge<sup>1</sup> located in vulnerable coastal communities. Local governments have raised issues relating to their operation of these facilities, and whether their capacity will meet demand and communities' reliance on them.

The purpose of this review is to examine cyclone and storm tide sheltering arrangements across Queensland. We examined eleven local governments to consider whether arrangements match local risk and vulnerable people can find out about them. We focused on three areas: risk, sheltering arrangements, and community engagement.

We found some local governments exposed to storm tide have not undertaken risk modelling and do not have storm tide evacuation zones. Where risk modelling has been undertaken and evacuation zones mapped, we found examples of inconsistency. This may lead to confusion during evacuations, particularly along local government borders.

Community profiling is often lacking and inconsistent. Local governments generally understand which areas of housing are vulnerable to storm tide inundation and which older housing is at increased risk from cyclonic winds. However, detailed information about the communities' reliance on public sheltering is not always known.

Residual risks, particularly for extreme events, are often not adequately identified; nor is there a consistent method to transfer risks. Further, residual risks are not collated at the state level to inform state agencies' capability planning. We do not know if sheltering arrangements match risk, because risk is not always adequately identified and assessed.

Local and district disaster management groups would benefit from clear guidance on how to identify and engage vulnerable people during emergencies. We found examples of a lack of agreement around responsibilities for supporting vulnerable persons to evacuate early and shelter. Local governments we spoke to are concerned about the lack of disaster management and business continuity planning by residential aged care facilities. Guidance is needed to foster collaboration between disaster management groups and service providers.

Opportunities exist to review a number of guidelines to improve consistency and promote scalability for events and the capacity of local government. Many stakeholders interviewed had concerns about legal protection for public cyclone managers. Their view is that legal

---

<sup>1</sup> Places of refuge are a type of safer location identified as suitable to provide a level of protection from the effects of a cyclone as it passes, section 10.1 of the *Queensland Evacuation Guidelines for Disaster Management Groups*, Emergency Management Queensland, 2011.



advice is required to inform doctrine<sup>2</sup> on the staffing of public cyclone shelters and places of refuge.

Some local governments have mature community engagement programs to advise their communities of identified risks and local arrangements. These programs promote resilience by encouraging and supporting communities to make their own sheltering arrangements. Local governments and state agencies are active in delivering community education. However, there is evidence of mixed messages and a lack of coordination between agencies to deliver comprehensive and consistent all-hazards messaging that supports local context.

## Findings

1. The *Queensland Evacuation Guidelines for Disaster Management Groups* does not describe standard colours for storm tide evacuation zones and does not meet the needs of all local governments.
2. Many local governments do not have reliable predictions of public sheltering demand for a range of cyclone and storm tide scenarios.
3. Of the local governments we interviewed, there was limited awareness of the guideline *Mitigating the adverse impacts of cyclones – Evacuation and shelter*. Few local governments use it to predict public sheltering demand.
4. There is opportunity to improve guidance and doctrine for local governments to identify and engage vulnerable persons in emergencies.
5. A clearly defined risk management process would assist local government with risk-based planning and residual risk escalation.
6. Greater understanding of privacy legislation will reduce barriers to the sharing and coordination of information during emergencies.
7. Local government and aged care providers would benefit from improved collaboration and coordination around business continuity planning for the sector.
8. Opportunities exist to raise awareness with local government of research and planning tools developed at the national level to assist planning for animals in emergencies.
9. The guidelines should encourage risk-based and flexible planning that result in plans that address local needs, and promote alignment between neighbouring local government areas.
10. Disaster management doctrine lacks guidance on activation levels for, and the resourcing of, places of refuge.
11. Staffing of public cyclone shelters and places of refuge is problematic in most local government areas.
12. The delivery of public cyclone shelter training lacks alignment with broader disaster management exercises to reinforce understanding and develop relationships.
13. Disaster management doctrine lacks guidance on triggers and safety considerations for re-opening public sheltering facilities.

---

<sup>2</sup> ‘...collective knowledge that has been structured and systematised to facilitate its application in practice and prepared for dissemination in a way appropriate for its intended audience’, Australasian Fire and Emergency Services Authorities Council, *Fundamentals of doctrine: A best practice guide*, 2011, p. 2.

14. Communities are less likely to be aware of their risk to cyclone and storm tide events and perform appropriate risk reduction activities if risk assessments have not been conducted and communicated.
15. There are opportunities to improve collaboration, in the first instance between State agencies, and subsequently with local government, to ensure community education for disaster is consistent and locally relevant.
16. An opportunity exists for State Emergency Service volunteers to become more involved in the delivery of community education for disaster preparedness.

## Conclusion

Queensland's arrangements for sheltering people from cyclones and storm tide are well catered for in guidelines and plans. However, the application of the arrangements is an ongoing learning process.

The recent focus on disaster resilience and increased modern housing stock means more people can find adequate shelter in their own homes. This reduces the burden on local government to provide public cyclone shelters and places of refuge.

Local governments are generally satisfied with their community's levels of preparedness; however the lack of consistent risk modelling across all coastal local government areas makes it difficult to predict public shelter demand. Better information is required before we can be sure that Queensland's sheltering arrangements match the risks faced by the community.

## Recommendations

We recommend that:

### Recommendation 1

An integrated risk-based approach to disaster management planning for Queensland is developed that is consistent with the *Standard for Disaster Management in Queensland* and applicable at all levels of the arrangements.<sup>3</sup>

### Recommendation 2

An audit of all local government areas vulnerable to storm tide events is undertaken to identify gaps in evacuation zone planning and ensure consistency with neighbouring local government areas and the *Queensland Evacuation Guidelines for Disaster Management Groups*.

### Recommendation 3

A state-wide strategy, including a common definition, is developed for identifying and engaging vulnerable people in emergencies.

---

<sup>3</sup> Aligned to recommendation 3 of *Review of state agency integration at a local and district level: Report 2: 2014-15*, Office of the Inspector-General Emergency Management, 2015b.



#### **Recommendation 4**

The following disaster management doctrine is reviewed and reissued to ensure consistency and improved guidance to local government:

- *Queensland Evacuation Guidelines for Disaster Management Groups*
- *Queensland Public Cyclone Shelter Operations Guidelines*
- *Queensland Public Cyclone Shelters Maintenance Guidelines*
- *Mitigating the Adverse Impacts of Cyclones – Evacuation and Shelter*
- *Business Continuity Planning Resource for Aged Care Facilities.*

#### **Recommendation 5**

A state-wide engagement strategy is coordinated to ensure community messaging is consistent across all levels of Queensland's disaster management arrangements.

#### **Professional practice considerations<sup>4</sup>**

##### **Professional Practice Consideration 1**

Queensland Fire and Emergency Services should consider examining regulatory provisions to improve disaster management and business continuity planning for aged care providers.

##### **Professional Practice Consideration 2**

Opportunities should be identified through the Local Government Association of Queensland council to council arrangement to share structural engineers to assess potential places of refuge against the Department of Housing and Public Works' *structure classification criteria*.

##### **Professional Practice Consideration 3**

The Department of Housing and Public Works should consider preparing an annual communicate to asset owners of, and local governments with access to public cyclone shelters, outlining the maintenance and certification process and pre-season status.

##### **Professional Practice Consideration 4**

In conjunction with the Queensland Fire and Emergency Services review of guidelines, the Public Safety Business Agency should consider reviewing the cyclone shelter management training package to include guidance to the shelter management team on their roles and responsibilities, and powers available under legislation and how these may be exercised.

---

<sup>4</sup> 'Formal advice resulting from research, evaluation or assessment activities where the evidence to inform the preferred course of action may be anecdotal... tracked by the Office of the IGEM, but no action plan or formal response is required by the entity', Office of the Inspector-General Emergency Management, *Assurance Activity Handbook*, 2014, V1.1.

## Context

---

Since 2011, ten new Queensland public cyclone shelters have been commissioned in a joint funded venture between the Queensland Government and the Emirate of Abu Dhabi. These shelters, along with three existing public cyclone shelters, have increased the ability of local governments in the north of the state to protect vulnerable members of the community during severe tropical cyclones.<sup>5</sup>

In 2013-14, an exercise program was conducted to examine the capability of local governments to plan and operate their public cyclone shelters. The findings from this exercise, known as Exercise Salus, along with additional stakeholder feedback, resulted in the Inspector-General Emergency Management identifying cyclone and storm tide sheltering as an issue for review. We decided further examination was required to improve emergency management performance and outcomes for the community in this area.

Since 1858, Queensland has recorded more *than* 207 tropical cyclones crossing its coastline.<sup>6</sup> Between 1900 and 2011, a total of 617 cyclone-related fatalities were recorded, contributing to over half the fatalities from all natural hazards for this period.<sup>7</sup> Risk Frontiers, an independent research centre, has projected that on a global scale the frequency of tropical cyclones occurring may decrease, while their intensity may increase. Rainfall rates associated with tropical cyclones are also likely to increase.<sup>8</sup>

Queensland's population growth has been most rapid along its coastline, with 88% of the population living within 50km of the coast.<sup>9</sup> It is projected that Queensland's population aged 65 years and over living in areas exposed to cyclone and storm tide may double over the next twenty years. Life expectancies are also likely to increase by five to ten years. This may cause an increase in people requiring support to evacuate.

By 2044, it is also projected that 27% of Queensland's population will live in single person households<sup>10</sup>. People living alone may have less contact with friends and family, and this isolation may increase with age and retirement. The lack of social contact may make it difficult to identify evacuation support requirements in the lead up to disaster events.

Improved building structures and codes, as well as human experience, have made sheltering in place from cyclonic winds safer now than 50 years ago. The *Building Act 1975* (Qld) was amended in the early 1980s following the extensive damage to housing caused by Tropical Cyclone Tracy in Darwin in 1974. The amendment of Appendix 4 in the Standard Building By-Laws<sup>11</sup> was to provide for adequate strength in housing to withstand cyclonic winds. By the mid- to late-1980s, new houses in cyclone-prone regions of

---

<sup>5</sup> A fourth, Cooktown, has recently been downgraded to a place of refuge.

<sup>6</sup> Bureau of Meteorology, *Tropical cyclones in Queensland*, 2015.

<sup>7</sup> Risk Frontiers, *Historical analysis of natural hazard building losses and fatalities for Queensland 1900-2011*, 2012.

<sup>8</sup> Risk Frontiers, *State-wide natural hazard risk assessment - Report 6: Australian natural disaster losses and climate change: Implications for disaster risk management*, 2011.

<sup>9</sup> Department of Environment and Heritage Protection, *State of the environment Queensland 2011*, 2012.

<sup>10</sup> Queensland Government Statistician's Office, *Queensland Government population projections*, 2013.

<sup>11</sup> Queensland Government Climate Change and Community Vulnerability to Tropical Cyclones Report, 2003.

Queensland were being designed and built to its requirements. Houses built before then are generally considered more vulnerable to cyclonic wind.<sup>12</sup>

However, a changing climate and higher wind speeds mean residential construction is increasingly likely to receive more damage if design standards are maintained at the current level.<sup>13</sup> It has been proposed that the vulnerability of residential construction may be reduced by an adaptation strategy that increases design wind speeds specified by Standards Australia under the following standards:

- *AS4055:2012 Wind Loads for Housing*
- *AS/NZS 1170.2:2011 Structural Design Actions Part 2: Wind Actions.*<sup>14</sup>

Additionally, the resistance of a house to cyclonic winds has little relevance when threatened by storm tide inundation. The evacuation of residents will continue to occur.

In 1994-95, the former Department of Public Works was made responsible for maintaining a register of public cyclone shelters under the *State Disaster Management Plan*.<sup>15</sup> The department found most facilities previously identified by local governments as shelters were unsuitable due to their design or location. In 1997 the department developed a minimum construction standard for buildings suitable for use as public cyclone shelters. This new standard ruled out a number of existing buildings already identified for this purpose.

Following impacts from Tropical Cyclone Larry in 2006, the State Disaster Management Group recognised the need for a public cyclone shelter design guideline. The *Design Guidelines for Queensland Public Cyclone Shelters: September 2006* (the Design Guidelines) were developed through a cross agency committee and endorsed in September 2006. Minor changes have been made to these guidelines to consider planning of new public cyclone shelters undertaken in 2011. We note that work is underway to review the design guidelines to take account of revised design criteria and learnings from events.

A total of 14 public cyclone shelters have been built in Queensland since 2006. Two of the first four constructed are currently being retro-fitted to a higher design standard. One of the original four was recently downgraded to a *place of refuge* following vandalism and damage sustained from Tropical Cyclone Ita in 2014. A place of refuge is not specifically designed as a public cyclone shelter and is usually a privately-owned or government building that provides a level of protection from the effects of a cyclone as it passes. Ten new state-owned public cyclone shelters were built in 2011-12 following a gift from the Emirate of Abu Dhabi, with funds matched by the Queensland Government. There are now 13 operational public cyclone shelters in Queensland.<sup>16</sup>

Two additional facilities have been purpose-built by local governments at significantly lower cost; however, these were not designed and constructed in accordance with the design guidelines. Several other facilities have been identified and maintained by local

---

<sup>12</sup> M.G. Stewart, *Risk and economic analysis of residential housing climate adaptation, strategies for wind hazards in South-East Australia*, 2013, pp. 2853-2854.

<sup>13</sup> Ibid.

<sup>14</sup> See Standards Australia.

<sup>15</sup> Strategic Asset Management, Department of Housing and Public Works email to the Office of the Inspector-General Emergency Management, 2 October 2014.

<sup>16</sup> See Appendix D for locations of public cyclone shelters in Queensland.

governments as places of refuge. To help local governments better define public sheltering needs, the former Department of Emergency Services and Department of Public Works, and the Queensland Tropical Cyclone Consultative Committee developed the guideline *Mitigating the Adverse Impacts of Cyclones- Evacuation and Shelter*<sup>17</sup>, endorsed by the State Disaster Management Group in 2008. Additional guidance followed including:

- *Queensland Evacuation Guidelines for disaster management groups* (the Evacuation Guidelines) (2011);
- *Business Continuity Planning Resource For Aged Care Facilities* (2012);
- *Queensland Public Cyclone Shelters Maintenance Guidelines* (the Maintenance Guidelines) (2012); and
- *Queensland Public Cyclone Shelter Operations Guidelines* (the Operations Guidelines) (2013).

In 2013, (the former) Emergency Management Queensland collaborated with the Australian Red Cross to develop a Queensland-specific evacuation field guide and handbook. This year, the Australian Red Cross also re-released their *Preferred Sheltering Practices for Emergency Sheltering in Australia: The Application of International Humanitarian Best Practice*. Details on these guidelines are included at Appendix A.

## Purpose

---

The purpose of this review is to examine cyclone and storm tide sheltering arrangements in relation to reducing the risk to communities; and how communities are engaged, particularly vulnerable persons.

## Scope

---

The review aligns with the functions of the Office of the Inspector-General Emergency Management, as outlined in sections 16C (b), (c), (f) and (i) of the *Disaster Management Act 2003* (the Act). It provides a level of assurance against the *Standard for Disaster Management in Queensland* (the Standard), in particular against Key Outcomes 2.2 and 2.3 of the Shared Responsibility Hazard Mitigation and Risk Reduction.

The following are included in the scope of this review:

1. Identify and validate that sheltering arrangements are commensurate with the identified risk of cyclones and storm surge to the community
2. Identify and validate the public engagement strategies, including vulnerable populations, relating to sheltering are commensurate with the identified risk of cyclones and storm surge to the community
3. Develop recommendations to enhance sheltering arrangements.

---

<sup>17</sup> Department of Emergency Services and Department of Public Works, *Mitigating the adverse impacts of cyclones: Evacuation and shelter*, 2008.

## Methodology

We conducted the review between October 2014 and March 2015. Analysis of cyclone and storm tide sheltering risk, arrangements and community engagement were assessed against the following indicators of the Standard across three areas of focus:

Shared Responsibility: Hazard Mitigation and Risk Reduction		
<p><b>Key Outcome 2.2</b> Hazard mitigation and risk reduction is embedded in all levels of planning and into core business across all phases of disaster management, including the management of shared residual risk</p> <p><b>Key Outcome 2.3</b> The community performs risk reduction activities that align to entity risk treatment and/or hazard mitigation plan</p>		
Risk	Arrangements	Community engagement
<p><b>Indicator j</b> Residual risks are identified and assigned in disaster management plans</p> <p><b>Indicator k</b> Risk modelling is available to inform disaster operations including public information and warnings</p>	<p><b>Indicator b</b> Mitigation priorities are included in strategic and operational plans and inform land-use planning schemes</p> <p><b>Indicator c</b> Mitigation plans and risk reduction activities are documented and outline agreed roles and responsibilities for each activity</p> <p><b>Indicator e</b> Hazard mitigation strategies and risk reduction activities are developed in partnership with stakeholders and are reviewed at regular intervals by individuals or entities skilled in the process</p>	<p><b>Indicator f</b> Mitigation strategies and risk reduction activities consider, and communicate interdependencies, across all levels of government and business and where possible, are complementary to each other and consistent with interdependent strategies and / or activities</p> <p><b>Indicator i</b> Risk reduction activities use plain language explanations; are readily accessible to communities to which they relate; and encourage community involvement in risk reduction activities</p>

The research and planning phase included a literature review and consideration of formal submissions from the disaster management sector. We also collected scoping evidence based on the following criteria:

- 2013-14 disaster management plan assessment results, including good practice examples
- natural hazard risk data from the preceding five years
- the weather outlook for the 2014-15 storm season
- 15 disaster events in the preceding five years with activation of the Natural Disaster Relief and Recovery Arrangements
- population demographics.

We identified that 45 local government areas are located on or near Queensland's coastline and are therefore exposed to cyclonic winds and storm tide. A full list of the local

government areas is included at Appendix D. Of the 45, we selected 11 to interview based on their level of exposure, recent disaster events, geographic spread and a review of disaster management plans. The 11 local governments interviewed were:

- Burdekin Shire Council
- Cairns Regional Council
- Carpentaria Shire Council
- Cassowary Coast Regional Council
- Kowanyama Aboriginal Shire Council
- Mackay Regional Council
- Tablelands Regional Council
- Torres Shire Council
- Torres Strait Island Regional Council
- Townsville City Council
- Whitsunday Regional Council

We also interviewed a number of government and non-government stakeholders. A full list of contributing entities is included at Appendix E.

Observations from interviews were provided to stakeholders for validation and a final opportunity to include further comment. A qualitative analysis of interview observations and research data was then completed according to the indicators of the Standard determined to be in scope. Based on our findings, representatives from state agencies and local governments were invited to provide advice. Following this session, we developed recommendations and professional practice considerations.

Late in the review, Tropical Cyclone Marcia crossed the Queensland coast. A number of coastal communities were affected, including Yeppoon, where low lying coastal areas were evacuated due to storm tide threat. A case study of the activation of Yeppoon Public Cyclone Shelter by Livingstone Shire Council is included as Appendix G of this report.

Stakeholders interviewed for this review were provided a final draft for consultation and requested to indicate their agreement with and acceptance of recommendations.



# Risk

---

This section focuses on the identification, assessment and modelling of risk as it informs sheltering arrangements. It aligns with indicators j and k of Shared Responsibility: Hazard Mitigation and Risk Reduction.

## What we expected to find

Based on the Standard, current disaster management guidelines and relevant inquiry recommendations,<sup>18</sup> we expected that:

1. risk modelling of storm tide and cyclonic wind across a range of scenarios would be available to inform disaster operations, including public information and warnings
2. community characteristics would be identified
3. residual risk would be identified and escalated.

The basis for these expectations is detailed in Appendix F.

## What we found

Briefly, in considering our sample of 11 local governments we found that:

- Not all local governments have developed storm tide evacuation zones.
- The Evacuation Guidelines lack guidance on standardised colours and datums and are not consistently applied by local governments to storm tide evacuation zones.
- Local governments in some areas lack access to specialist skills to assist in risk assessments.
- Many local governments do not have records of housing vulnerable to cyclonic winds.
- Many local governments are unable to predict public sheltering demand, especially for high category events.
- The identification of *vulnerable persons* is inconsistent.
- Many local governments highlighted mass evacuation as a residual risk.
- Residual risks are unclear at the state level.

## Risk modelling for storm tide and cyclones

Risk modelling for storm tide and cyclonic wind threats should cover a range of scenarios, up to an extreme event, and inform storm tide evacuation zone mapping. The availability of mapping indicates that risk modelling for storm tide has been undertaken. Local governments are responsible for identifying risk of natural hazards and making this information available to stakeholders, including communities, to appropriately inform planning, sheltering and other disaster operations.

A number of the local governments we examined have undertaken risk modelling of storm tide and developed evacuation zones. These are generally publicly available on local government websites. However, some local governments have identified storm tide as a hazard, but not identified evacuation zones; while some had inundation maps but had not

---

<sup>18</sup> Queensland Floods Commission of Inquiry, *Queensland Floods Commission of Inquiry interim report*, 2011; Parliament of Victoria, *The 2009 Victorian Bushfires Royal Commission final report*, 2010.

identified evacuation zones. Information exists to assist local governments to understand their storm tide risk. The Department of Science, Information Technology and Innovation *Storm Tide Mapping Study*<sup>19</sup> shows storm tide inundation for various probabilities, however the study and access to the data this was not widely known by the local governments we interviewed.

We identified inconsistencies in some local government evacuation maps, such as in the numbers of zones, colours and datums used. In one case, storm tide colours are reversed for riverine inundation, which could lead to confusion. Local governments using the storm tide evacuation zones in the Evacuation Guidelines were supportive of these. Others felt the guidelines did not adequately meet their needs as they were more advanced in their planning processes. Local governments also wanted consistency in evacuation zone colours to avoid confusion between local government areas and make messaging more consistent. We note the guidelines do not currently describe evacuation zone colours.

### **Finding 1**

The *Queensland Evacuation Guidelines for Disaster Management Groups* does not describe standard colours for storm tide evacuation zones and does not meet the needs of all local governments.

## **Identifying community characteristics**

The Evacuation Guidelines and the guideline *Mitigating the adverse impacts of cyclones – Evacuation and shelter*<sup>20</sup> describe a range of community characteristics that should inform predictions of demand for public sheltering facilities. We consider demand predictions should be embedded in core business, including land-use and town planning decisions.

Most of the local governments reviewed have difficulty profiling community characteristics. Cairns Regional Council and Cassowary Coast Regional Council are confident in their predictions, largely due to recent disaster events. Other local governments had limited understanding of how many evacuees might present, particularly in high category cyclone events. We did not see widespread evidence of *Mitigating the adverse impacts of cyclones – Evacuation and shelter* being applied by local governments to estimate sheltering demand.

### **Finding 2**

Many local governments do not have reliable predictions of public sheltering demand for a range of cyclone and storm tide scenarios.

### **Finding 3**

Of the local governments we interviewed, there was limited awareness of the guideline *Mitigating the adverse impacts of cyclones – Evacuation and shelter*, and few local governments using it to predict public sheltering demand.

---

<sup>19</sup> Queensland Government data, NDRP Storm Tide Hazard Interpolation series, 2014.

<sup>20</sup> Department of Emergency Services and Department of Public Works, *Mitigating the adverse impacts of cyclones: Evacuation and shelter*, 2008.

We expected local governments would be able to identify their at-risk housing stock: those in storm tide inundation zones and older housing stock with increased risk to cyclonic wind. This understanding should inform likely demand for public sheltering. Knowledge of potential transient populations such as tourists, students and temporary workers will add to this understanding.

All local governments interviewed could identify general areas of housing at greater risk to cyclonic wind by development age, but many lacked records of individual properties. There was good awareness of at-risk facilities such as caravan parks and marinas. Local government community engagement activities promoted the idea that property owners are responsible for determining if their house could withstand cyclonic wind, and it is their responsibility to maintain their house.

Some community members will be vulnerable, due to their reliance on others or special needs. The Evacuation Guidelines state 'persons should be considered vulnerable if it is determined that upon receiving an evacuation message they are unable to comply with the evacuation directions without assistance'.<sup>21</sup> This may include the frail, physically or mentally impaired, or those otherwise unable to understand warnings and directions. We expected these people would be identified to support their early evacuation and independent sheltering. Failure to identify vulnerable persons and provide them support may add to demand for public sheltering.

Many local governments and state agencies define *vulnerable persons* differently. Some local governments take a narrow view, for example people requiring high levels of care, or the homeless, with no networks for care. Yet others included residents or tourists who do not speak English as their primary language; are new to the area; are disabled, elderly or isolated. Some local governments had difficulty quantifying populations because of the levels of tourists, temporary workers and students in their communities. Local governments requested the state develop a common definition and application of the term *vulnerable persons* across departments and emergency management doctrine.

#### **Finding 4**

There is opportunity to improve guidance and doctrine for local governments to identify and engage vulnerable persons in emergencies.

#### **Identifying and transferring residual risk**

Local government sheltering arrangements should reduce the risk to communities from cyclone and storm tide as low as reasonably possible. However, where the risk cannot be managed at the local level, the transfer of residual risk should inform planning by districts and the state in support of local governments.

We expect residual risk is identified in local government plans and assigned to disaster districts. Districts should consider this in their planning activities and where residual risk remains, should transfer this to the state.

---

<sup>21</sup> Emergency Management Queensland, *Queensland evacuation guidelines for disaster management groups*, 2011.

Most local governments said it was beyond their capacity to undertake mass evacuations and the staffing of public sheltering facilities. This review found no evidence of these risks being accounted for at the state level. In fact, a recent evaluation of disaster management plans generally found residual risks were not clearly identified in disaster management plans at any level. Further, no clearly defined process exists to guide the identification and transfer of residual risk.<sup>22</sup> The process for transferring residual risks to disaster districts and the state needs improvement, and often occurs during the response phase of an event. This can result in resources being incorrectly prioritised. An example is provided in Appendix G of this report.

**Finding 5**

A clearly defined risk management process would assist local government with risk-based planning and residual risk transfer.

---

<sup>22</sup> Office of the Inspector-General Emergency Management, *Report on the assessment of disaster management plans: Discussion paper 2: 2014-15, 2015a.*

# Arrangements

---

This section focuses on sheltering arrangements across Queensland, from sheltering in place to the operation of public cyclone shelters. Sheltering arrangements are a shared responsibility for individuals, businesses, non-government organisations, local governments and the state. The section aligns with indicators b, c and e of Shared Responsibility: Hazard Mitigation and Risk Reduction.

## What we expected to find

Based on current doctrine, relevant inquiry recommendations<sup>23</sup> and issues identified by stakeholder submissions, we expected that:

1. individuals make their own sheltering arrangements
2. arrangements are in place to support vulnerable persons
3. arrangements consider pets
4. public sheltering facilities meet predicted demand and can be operated effectively
5. disaster management guidelines are followed
6. disaster management priorities inform land-use and town planning schemes.

The basis for these expectations is detailed in Appendix F and guidance for developing sheltering arrangements is described in Appendix A.

## What we found

Briefly, in considering our sample of 11 local governments, we found that:

- Local governments are generally satisfied with their community preparedness for cyclone and storm tide events.
- Shelter arrangements are not risk-based in some areas.
- Disaster management guidelines are not consistently applied.
- Roles and responsibilities are ambiguous in arrangements and doctrine, especially in regards to the support of vulnerable persons.
- Local governments in some areas lack access to specialist skills to review arrangements.
- Obstacles exist to the effective operation of sheltering facilities.
- Many residential care facilities lack suitable plans for evacuation and business continuity, which may place additional burden on government resources in events.

## Individual sheltering arrangements

'Disaster resilience is based on individuals taking their share of responsibility for preventing, preparing for, responding to and recovering from disasters'.<sup>24</sup> Resilient communities will reduce the burden on public sheltering facilities. Individuals should be encouraged to plan for and prepare to evacuate the predicted impacted areas early, or shelter in place with family or friends located outside the storm tide inundation zone.

---

<sup>23</sup> Queensland Floods Commission of Inquiry, loc. cit; J. O'Sullivan, *Report on a review of disaster management legislation and policy in Queensland*, 2009.

<sup>24</sup> Council of Australian Governments, *National Strategy for Disaster Resilience*, 2011.

Most local governments interviewed were satisfied with their communities' preparedness, particularly those frequently exposed to storm tide and cyclones; however we found the level of reliance on public sheltering facilities is unknown. Local governments suggested some residents may be unaware of the structural safety of their own homes and that their best option may be to shelter in place.

A number also expressed concern that the existence of public sheltering facilities raises expectations councils can shelter evacuees in larger numbers than is actually possible. This expectation may lower the likelihood of individuals making their own arrangements. The case study at Appendix G of this report found that approximately two-thirds of storm tide evacuees did not use public sheltering facilities, when sheltering in place was not an option.

### Arrangements for vulnerable persons

The Queensland Floods Commission of Inquiry made seven recommendations about improving support to vulnerable people in disasters.<sup>25</sup> In particular, it recommended local governments should work with service providers to ensure business continuity, including ongoing care and medical support during evacuation is provided.

Local governments advised that residents of smaller communities are often best placed to know who their vulnerable persons are, and what assistance they require. Some local governments and State Emergency Service groups maintain vulnerable persons' registers, although it was not always clear how the people registered would be assisted or would facilitate early evacuation.

Other stakeholders such as Queensland Health, the Department of Housing and Public Works, care agencies and Ergon Energy also maintain lists relevant to their business. However, concerns about privacy have prevented these lists being shared between agencies during disaster events, making coordination difficult. Issues around privacy are discussed in the Office of the Inspector-General Emergency Management's 2015 *Review of local governments' emergency warning capability*.<sup>26</sup> The Queensland Information Commissioner has confirmed there is no statutory restriction to the sharing of de-identified data sets for the purpose of emergency response.<sup>27</sup>

Roles and responsibilities to support vulnerable persons in emergencies are unclear in guidelines and the *State Disaster Management Plan*. The Evacuation Guidelines do provide guidance on persons considered vulnerable during evacuation, but people interviewed for this review found the definition too limiting and not supported by a broader strategy.

The Evacuation Guidelines also require local disaster management groups to engage with service providers who support vulnerable people in the community. All stakeholders interviewed highlighted privacy concerns with the collection and sharing of information relating to vulnerable people. Further work is needed to develop a state-wide strategy that

---

<sup>25</sup> Queensland Floods Commission of Inquiry, loc, cit.

<sup>26</sup> Office of the Inspector-General Emergency Management, 2015b.

<sup>27</sup> Advice from the Office of the Information Commissioner to the Inspector-General Emergency Management, *Privacy flexibilities in the management of disaster events*, available at [www.igem.qld.gov.au](http://www.igem.qld.gov.au).



includes guidance on privacy issues; defining *vulnerable persons* in the context of emergencies; and assistance for disaster management stakeholders to identify and engage members of the community who may be vulnerable during an emergency.

Most local governments interviewed believe community care providers should be responsible for maintaining registers. However, we recognise some people may not be clients of providers, non-government or government agencies, or be identified on registers. More work is needed at a local level to establish bottom-up support networks. We found examples of online services<sup>28</sup> that have the potential to connect those needing support with local government and service providers.

### Finding 6

Greater understanding of privacy legislation will reduce barriers to the sharing and coordination of information during emergencies.

All local governments interviewed stated people requiring high levels of care should not be sheltered in public cyclone shelters or places of refuge. They suggested it is the responsibility of care providers, family and friends to undertake and support planning for high-care individuals in disasters and provide them shelter. Most used community engagement strategies to encourage vulnerable persons, carers and care agencies to plan and prepare themselves and those in their care. These strategies include the Australian Red Cross *emergency REDiPlan Household preparedness for seniors*<sup>29</sup> and the *Business Continuity Planning Resource for Aged Care Facilities*.<sup>30</sup>

The evacuation of residential care facilities has proved challenging in past events. The *Aged Care Act 1997 (Cth)*<sup>31</sup> and *Quality of Care Principles 2014 (Cth)*<sup>32</sup> outline the responsibilities of providers to provide quality of care, maintain user rights for those in care, and accountability for the care they provide. Approved providers are required to have emergency plans and protocols in place to protect the health, safety and wellbeing of residential care recipients.

Under Queensland legislation, there is no requirement for aged care facilities to maintain an all-hazards evacuation plan. The *Building Fire Safety Regulation 2008 (Qld)* requires all facilities to have a fire evacuation plan, but local governments suggested there is scope to expand state legislation to include all-hazards evacuation plans. This could provide for stronger governance and regulatory compliance by aged care providers and potentially applied to other facilities accommodating vulnerable people.

Many local governments stated they did not have the resources to effectively engage with the aged care sector or provide assistance to vulnerable persons in emergencies. At present, no overarching strategy or clear guidance exists at the state level. Local governments want to work collaboratively with service providers on business continuity planning, so the evacuation of residents does not become an additional burden on them during response.

---

<sup>28</sup> For example [www.nabo.com.au](http://www.nabo.com.au) and [www.mycommunitydirectory.com.au](http://www.mycommunitydirectory.com.au).

<sup>29</sup> Australian Red Cross, 2009.

<sup>30</sup> Emergency Management Queensland, 2012.

<sup>31</sup> Chapter 1, Division 3-4.

<sup>32</sup> Schedule 2, Part 4.

This planning will also enable the care of residents to be maintained and service providers to meet their duty of care under legislation and standards. It should result in residential care

---

*Cairns Regional Council has signed a memorandum of understanding with a local taxi company to transport people on their vulnerable persons' register to safer locations.*

---

facilities undertaking their own evacuation and sheltering, and not unduly transferring this risk to local governments or the state, particularly the Queensland Ambulance Service and Queensland Health.

We interviewed care providers along the Wide Bay Burnett and Southeast Coast areas and

identified an informal network that coordinates and shares capacity in disasters. This *human and social* network connects with members of the relevant local disaster management groups and seeks to improve business continuity arrangements for clients requiring high-level care.

### **Finding 7**

Local government and aged care providers would benefit from improved collaboration and coordination around business continuity planning for the sector.

### **Professional Practice Consideration 1**

Consider examining regulatory provisions to improve disaster management and business continuity planning for aged care providers.

## **Arrangements for pets**

Overall, the management of animals in disasters appears well integrated with local disaster management plans. Many local governments cited the three recommendations arising from the *Queensland Floods Commission of Inquiry interim report* as the impetus for improving local arrangements for animals in disasters.<sup>33</sup> Many local governments we spoke to encourage residents to make their own arrangements for animals and in some cases have developed emergency pet fostering programs. Some have identified sheltering facilities that may be used as a last resort should evacuees present to public cyclone shelters with their animals.

The Evacuation Guidelines provide guidance for both local disaster management groups and pet owners in the event of an evacuation. Similarly, the Operations Guidelines state that only assistance animals are allowed in public cyclone shelters, and encourage local disaster management groups to identify alternate locations to shelter pets.

Local governments use a wide range of media to advise the public on pets in disasters, including brochures and advertising on council local laws vehicles. Arrangements should emphasise owners' responsibility to care for their pets, support individuals to plan and prepare to voluntarily evacuate with pets from the impact zone early, or shelter their pets independently.

---

<sup>33</sup> Queensland Floods Commission of Inquiry, op. cit., pp. 5.71 – 5.73.

In 2014, Queensland, as a member of the Australia-New Zealand Emergency Management Committee (ANZEMC), agreed to the *National Planning Principles for Animals in Disasters*<sup>34</sup> to promote the integration of animals in disaster planning arrangements. Also, the Bushfire and Natural Hazard Cooperative Research Centre's *Managing Animals in Disasters*<sup>35</sup> project is engaging with animal owners and disasters management stakeholders to identify best practice approaches.

### Finding 8

Opportunities exist to raise awareness with local government of research and planning tools developed at the national level to assist planning for animals in emergencies.

## Disaster management guidelines

Disaster management groups are required by the Act to develop plans consistent with standards and guidelines.<sup>36</sup> However, as the Standard was released in September 2014, we recognise plans may not yet reflect the new requirements.

We found local governments are generally satisfied with sheltering doctrine, but call for a review to incorporate learnings and good practice. We also found examples where doctrine was not consistently applied by local governments, and would benefit from improved alignment between local government areas. As previously noted, not all guidelines are available on the Queensland Government disaster management website, particularly relating to cyclone sheltering.

Local governments have requested that sheltering terminology be clear, concise and consistent. In most local government areas we reviewed, shelter arrangements are based on the Evacuation Guidelines that describe five types of safer locations;<sup>37</sup> however some had adopted terminology from the *Australian Emergency Management Institute Handbook 4: Evacuation Planning*,<sup>38</sup> where seven options for sheltering are provided. Some suggested there were too many sheltering types, which could lead to confusion for residents living in communities bordering other local government areas. For some larger councils the Evacuation Guidelines are not sufficiently scalable and flexible to allow for more advanced planning.

### Finding 9

The guidelines should encourage risk-based and flexible planning that result in plans that address local needs, and promote alignment between neighbouring local government areas.

---

<sup>34</sup> Australian Animal Welfare Advisory Committee, 2014.

<sup>35</sup> Bushfire and Natural Hazards Cooperative Research Centre, 2015.

<sup>36</sup> Guidelines on sheltering are detailed at Appendix A of this report.

<sup>37</sup> '...shelter in place, assembly points, evacuation centres, public cyclone shelters and places of refuge', Emergency Management Queensland, 2011, p. 40.

<sup>38</sup> Australian Emergency Management Institute, 2013.

## Public sheltering facilities

We expect that local governments know the predicted demand for and capacity of their public sheltering facilities, and that these can be operated effectively. Guidance around infrastructure planning to meet sheltering demand can be found in the guideline *Mitigating the adverse impacts of cyclone - Evacuation and shelter*, the *Places of Refuge Project Report*,<sup>39</sup> and the Evacuation Guidelines.

All local governments we spoke with had identified a range of public sheltering facilities. However, many do not understand predicted levels of demand, or if the capacity of these facilities will meet this demand for likely events. The guideline *Mitigating the Adverse Impacts of Cyclone – Evacuation and Shelter* provides useful planning guidance, but is not commonly used by local governments.

Most local governments do not have public cyclone shelters, and identifying buildings that can be used as places of refuge is a challenge. Identified buildings need a high level of structural integrity and not require significant hardening.<sup>40</sup> The issue with many proposed facilities is the need to protect exposed glazing from windborne debris. A structural engineer is required to assess and propose the preparations to harden the facility for use as a place of refuge.

Many buildings identified for public sheltering have not been assessed due to a lack of access to specialist engineering skills. In 2011-12, the Department of Housing and Public Works set out to assist local governments identify and assess the suitability of buildings as places of refuge. Local governments nominated buildings for assessment, with 76 nominated by ten local governments. These buildings were subject to a desktop review, with some eliminated due to construction and age, and some additional buildings identified.

Assessment reports were prepared for 130 buildings across 22 local government areas in line with the department's *structure classification criteria*.<sup>41</sup> Thirty-three buildings were deemed unsuitable and none were classified as a three star place of refuge, the highest available rating. Recently, two new sheltering facilities have been established in Ayr and Hope Vale. The Department of Housing and Public Works deem these to be well-constructed places of refuge, but they may not be classified as public cyclone shelters.

The Department of Housing and Public Works is encouraging local governments to use its *structure classification criteria* to conduct self-assessments. Where access to structural engineers is not available, local governments may consider developing a business case to access these specialist skills on a council to council basis, or from the membership of the local disaster management group.

### Professional Practice Consideration 2

Consider opportunities for local governments to share structural engineers to assess potential places of refuge against the Department of Housing and Public Works *structure classification criteria*.

---

<sup>39</sup> Department of Housing and Public Works, *Places of refuge project report*, 2012.

<sup>40</sup> *Hardening* in this context is the temporary or permanent strengthening of a building against cyclonic wind.

<sup>41</sup> Appendix B of the *Places of refuge project report*.

The Evacuation Guidelines describe places of refuge as safer locations,<sup>42</sup> but do not provide sufficient guidance on the identification, operation and resourcing of these facilities. We are unable to provide an assurance that these facilities can be operated effectively in the local government areas included in the review.

By *operated effectively*, we mean that facilities:

- are maintained
- can be prepared within warning timeframes
- allow evacuees to be registered on entry
- have adequate staff to manage facilities throughout their activation as shelters.

The safety of all persons sheltering relies on these factors. We found issues with these factors in some local governments, and good practice examples in others.

Guidance on the arrangements for operating public cyclone shelters is documented in the Operations Guidelines, and for places of refuge in *Preferred Sheltering Practices for Emergency Sheltering in Australia: The Application of International Humanitarian Best Practice*.<sup>43</sup>

All public cyclone shelters must be maintained in accordance with the Maintenance Guidelines. This provides the state responsibility to maintain shelters owned and operated by the state, and responsibility to local government for maintenance of shelters owned or managed by the local government. If maintenance falls below this standard, the shelter may be downgraded to a place of refuge. This recently occurred with the Cooktown Public Cyclone Shelter. The shelter was downgraded to a place of refuge following structural discrepancies identified after Tropical Cyclone Ita made landfall in 2014 and a spate of vandalism.<sup>44</sup>

The Department of Housing and Public Works' maintenance program encourages the Department of Education and Training (as asset owner) to monitor and notify them of any maintenance issues. Local governments run a range of individual maintenance programs for shelters they own. The review found these are not always compatible with the standard process outlined in the Maintenance Guidelines.

These guidelines also set out a process of annual certification. In the case of public cyclone shelters owned by the state, pre-cyclone season certification from the Department of Housing and Public Works has not been publicly available. We found local governments were generally unsure of the maintenance status of state-owned public cyclone shelters but expressed interest toward being kept informed. The department is working to improve this process and combine it with fire safety inspections conducted by Queensland Fire and Emergency Services. The Department of Housing and Public Works is also taking steps to retrofit the Redlynch and Innisfail public cyclone shelters constructed before the Design Guidelines were developed. These buildings will include a number of design innovations implemented following construction of the new public cyclone shelters in 2011-12.

---

<sup>42</sup> Refer to section 10.1 of the Evacuation Guidelines.

<sup>43</sup> Australian Red Cross, 2014.

<sup>44</sup> Cairns Post, *Cooktown cyclone shelter rating downgraded as flaws revealed*, 2015.

The maintenance of places of refuge is coordinated by local governments. There is no specific guidance for maintaining these facilities; however the *Places of refuge project report* provides information on ventilation, amenities and temporary works.

### Professional Practice Consideration 3

Consider preparing an annual communique to asset owners of all public cyclone shelters, outlining the maintenance and certification process and pre-season status.

Many local governments advised places of refuge were difficult to prepare for operation in available timeframes and with available resources. One local government suggested the time required to prepare places of refuge exceeds the Bureau of Meteorology's standard watch and warning advice timeframes.<sup>45</sup> Often the materials required to harden the place of refuge to withstand cyclonic winds are not locally available and require repositioning. This may create an additional financial burden outside of disaster events. Some local governments expressed concern about their inability, under the joint Commonwealth-state *Natural Disaster Relief and Recovery Arrangements*,<sup>46</sup> to recoup funds required to harden places of refuge.<sup>47</sup>

Section 10.2 of the Evacuation Guidelines lacks guidance to local governments on identifying, establishing and resourcing places of refuge. The Guidelines would benefit from these issues being included as *key considerations*. The Department of Housing and Public Work's *Places of Refuge – Project Report* outlines types of temporary works that may need to be undertaken during a cyclone warning phase to prepare a place of refuge to receive evacuees. But it too fails to provide guidance around timeframes or resources.

### Finding 10

Disaster management doctrine lacks guidance on activation levels for, and the resourcing of, places of refuge.

The issue of timeframes for evacuation and their impact on shelter operations was also identified during our interviews with local government. The Evacuation Guidelines provide an overview of the planning process to determine and enact evacuation timelines. The Operations Guidelines support this with levels of activation and actions to be taken. All local governments stress that while these arrangements have been planned for, maximum warning times are required to evacuate and shelter large numbers of people. Inadequate timeframes for early evacuation increase the burden on public sheltering facilities.<sup>48</sup>

There is general agreement that resourcing adequate numbers of shelter staff is difficult. Issues include lack of interest, access to training, staff turnover, leave, personal priorities during disasters and concerns over liability protection for shelter managers. Despite this, many local governments were confident they could deploy at least some local government staff to shelters. Some local governments offer their staff financial incentives to undertake

---

<sup>45</sup> Bureau of Meteorology, *Tropical Cyclone Warning Advice*, <http://www.bom.gov.au/cyclone/about/warnings/advice.shtml>.

<sup>46</sup> Guidelines available at Queensland Reconstruction Authority, <http://qldreconstruction.org.au/ndrra>

<sup>47</sup> Funding arrangements are outside the scope of this review.

<sup>48</sup> Refer to the Office of the Inspector-General Emergency Management's Review of Local Governments' Emergency Warning Capability Report 1: 2014-15.



shelter training and volunteer in shelters. This has bolstered shelter staffing capacity but is considered expensive for other local governments to replicate.

Queensland Fire and Emergency Services provide training for public cyclone shelter management teams.<sup>49</sup> They suggest this should be done in conjunction with local government training exercises to reinforce learned knowledge and skills. One local government expressed general frustration about state agencies' non-attendance at familiarisation sessions, training and exercises and their unwillingness to provide assistance in specialised areas of sub-plans relating to sheltering.

#### **Finding 11**

Staffing of public cyclone shelters and places of refuge is problematic in most local government areas.

#### **Finding 12**

The delivery of public cyclone shelter training lacks alignment with broader disaster management exercise programs to reinforce understanding and develop relationships.

The local governments we spoke to agree the shelter manager should be subject to a more rigorous recruitment and training process. Many were concerned about the lack of legislative protection for the decisions made by shelter managers, particularly during lockdown. This is an impediment to recruiting shelter managers. When deciding to move the shelter to lockdown mode, the shelter manager becomes responsible for restricting movement into and out of the shelter; in effect *detaining* the persons inside. They may be required to refuse a person to enter or leave the shelter as it may put others at risk.

Section 75(1)(d) of the Act allows the chairperson of the state group or a relevant district disaster coordinator for the disaster situation to authorise a person to exercise declared disaster powers. A public cyclone shelter manager, if authorised as a *declared disaster officer*, would be protected under section 144. This means civil liability would not attach for anything done or omitted to be done under the Act in good faith. The shelter manager would also have protections under the *Civil Liability Act 2003* (Qld). We believe the current legislation is sufficient to temporarily appoint shelter managers as a *declared disaster officer* to allow them the authority to properly manage the shelter and arrangements, and provide them the necessary protections from civil liability.

#### **Professional Practice Consideration 4**

In conjunction with the Queensland Fire and Emergency Services review of guidelines, the Public Safety Business Agency should consider reviewing the cyclone shelter management training package to include guidance to the shelter management team on their roles and responsibilities, and powers available under legislation and how these may be exercised.

Most local governments interviewed expressed confidence in the presence of the Queensland Police Service, the Queensland Ambulance Service and Queensland Fire and Emergency Services, to support their public cyclone shelters during lockdown. Queensland

<sup>49</sup> It is responsibility of the Commissioner, Queensland Fire and Emergency Services, to ensure that persons performing functions under the Act in relation to disaster operations are appropriately trained (refer section 16A(c) of the Act).

Fire and Emergency Services has now committed to provide an authorised fire officer in the fire safety advisor role for each public cyclone shelter.

The Australian Red Cross and Queensland Fire and Emergency Services, including the State Emergency Service are developing *fly in, fly out* volunteer and paid public cyclone shelter staffing capabilities. We found awareness of these capabilities is low in regional areas, however many local governments expressed interest in these capabilities to augment local capacity. One indicated its preference that a state-based team manage their public cyclone shelter, rather than develop local capability. This allows its local government staff to focus on themselves and their families during disasters.

It is also difficult for the local governments we interviewed to find staff for places of refuge. These buildings are not constructed to the standard of public cyclone shelters, and some suggested their staff felt safer in their own homes than being deployed to places of refuge. There is little guidance in the Evacuation Guidelines about roles and responsibilities and levels of activation for places of refuge. In previous events, some non-staffed places of refuge have been damaged by those sheltering inside, placing a cost burden on local governments to repair. Adequate staffing is required to protect both evacuees and facilities but there is little confidence they could resource these facilities in all events. No state agency or the Australian Red Cross has committed to assist with staffing places of refuge.

Most local governments interviewed are confident of the processes for registering evacuees upon entry to public cyclone shelters. All agreed a simple method of registration is best for both public cyclone shelters and places of refuge. The Operations Guidelines includes an example of an evacuee registration form (as Annexure P) that is widely used and appreciated.

Some local governments stated evacuees would likely complete paperwork for the Australian Red Cross *Register. Find. Reunite* system during lockdown, rather than on arrival, as it is time consuming. According to the *State Disaster Management Plan*, the

---

*Tablelands Regional Council are investigating radio-frequency identification (RFID) systems (similar to those used for outdoor music festivals) to tag and scan evacuees. This may provide a de-identified method of quickly capturing the number of evacuees in a facility at any one time.*

---

Queensland Police Service and Australian Red Cross are to administer *Register. Find. Reunite.*, but awareness of the system by regional police officers appeared low, and police have competing priorities in the shelters. We observed a strong level of interest in the *Register. Find. Reunite.* mobile phone application being developed by the Australian Red Cross. They noted

that online self-registering may not assist the shelter management team know who are sheltering inside their facilities. Therefore, written on-site lists remain the primary method for registering evacuees into public sheltering facilities.

Some local governments were not confident of their triggers to re-open public cyclone shelters following impact, particularly in areas without recent operational experience. The Operations Guidelines provide technical procedures for re-opening such as opening barrel bolts and shutters. Little direction is provided to consider the safety of staff and evacuees, for example checking the surrounding area for debris, fallen power lines and local flooding. Some local governments have checklists, while others wait until emergency services have reported conditions to the local disaster coordinator.

Some local governments with recent operational experience highlighted the challenge of managing expectations during the later stages of shelter lockdown. Evacuees were aware via social media of damage to their communities and in some cases were receiving reports from their neighbours, who had sheltered in place and were now free to inspect their community. Clearer guidance to re-open shelters needs to be considered by local disaster planners to avoid this potential for frustration among evacuees.

**Finding 13**

Disaster management doctrine lacks guidance on triggers and safety considerations for re-opening public cyclone shelters.

**Disaster management priorities inform land-use and town planning**

The *State Planning Policy*<sup>50</sup> provides guidance to local governments to prevent, mitigate and manage the risks associated with natural hazards in order to protect people and property, and enhance the community's resilience. Local governments' land-use and town planning schemes and their local disaster management priorities should be aligned, considering the state's development provisions for natural and coastal hazards. This would ensure sheltering arrangements are risk-based; facilities are designed and located to withstand disaster events; and do not unduly burden disaster management response and recovery.

The integration of disaster management into land-use and town planning should seek to reduce the long-term burden on public sheltering facilities by enabling more people to shelter in place. Some local governments have raised minimum floor heights to prevent inundation and therefore allow more residents to shelter in place. One was considering a survey of residential floor heights to better understand the risk. Some local governments are also considering public-private partnerships that may see dual-purpose public safer locations built into shopping centres, sports facilities or cinemas. However, in some instances, communication between disaster management and land-use planning officers needs to improve if hazard mitigation priorities are to inform land-use planning.

---

<sup>50</sup> Department of Infrastructure, Local Government and Planning, *State Planning Policy*, 2014.

## Community engagement

---

This section focuses on how Queensland communities are educated, supported and encouraged through community engagement activities before, during and after an event. Queensland's sheltering arrangements require communities to have an understanding of local risk and appropriate levels of resilience in order to work well. The section aligns with indicators f and i of Shared Responsibility: Hazard Mitigation and Risk Reduction.

### What we expected to find

Based on doctrine and recent inquiry recommendations, we were looking for evidence that disaster management stakeholders are engaging with communities to encourage risk awareness and support risk reduction activities. This included evidence that:

1. communities understand their risk from storm tide and cyclone events
2. communities are encouraged and supported to make their own sheltering arrangements
3. agencies involved in community education deliver consistent and locally-focused information for all hazards and phases of disaster management.

The basis for these expectations is detailed in Appendix F.

### What we found

Briefly, in considering our sample of eleven local governments, we found that:

- Communities have information about their specific risk of storm tide and cyclone events, except in areas where risk assessments have not been completed.
- The risks associated with storm tide and information about evacuation zones are communicated differently across local governments.
- Communities are encouraged to perform risk reduction activities, however not all are aware of their risk from cyclone and storm tide events - therefore evidence is lacking to provide assurance that activities are specific and appropriate to local risk.
- Sheltering and risk reduction activities, including messaging to communities, use plain language and are accessible in most areas through a broad range of media and engagement.
- Individuals are encouraged to make their own plans and preparations for their pets in all areas.
- Communities' reliance on public sheltering facilities state-wide is unknown.
- There is a lack of consistent, integrated community messaging by local and state disaster management stakeholders.

### Communities understand their storm tide and cyclone risk

Within exposed areas, communities need to be aware of their risk to cyclonic wind and storm tide inundation. Most local governments' messaging emphasises the residents' responsibility to adequately maintain their home and determine whether it is a safe location to shelter in place. They also undertake risk-based modelling and make this available to the public to support planning and preparedness activities. The Standard states that

communities should be provided risk-based information that uses plain language and is accessible.

The local governments interviewed acknowledge the success of their sheltering arrangements relies on their community's awareness of risk, and knowledge of those arrangements. Residents should understand if their home is likely to be inundated by storm tide, how it will perform under cyclonic wind conditions, and know the strongest room in which to shelter. There is evidence of mature community engagement in most local governments interviewed. However, because risk assessments have not been conducted in all areas, assurance cannot be provided that all communities understand their risk from cyclone and storm tide.

Most local governments have storm tide evacuation zone maps available online as well as in other forms of media. Some issue evacuation zone stickers to residents for visibility in their homes, others list evacuation zones on rates notices. For some local governments, evacuation zone identifiers were not always well received due to concerns over property values and insurance premiums. In some communities, well-known local landmarks were being used as visible storm tide-specific markers to communicate risk.

#### **Finding 14**

Communities are less likely to be aware of their risk to cyclone and storm tide events and perform appropriate risk reduction activities if risk assessments have not been conducted and communicated.

### **Communities are encouraged and supported to make their own sheltering arrangements**

All local governments interviewed promote the *shelter in place*<sup>51</sup> key message. Some reinforced that adequate evacuation and public sheltering is reliant on exposed residents deciding to self-evacuate early. Their community engagement messaging emphasises this point, and promotes public sheltering facilities as a last resort. While sheltering facilities are intended for residents of storm tide evacuation zones and older housing, we found this distinction is not necessarily made clear in public messaging.

We found local governments generally use plain language in messaging, delivered through a range of media. We found some excellent examples of community engagement media

*Townsville City Council and Cairns Regional Council hold annual 'Cyclone Sunday' or 'Cyclone Saturday' events. Cassowary Coast Regional Council and Whitsunday Regional Council have held public cyclone shelter open days.*

that use clear language, describe risks and advise what individuals should do to prepare for and respond to disaster events. This includes resources targeting different sections of the community including Aboriginal and Torres Strait Islanders; people from non-English speaking backgrounds; people with disabilities, tourists and temporary workers. All

local governments interviewed publish and distribute community engagement media such as *GetReady* information and other locally-focused brochures and pamphlets. Most local

<sup>51</sup> Refer to section 10.1 of the Evacuation Guidelines.

governments interviewed also maintain a social media presence and stated they had good relationships with local radio stations.

### **Community education**

We found agencies responsible for community education tend to focus their programs according to their own capability or responsibilities in disaster management. Further, some focus on certain hazards. Agencies do not collaborate to consistently educate the community across all hazards and all phases. Community members are therefore unlikely to be aware of all agencies involved in disaster management and all the hazards they are exposed to. We saw good examples of community education programs, but there appears to be some inconsistency between state and local level messaging.

Local governments, State Emergency Service volunteers, Rural Fire Service volunteers and officers of Queensland Fire and Emergency Services are involved in separate school education programs. A number of local governments indicated they would like to improve their coordination with Queensland Fire and Emergency Services to standardise all hazards messaging and education programs. Queensland Fire and Emergency Services is investigating opportunities for State Emergency Service volunteers to take a stronger role in coordinating stakeholders' community engagement for disaster preparedness. This would leverage potentially 6,000 volunteers across the state to champion all hazards preparedness messaging.

#### **Finding 15**

There are opportunities to improve collaboration, in the first instance between state agencies, and subsequently with local governments, to ensure community education for disaster management is consistent and locally relevant.

#### **Finding 16**

An opportunity exists for State Emergency Service volunteers to become more involved in the delivery of community education and messaging.



## Conclusion

---

Queensland's arrangements for sheltering people from cyclones and storm tide are well catered for in guidelines and plans. However, the application of the arrangements is an ongoing learning process.

The focus on disaster resilience through the *GetReady* campaign and increased modern housing stock enables more people to shelter in place. This reduces the burden on local government to provide public cyclone shelters and places of refuge.

We found that local governments we spoke to are generally satisfied with their communities' levels of preparedness; however the lack of consistent risk modelling across all coastal local government areas makes it difficult to accurately predict public shelter demand. Better information is required before we can assure our sheltering arrangements match risks.

A state-wide risk assessment strategy will help to ensure risk is appropriately identified and managed across the three levels of Queensland's disaster management arrangements. Knowing sheltering risks and having the ability to prioritise them against other risk categories will support effective planning. A consistent process to escalate residual risks will allow local governments' public sheltering needs to be prioritised appropriately across the state.

Whole-of-government strategies to identify and support vulnerable people, clarify roles and responsibilities, and engage with service providers, are needed. In parallel, promoting appropriate business continuity arrangements for aged care facilities will inform local and district planning for shelter arrangements, and allow support to be provided where needed.

Guidelines relating to public sheltering need review to remain contemporary, relevant and align with the Standard. Legal advice regarding the role of cyclone shelter manager should improve recruitment of, and support for, people performing this important role.

There is need for a state-wide engagement strategy to ensure community messaging is consistent and all hazards based. Such a strategy should leverage the broad capability of emergency service volunteers and continue to support good practice activities already undertaken by many local governments.

## Recommendations

---

We recommend that:

### Recommendation 1

Queensland Fire and Emergency Services coordinate the development of an integrated risk-based approach to disaster management planning for Queensland that is consistent with the Standard and applicable at all levels of the arrangements.<sup>52</sup>

Accountable agency	Date of Completion
<b>Lead:</b> Queensland Fire and Emergency Services <b>Support:</b> Department of the Premier and Cabinet, Queensland Police Service, Department of Infrastructure, Local Government and Planning and the Public Safety Business Agency	30 June 2016
Recommendation accepted by lead and support agencies.	

### Recommendation 2

An audit of all local government areas vulnerable to storm tide events is completed and opportunities identified to resolve gaps in evacuation zone planning to ensure consistency with the *Queensland Evacuation Guidelines for Disaster Management Groups* and neighbouring local government areas.

Accountable agency	Date of Completion
<b>Lead:</b> Queensland Fire and Emergency Services <b>Support:</b> Queensland Police Service, Department of Infrastructure, Local Government and Planning and the Public Safety Business Agency	31 December 2015

### Recommendation 3

A state-wide strategy, including a common definition, is developed for identifying and engaging vulnerable people in emergencies.

Accountable agency	Date of Completion
<b>Lead:</b> Department of Communities, Child Safety and Disability Services <b>Support:</b> Queensland Fire and Emergency Services and the Queensland Police Service	31 December 2016

---

<sup>52</sup> Aligned to recommendation 3 of *Review of state agency integration at a local and district level: Report 2: 2014-15*, Office of the Inspector-General Emergency Management, 2015b.

#### Recommendation 4

The following disaster management doctrine are reviewed and reissued to ensure consistency and improved guidance to local government:

- *Queensland Evacuation Guidelines for Disaster Management Groups;*
- *Queensland Public Cyclone Shelter Operations Guidelines;*
- *Queensland Public Cyclone Shelters Maintenance Guidelines;*
- *Guideline. Mitigating the Adverse Impacts of Cyclones – Evacuation and Shelter; and*
- *Business Continuity Planning Resource for Aged Care Facilities.*

Accountable agency	Date of Completion
<b>Lead:</b> Queensland Fire and Emergency Services <b>Support:</b> Department of Housing and Public Works ( <i>Queensland Public Cyclone Shelter Operations Guidelines and Queensland Public Cyclone Shelters Maintenance Guidelines</i> )	30 June 2017

#### Recommendation 5

A state-wide engagement strategy is coordinated to ensure community messaging is consistent across all levels of Queensland's disaster management arrangements.

Accountable agency	Date of Completion
<b>Lead:</b> Public Safety Business Agency, Queensland Fire and Emergency Services <b>Support:</b> Department of the Premier and Cabinet	30 June 2016

### Professional practice considerations

#### Professional Practice Consideration 1

Queensland Fire and Emergency Services should consider examining regulatory provisions to improve disaster management and business continuity planning for aged care providers.

#### Professional Practice Consideration 2

Opportunities should be identified through the Local Government Association of Queensland council to council arrangement to share structural engineers to assess potential places of refuge against the Department of Housing and Public Works' *structure classification criteria*.

#### Professional Practice Consideration 3

The Department of Housing and Public Works should consider preparing an annual communique to asset owners of, and local governments with access to public cyclone shelters, outlining the maintenance and certification process and pre-season status.

#### **Professional Practice Consideration 4**

In conjunction with the Queensland Fire and Emergency Services review of guidelines, the Public Safety Business Agency should consider reviewing the cyclone shelter management training package to include guidance to the shelter management team on their roles and responsibilities, and powers available under legislation and how these may be exercised.

## Bibliography

---

*Aged Care Act 1997* (Cth)

Australasian Fire and Emergency Service Authorities Council, *Fundamentals of doctrine: A best practice guide*, 2011, <http://www.afac.com.au/docs/guideline/fundamentals-doctrine-best-practice.pdf?sfvrsn=14>.

Australian Animal Welfare Advisory Committee, *National planning principles for animals in disasters*, 2014, [http://www.ava.com.au/sites/default/files/AVA\\_website/FINAL%20National%20Planning%20Principles%20for%20Animals%20in%20Disasters.pdf](http://www.ava.com.au/sites/default/files/AVA_website/FINAL%20National%20Planning%20Principles%20for%20Animals%20in%20Disasters.pdf).

Australian Emergency Management Institute, *Australian Emergency Management Institute handbook 4: Evacuation planning*, 2013, [www.em.gov.au/publications/australianemergencymanualseries/documents/evacuationplanning-handbook4.pdf](http://www.em.gov.au/publications/australianemergencymanualseries/documents/evacuationplanning-handbook4.pdf).

Australian Red Cross, *emergency REDiPlan, Household preparedness for seniors*, 2009, [http://www.redcross.org.au/files/REDiPlan\\_SENIORS\\_Household\\_preparedness\\_for\\_seniors.pdf](http://www.redcross.org.au/files/REDiPlan_SENIORS_Household_preparedness_for_seniors.pdf).

Australia Red Cross, *Preferred Sheltering Practices for Emergency Sheltering in Australia*, 2014.

*Building Act 1975* (Qld)

*Building Fire Safety Regulation 2008* (Qld)

Bureau of Meteorology, *Tropical cyclones in Queensland*, 2015, <http://www.bom.gov.au/cyclone/about/eastern.shtml#history>.

Bureau of Meteorology, *Tropical cyclone warning advice*, 2015, <http://www.bom.gov.au/cyclone/about/warnings/advice.shtml>.

Bushfire and Natural Hazards Cooperative Research Centre, *Managing animals in disasters: Improving preparedness, response, and resilience through individual and organisational collaboration*, 2015, <http://www.bnhcrc.com.au/research/resilient-people-infrastructure-and-institutions/237>.

Cairns Post, *Cooktown cyclone shelter rating downgraded as flaws revealed*, 2015, <http://www.cairnspost.com.au/news/cairns/cooktown-cyclone-shelter-rating-downgraded-as-flaws-revealed/story-fnpqpw0-1227246968503>.

Council of Australian Governments, *National strategy for disaster resilience*, 2011, <https://www.em.gov.au/Documents/1National%20Strategy%20for%20Disaster%20Resilience%20-%20pdf.PDF>.

Department of Community Safety, *Queensland public cyclone shelter operations guidelines*, 2013, <http://www.disaster.qld.gov.au/Disaster-Resources/Documents/Queensland%20Public%20Cyclone%20Shelter%20OperationsGuidelines.pdf>.

- Department of Emergency Services et. al., *National storm tide mapping model for emergency response: Project report*, 2002, <http://www.disaster.qld.gov.au/Disaster-Resources/Documents/Final%20Report%2029%20May%2003.pdf>.
- Department of Environment and Heritage Protection, *State of the environment Queensland 2011*, 2012, [www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/executive-summary.pdf](http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/executive-summary.pdf).
- Department of Emergency Services and Department of Public Works, *Mitigating the adverse impacts of cyclones: Evacuation and shelter*, 2008, <http://www.hpw.qld.gov.au/SiteCollectionDocuments/GuidelineEvacuationShelter.pdf>
- Department of Housing and Public Works, *Design Guidelines for Queensland Public Shelters*. September 2006. (currently under review and expected to be reissued in September 2015)
- Department of Housing and Public Works, *Places of refuge project report*, State of Queensland, Nov. 2012.
- Department of Infrastructure, Local Government and Planning, *State Planning Policy*, 2014, <http://www.statedevelopment.qld.gov.au/resources/policy/state-planning/state-planning-policy-jul-2014.pdf>.
- Department of Natural Resources and Mines, Department of Emergency Services and Environmental Protection Agency, *Queensland Climate Change and Community Vulnerability to Tropical Cyclones. Cyclone Hazards Assessment – Stage 4 Report. September 2003*. <https://www.longpaddock.qld.gov.au/about/publications/pdf/climatechange/vulnerabilitytotropicalcyclones/stage4/FullReportHighRes.pdf>
- Dobes, L., Scheufele, G. & Bennett J., *Post-cyclone emergency services: a cost-benefit analysis for Cairns, Australia*, *Natural Hazards Journal*, vol. 75, no. 1, 2015.
- Emergency Management Queensland, *Queensland Evacuation Guidelines for Disaster Management Groups*, 2011, [http://www.disaster.qld.gov.au/Disaster-Resources/Documents/2907EMQ\\_SDMG\\_QLD\\_Evac%20Guide\\_web.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/2907EMQ_SDMG_QLD_Evac%20Guide_web.pdf).
- Emergency Management Queensland, *Business continuity planning resource for aged care facilities*, 2012, [www.disaster.qld.gov.au](http://www.disaster.qld.gov.au).
- Garlick, D., *The vulnerable people in emergencies policy: Hiding vulnerable people in plain sight*, *Australian Journal of Emergency Management*, vol. 30, No.1, 2015.
- Granger, K. et al., *Community risk in Cairns: A multi-hazard risk assessment*, Australian Geological Survey Organisation, 1999, [www.ga.gov.au/corporate\\_data/33548/33548.pdf](http://www.ga.gov.au/corporate_data/33548/33548.pdf).
- McLennan, J., Elliott, G. & Omodei, M., *Householders' safety-related decisions, plans, actions and outcomes during the 7 February 2009 Victorian (Australia) wildfires*, *Fire Safety Journal*, vol. 61, 2013, 175-184.
- Office of the Information Commissioner, *Privacy flexibilities in the management of disaster events, Right to Information and Privacy Guidelines*, advice provided to the Inspector-General Emergency Management, 22 December 2014, available at [www.igem.qld.gov.au](http://www.igem.qld.gov.au).

Office of the Inspector-General Emergency Management, *Report on the assessment of disaster management plans: Discussion paper 2: 2014-15*, 2015a.

Office of the Inspector-General Emergency Management, *Review of local governments' emergency warning capability: Report 1: 2014-15*, 2015b.

O'Sullivan, J., *Report on a review of disaster management legislation and policy in Queensland*, The Consultancy Bureau Pty Ltd, 2009, <http://www.emergency.qld.gov.au/publications/pdf/consultants%20dm%20report%20final.pdf>

Parliament of Victoria, *The 2009 Victorian Bushfires Royal Commission final report*, 2010, <http://www.royalcommission.vic.gov.au/Commission-Reports.html>.

Pritchard, B., *Increasing risk in cyclone prone areas of Queensland, in the context of an aging demographic and the growing trend towards single person households*, Centre for Disaster Studies, James Cook University, Australia, 2006.

Productivity Commission, *Natural disaster funding arrangements: Productivity Commission draft report*, Australian Government, 2014, <http://www.pc.gov.au/inquiries/completed/disaster-funding/draft-report>.

Queensland Floods Commission of Inquiry, *Queensland Floods Commission of Inquiry interim report*, 2011, [http://www.floodcommission.qld.gov.au/\\_data/assets/pdf\\_file/0006/8781/QFCI-Interim-Report-August-2011.pdf](http://www.floodcommission.qld.gov.au/_data/assets/pdf_file/0006/8781/QFCI-Interim-Report-August-2011.pdf).

Queensland Government data, NDRP Storm Tide Hazard Interpolation series, 2014. <https://data.qld.gov.au/dataset/ndrp-storm-tide-hazard-interpolation-series>

Queensland Government Statistician's Office, Queensland Government population projections, 2013. [www.qgso.qld.gov.au/products/reports/qld-govt-pop-proj/qld-govt-pop-proj.pdf](http://www.qgso.qld.gov.au/products/reports/qld-govt-pop-proj/qld-govt-pop-proj.pdf), accessed 6 Jan. 2015.

Queensland Police Service, *2014-2015 Queensland State Disaster Management Plan [draft]*, Brisbane, 2014.

Risk Frontiers, *State-wide natural hazard risk assessment - Report 6: Australian natural disaster losses and climate change: Implications for disaster risk management*, 2011, [www.disaster.qld.gov.au/Disaster-Resources/Documents/Report%206.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/Report%206.pdf).

Risk Frontiers, *Historical analysis of natural hazard building losses and fatalities for Queensland 1900-2011*, 2012, [www.disaster.qld.gov.au/historical-analysis](http://www.disaster.qld.gov.au/historical-analysis).

Standards Australia, [www.standards.org.au](http://www.standards.org.au)

Stewart, M.G., *Risk and Economic Analysis of Residential Housing Climate Adaptation, Strategies for Wind Hazards in South-East Australia*, CSIRO, Canberra, 2013, pp. 2853-2854.



## Appendix A: Doctrine

---

*Disaster Management Act 2003*  
*Disaster Management Strategic Policy Framework*  
*State Planning Policy*  
*State Disaster Management Plan*  
*Queensland Local Disaster Management Guidelines*  
*Queensland District Disaster Management Guidelines*  
*Emergency Management Assurance Framework*



### **Queensland evacuation guidelines for disaster management groups**

The guidelines were endorsed by the State Disaster Management Group and issued by Emergency Management Queensland in 2011. It assists councils, local disaster management groups and other key local stakeholder to plan evacuations of communities. It describes five types of safer locations to be used as shelter from extreme events: shelter in place, assembly points, evacuation centres, public cyclone shelters and places of refuge.

[www.disaster.qld.gov.au/Disaster-Resources/Documents/2907EMQ\\_SDMG\\_QLD\\_Evac%20Guide\\_web.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/2907EMQ_SDMG_QLD_Evac%20Guide_web.pdf)



### **Mitigating the adverse impacts of cyclones – Evacuation and shelter**

Published in 2008 by the Department of Emergency Services and the Department of Public Works. It aims to provide local governments with detailed guidance on a risk management study for evacuation and shelter which:

- evaluates community risk from storm tide inundation, wind, and its ability to evacuate and shelter
- substantiates infrastructure development to mitigate the risk
- informs functional operational planning.

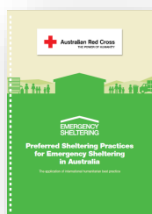
[www.hpw.qld.gov.au/SiteCollectionDocuments/GuidelineEvacuationShelter.pdf](http://www.hpw.qld.gov.au/SiteCollectionDocuments/GuidelineEvacuationShelter.pdf)



### **Business continuity planning resource for aged care facilities**

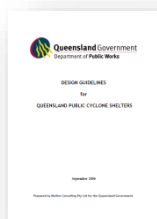
This resource was published in 2012 by Emergency Management Queensland. It guides owners and operators of aged care facilities on considerations to ensure business continuity during disaster disruptions. It provides guidance additional to the requirements of facilities to have plans under the Commonwealth *Aged Care Act 1997*, the Queensland *Fire and Rescue Services Act 1990*, and *Workplace Health and Safety Act 1995*.

[www.disaster.qld.gov.au/Disaster-Resources/Documents/BCP-A-Better-Practise-Guide-for-Disasters-Aged-Care-Facilities.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/BCP-A-Better-Practise-Guide-for-Disasters-Aged-Care-Facilities.pdf)



***Preferred sheltering practices for emergency sheltering in Australia: The application of international humanitarian best practice***

These guidelines were published by the Australian Red Cross in 2014. They seek to establish common minimum requirements to safeguard public health, safety and general welfare for those seeking emergency sheltering. They were updated and republished in 2015. The practices apply well-recognised international humanitarian best practice to the Australian context and draw heavily on *The Sphere Project: Humanitarian Charter and Minimum Standards in Humanitarian Response*.



***Design guidelines for Queensland public cyclone shelters: September 2006***

The design guidelines were issued in 2006 by the Department of Public Works. They were developed over several years in collaboration with Emergency Management Australia and the James Cook University Cyclone Testing Station. The Department of Housing and Public Works advises the guidelines will be reviewed and reissued mid-2015. The review will incorporate lessons learned from the existing public cyclone shelters built to the guidelines that have weathered a cyclone impact.

[www.pandora.nla.gov.au/pan/124425/20110531-0834/www.works.qld.gov.au/downloads/tdd/guideline\\_public\\_shelter.pdf](http://www.pandora.nla.gov.au/pan/124425/20110531-0834/www.works.qld.gov.au/downloads/tdd/guideline_public_shelter.pdf)



***Queensland public cyclone shelter operations guidelines***

These guidelines were endorsed by the State Disaster Management Group and published by Emergency Management Queensland in July 2013. They are for adoption by Queensland State agencies and local governments. They provide guidance on all aspects of public cyclone shelter operations. The *Public Cyclone Shelter Code of Conduct* is included at Appendix H.

[www.disaster.qld.gov.au/Disaster-Resources/Documents/Queensland%20Public%20Cyclone%20Shelter%20Operations\\_Guidelines.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/Queensland%20Public%20Cyclone%20Shelter%20Operations_Guidelines.pdf)



***Queensland public cyclone shelters maintenance guidelines***

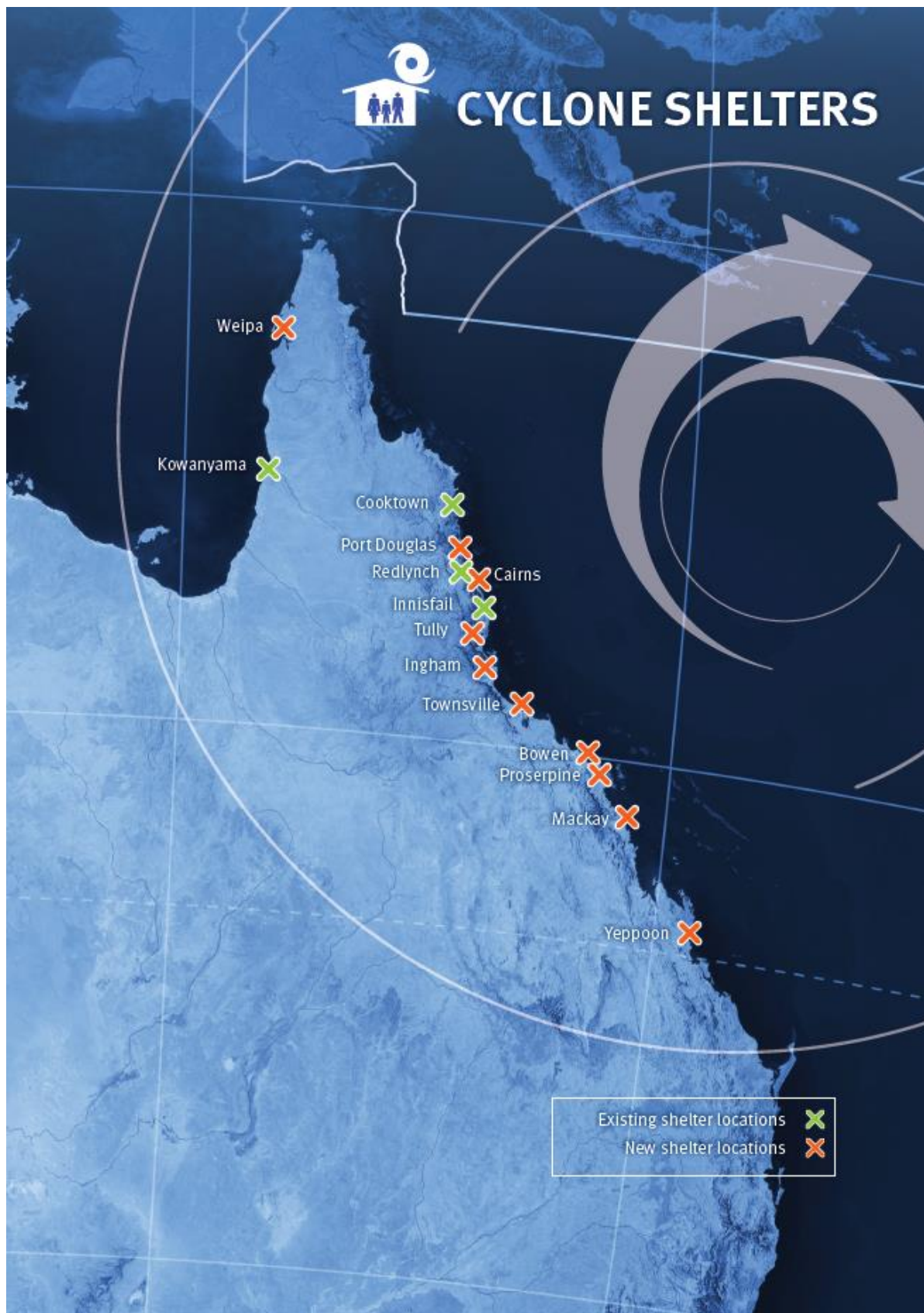
These guidelines were developed and published by the Department of Housing and Public Works in 2012, with Emergency Management Queensland authorisation and endorsement from the State Disaster Management Group.

[www.disaster.qld.gov.au/Disaster-Resources/Documents/Queensland-Public-Cyclone-Shelter-Maintenance-Guidelines.pdf](http://www.disaster.qld.gov.au/Disaster-Resources/Documents/Queensland-Public-Cyclone-Shelter-Maintenance-Guidelines.pdf)

## Appendix B: Queensland's public cyclone shelters

Town	Local Government Area	Building Owner	Normal Building Function	Normal-Use Operator	Sheltering capacity	Year Built
Weipa	Weipa Town Council	Department of Housing and Public Works	Multipurpose Sports	Weipa Town Council	780	2012
Kowanyama	Kowanyama Aboriginal Shire Council	Kowanyama Aboriginal Shire Council	Multipurpose Sports and Recreation Centre	Kowanyama Aboriginal Shire Council	800	2010
Cooktown	Cook Shire Council	Cook Shire Council	Community Events & Sports Centre	Cook Shire Council	1215	2011
Port Douglas	Douglas Shire Council	Department of Education and Training	Multipurpose Sports	Port Douglas State School	780	2012
Cairns	Cairns Regional Council	Department of Education and Training	Multipurpose Sports	Redlynch State College	800	2009
		Cairns Regional Council	Multipurpose Sports	Cairns Regional Council	1500	2013
Innisfail	Cassowary Coast Regional Council	Department of Education and Training	Performing Arts Centre	Innisfail State College	330	2010
Tully		Department of Education and Training	Multipurpose Sports	Tully State School	780	2012
Ingham	Hinchinbrook Shire Council	Department of Education and Training	Multipurpose Sports	Ingham State High School	780	2012
Townsville	Townsville Regional Council	Department of Education and Training	Multipurpose Sports	Heatley Secondary College	780	2012
Bowen	Whitsunday Regional Council	Department of Education and Training	Multipurpose Sports	Bowen State High School	780	2012
Proserpine		Department of Education and Training	Multipurpose Sports	Proserpine State School	780	2012
Mackay	Mackay Regional Council	Department of Education and Training	Multipurpose Sports	Northern Beaches State High School	780	2013
Yeppoon	Livingstone Shire Council	Department of Education and Training	Multipurpose Sports	Yeppoon State High School	780	2012

# Appendix C: Queensland cyclone shelter map



## Appendix D: Queensland local government areas exposed to cyclonic wind & storm tide

---

The 45 local governments we identified as being exposed to cyclonic wind and storm tide are listed below. The 11 we interviewed are highlighted in **bold font**:

- Aurukun Shire Council
- Banana Shire Council
- Brisbane City Council
- Bundaberg Regional Council
- **Burdekin Shire Council**
- Burke Shire Council
- **Cairns Regional Council**
- **Carpentaria Shire Council**
- **Cassowary Coast Regional Council**
- Charters Towers Regional Council
- Cook Shire Council
- Doomadgee Aboriginal Shire Council
- Douglas Shire Council
- **Fraser Coast Regional Council**
- Gladstone Regional Council
- Gold Coast City Council
- Gympie Regional Council
- Hinchinbrook Shire Council
- Hope Vale Aboriginal Shire Council
- Isaac Regional Council
- **Kowanyama Aboriginal Shire Council**
- Livingstone Shire Council
- Lockhart River Aboriginal Shire Council
- Logan City Council
- **Mackay Regional Council**
- Mapoon Aboriginal Shire Council
- Mareeba Shire Council
- Moreton Bay Regional Council
- Mornington Shire Council
- Napranum Aboriginal Shire Council
- Noosa Shire Council
- Northern Peninsula Area Regional Council
- Palm Island Aboriginal Shire Council
- Pormpuraaw Aboriginal Shire Council
- Redland City Council
- Rockhampton Regional Council
- Sunshine Coast Regional Council
- **Tablelands Regional Council**
- Torres Shire Council
- **Torres Strait Island Regional Council**
- **Townsville City Council**
- Weipa Town Council
- **Whitsunday Regional Council**
- Wujal Wujal Aboriginal Shire Council
- Yarrabah Aboriginal Shire Council



## Appendix E: Contributors

Entity	Submission	Interview	Workshop	Feedback
<b>Local government</b>				
Burdekin Shire Council		X		
Cairns Regional Council		X	X	
Carpentaria Shire Council		X		
Cassowary Coast Regional Council	X	X		
Fraser Coast Regional Council		X		
Hinchinbrook Shire Council	X			
Kowanyama Aboriginal Shire Council		X		
Livingstone Shire Council	X	X		X
Mackay Regional Council	X	X		X
Sunshine Coast Council	X			
Tablelands Regional Council	X	X		
Torres Strait Island Regional Council		X		
Townsville City Council		X		
Whitsunday Regional Council		X		X
<b>Non-government entities</b>				
Australian Red Cross (auxiliary to government)	X	X		X
Clubs Queensland		X		
Local Government Association of Queensland		X		
MyCommunityDirectory.com.au		X		
OzCare (Hervey Bay)		X		
RSPCA	X	X		X
<b>Commonwealth agencies</b>				
Bureau of Meteorology		X		
<b>State agencies</b>				
Department of Aboriginal and Torres Strait Islander Partnerships	X			X
Department of Communities, Child Services and Disability Services		X		
Department of Education and Training		X		X
Department of Housing and Public Works	X	X	X	X
Department of Infrastructure, Local Government and Planning		X		X
Department of National Parks, Recreation, Sport and Racing		X		
Department of Science, Information Technology and Innovation	X	X		X
Department of Tourism, Major Events, Small Business and Commonwealth Games	X			
Department of Transport and Main Roads		X		X
Public Safety Business Agency	X	X		X
Queensland Ambulance Service		X		X
Queensland Fire and Emergency Services	X	X	X	X
Queensland Police Service		X		X

## Appendix F: Expectations

Risk	
Expectation	Basis for expectation
That risk modelling of storm tide and cyclonic wind across a range of scenarios is available to inform disaster operations, including public information and warnings	Indicator k under Key Outcome 2.3 of the <i>Standard for Disaster Management in Queensland</i> , and section 57 of the <i>Disaster Management Act 2003</i> (that local governments must prepare a local disaster management plan that identifies hazards and describes risks)
That community characteristics are identified	Section 7.6 of the <i>Queensland Local Disaster Management Guidelines</i> (disaster risk assessment). Community characteristics include: <ul style="list-style-type: none"> <li>the identification of homes vulnerable to cyclonic wind;</li> <li>the identification of vulnerable persons that may require support to evacuate early; and</li> <li>current and future forecasts of people likely to present at public sheltering facilities (in a range of scenarios).</li> </ul>
That residual risks are identified and transferred	Section 7.7.2 of the <i>Queensland Local Disaster Management Guidelines</i> and section 9.7.1 of the <i>Queensland District Disaster Management Guidelines</i>

Arrangements	
Expectation	Basis for expectation
That individuals make their own arrangements	<a href="#"><i>Natural Strategy For Disaster Resilience</i></a> <sup>53</sup>
that arrangements are in place to support vulnerable persons	This expectation is based on sections 8.7 and 7.9.1 of the <i>Queensland Local Disaster Management Guidelines</i> ; Sections 4.3 and 9.6 of the <i>Queensland Evacuation Guidelines for Disaster Management Groups</i> ; <i>Queensland Flood Commission of Inquiry</i> recommendations 5.62-5.68 and 15.1-15.2; and <i>Victorian Bushfire Royal Commission</i> recommendation 5.
That arrangements consider pets	Refer to sections 4.3, 10.2 and 10.6 of the <i>Queensland Evacuation Guidelines for Disaster Management Groups</i> , and <i>Queensland Flood Commission of Inquiry</i> Interim Report recommendations 5.71-5.73.
That public sheltering facilities meet predicted demand and can be operated effectively	<i>Guideline: Mitigating the adverse impacts of cyclones – Evacuation and shelter</i> and <i>Queensland Evacuation Guidelines for Disaster Management</i> Section 10.2 and 10.5 of the <i>Queensland Evacuation Guidelines for Disaster Management Groups</i> and as per section 9 of the <i>Queensland Public Cyclone Shelter Operations Guidelines</i> As per local governments' function to ensure they have a disaster response capability (section 80 of the <i>Disaster Management Act 2003</i> ). For public cyclone shelters, in accordance with the <i>Queensland Public Cyclone Shelter Maintenance</i>

<sup>53</sup> Council of Australian Governments (2011)



	<p><i>Guidelines.</i></p> <p>Requirements for public cyclone shelter management teams are described in the <i>Queensland Public Cyclone Shelter Operations Guidelines</i>. The doctrine contains no guidance on the staffing of places of refuge.</p>
That disaster management guidelines are followed	Section 57 of the <i>Disaster Management Act 2003</i> , and <i>Queensland Flood Commission of Inquiry</i> recommendation 5.40. Refer to <a href="#">Appendix A</a> of this report.
That disaster management priorities inform land-use and town planning schemes.	According to the <i>State Planning Policy 2014</i> , planning schemes are to appropriately integrate the state interest by undertaking to “(b) support, and not unduly burden, disaster management response or recovery capacity and capabilities,(c) directly, indirectly and cumulatively avoid an increase in the severity of the natural hazard and the potential for damage on the site or to other properties”. This is supported by section 12 of the <i>Local Government Act 2009</i> that obligates councillors to represent the current and future interests of the residents of the local government area, which we interpret here as proactively reducing risk in accordance with the <i>State Planning Policy 2014</i> . Also, refer to <i>Queensland Flood Commission of Inquiry</i> recommendations 7.3, 7.15, 8.5, and 8.7

Community engagement	
Expectation	Basis for expectation
That communities understand their risk to storm tide and cyclone events;	Section 4(c) of the <i>Disaster Management Act 2003</i> , and <i>Queensland Flood Commission of Inquiry</i> recommendation 5.69-5.70
That communities are encouraged and supported to make their own sheltering arrangements:	As per section 6 of the <i>Queensland Evacuation Guidelines for Disaster Management Groups</i> , Indicator i under Key Outcome 2.3 of the <i>Standard for Disaster Management in Queensland</i> , and section 6.1.3 of the <i>Queensland Evacuation Guidelines for Disaster Management Groups</i> The responsibility of animal owners stated in section 17 of the <i>Animal Care and Protection Act 2001</i> . Further, in accordance to the <i>Queensland Public Cyclone Shelter Operation Guidelines</i> , pets are not to be admitted into public cyclone shelters. Assistance animals, on the other hand, are. Also, <i>Queensland Flood Commission of Inquiry</i> recommendation 5.71. There is no guidance around pets in places of refuge.
That agencies involved in community education deliver consistent and locally-focused information for all hazards and phases of disaster management.	As per section 7.9.1 of the <i>Queensland Local Disaster Management Guidelines</i> , section 8.1.1 of the draft 2015 <i>State Disaster Management Plan</i> and <i>Queensland Flood Commission of Inquiry</i> recommendation 3.14.

## Appendix G:

# Case study of Tropical Cyclone Marcia

---

This case study provides an overview of the actions taken by key stakeholders in the lead up to, the activation, and the closing of, the Yeppoon public cyclone shelter in response to Severe Tropical Cyclone Marcia. This case study is not intended to apportion blame, and recognises the rapid intensification of the cyclone rendered many of the local plans inoperable. The case study captures findings applicable to the management of all public cyclone shelters in Queensland and highlights the need for scalable and adaptable approaches to disaster management at all levels of government.

Early on Thursday morning, 19 February 2015, the Mayor of Livingstone Shire Council and Chair of the Livingstone Local Disaster Management Group announced on radio his intention to open the Yeppoon Public Cyclone Shelter by 4.30pm that afternoon. Some were surprised by the Mayor's proposed action when it was anticipated the shire would only be subjected to a lower category tropical cyclone with minimal storm tide inundation. Regardless, the key stakeholders started the various tasks required to prepare the shelter. A member of the Livingstone Local Disaster Management Group (the LDMG) telephoned the Principal of Yeppoon State High School to inform him of the decision to activate the shelter, which he had also heard on the radio that morning. Shortly after, the school staff and students implemented their handover action plan: clearing sports equipment from the shelter and moving office furniture. Council staff arrived and started arranging 800 chairs as detailed in the Yeppoon Cyclone Shelter Sub Plan.

The LDMG convened mid-morning and were informed no one had been identified to perform the role of cyclone shelter manager and there were likely gaps in the cyclone shelter management team. A request for assistance was forwarded to the Rockhampton District Disaster Management Group (DDMG) requesting the state to provide a shelter management team. By noon the commercial airlines had begun cancelling flights in anticipation of the Rockhampton airport closing. The DDMG sought further clarification from the LDMG as to the composition and skills required for the requested shelter management team and indicated it was unlikely to fulfil this request given the deteriorating conditions. The Queensland Fire and Emergency Services (QFES) Area Coordinator, in consultation with the LDMG, volunteered to be the cyclone shelter manager in the absence of any other suitable local candidates.

When the shelter opened at 5.00pm it had adequate bottled water, limited tea, coffee and food stuffs. There was one small television and reportedly no internet connection or telephone landline. The incoming shelter management team were unaware of the availability of, and access to, dedicated telephone and internet connections inside the shelter maintained by the Department of Housing and Public Works. It also emerged the generator was only three-quarters full, having been wrongly left in auto-mode and probably activated during a recent electrical outage in Yeppoon. The set-up team was unable to fully engage two of the door mullions and padbolts due to misalignment. Local Council buses were used to transport evacuees from coastal communities between Emu Park and Yeppoon to the shelter, but there was little public take-up for this free service. During the evening, the cyclone shelter manager estimates 63 people self-evacuated to the shelter including those

presenting with assistance animals, and some with pets. The *Yeppoon Cyclone Shelter Sub-plan* and associated public messaging prohibit pets from entering the shelter; however the plan is silent on how to manage animals and their owners who do present as evacuees. A Livingstone local laws officer was called to transfer pets to a council warehouse adjoining the Livingstone Local Disaster Coordination Centre (LDCC), where a team erected temporary enclosures for the pets.

During the evening, Severe Tropical Cyclone Marcia continued to intensify. By 10.00 pm the LDC recalled forecasts of landfall the next morning as a category five cyclone with a storm tide of 2.5 metres on a high tide. By 1.00am on Friday 20 February 2015, the LDMG decided to issue three Emergency Alert campaigns to low-lying coastal communities of Yeppoon requesting people take immediate action to evacuate to friends in high places, the Yeppoon public cyclone shelter or two identified places of refuge. St Brendan's College or the PCYC on Matthew Flinders Drive. St Brendan's College and the Emu Park State School were eventually used for these.

This public warning campaign was accompanied by a door-knock of the coastal communities by Queensland Police Service (QPS) and the State Emergency Service (SES). By 4.00am on Friday, the LDCC had coordinated the evacuation of more than 2,000 residents from the coastal storm tide inundation zone and received approximately 750 additional people into the shelter. Many drove their cars to the shelter and parked on the school campus or in the surrounding streets. The three council staff managed the registration process and tried to enforce the conditions of entry but described the situation as 'diabolical' given the massive influx of evacuees, the heavy rain and lack of covered areas outside the shelter. Similar difficulties were experienced when requiring evacuees to complete the two registration forms; both individual registration and medical details.

The shelter was locked down at 7.30am on Friday with 817 evacuees plus the shelter management team. The team included one shelter manager, two QPS, four QFES and two Queensland Ambulance Service (QAS) officers along with three council staff and two Red Cross officers. Some of the shelter team members interviewed for this case study reported a lack of clarity for their roles. It was unknown how long the shelter would be locked down and at least half the shelter management team, including the manager, had been there since the shelter opened the previous evening.

Earlier that morning a Brisbane-based journalist and television camera crew had presented to the shelter manager requesting to film live from inside the shelter. The request was denied in accordance with the *Yeppoon Cyclone Shelter Sub-plan*. The journalist was told he and his crew could only film in the foyer. The journalist and television crew were still there when the shelter manager made the decision to lock the shelter due to rapidly deteriorating weather conditions. During the morning as Severe Tropical Cyclone Marcia passed by Yeppoon—with gusts at Category 2 levels—the journalist made repeated live broadcasts to national television from inside the shelter without permission from the shelter manager.

The shelter was locked down for approximately nine hours. By all reports, the shelter facilities performed as designed, including emergency power, ventilation and lighting. The QPS restrained one individual in relation to smoking and cautioned two others, particularly in the afternoon when the shelter was still locked and the cyclone threat had seemingly passed. Some evacuees volunteered to assist the shelter management team distribute food snacks, tea and coffee. The Operations Guidelines, *Yeppoon Cyclone Shelter Sub-plan*. and

associated public messaging require evacuees to bring their own food to a public cyclone shelter and be self-sufficient for the duration of the event. This proved challenging in cases such as this where evacuees arrived at the shelter at 4.00am, following a managed evacuation and are required to shelter for the next 12 hours. The shelter management team reported a high number of evacuees arrived without sufficient food supplies for themselves or their families. Those interviewed for this case study suggested volunteers were under-utilised in the shelter and a skills audit of evacuees during registration may have identified nursing, child care and welfare skills, etc., that could have assisted the shelter management team. During the rapid activation the shelter team had not adequately planned for the care of assistance animals, in particular, providing waste capture and disposal facilities. Similarly, the shelter suffered significant water ingress on the windward side during impact that required evacuees to move their seating and mop up with limited cleaning tools.

During interviews, the shelter management team mentioned they were frustrated by an apparent lack of a public address system (PA) in the shelter. The shelter manager used a loud hailer but found this inadequate and resorted to briefing the team who then walked the floor and shared information to clusters of evacuees. The shelter management team were unaware of the shelter's permanent PA, that is integrated with the fire panel and outlined in the operations guidelines. The team were also frustrated by a lack of technology to display public information, i.e. weather updates and situation reports.

The shelter was opened at 4.30pm on Friday 20 February 2015. Evacuees and the shelter management team were in a hurry to leave. Poor communications in the shelter meant little information was provided to evacuees about what to do next, how to keep safe and where evacuation centres might be established. Many of the evacuees' cars parked near the shelter had been damaged by debris and were unable to be moved. Providing public transport from the shelter was also difficult due to fallen trees, power lines and debris. Pet owners made their way to the temporary pet shelter and found it locked, with some resorting to scaling the fence to reclaim their pets.

On Saturday 21 February 2015, the Principal returned to the Yeppoon public cyclone shelter to find the generator still running, a large amount of food waste and rubbish throughout the shelter and the door mullions and pad-bolts still in the locked position. On Sunday 22 February 2015, the Principal sent a staff member to the Livingstone LDCC to locate the officer who held the shelter keys for access to the mullions, the generator room and could provide answers regarding the planned clean up and handing back of the shelter to the school. The Principal was endeavouring to achieve reopening of the school by Tuesday 24 February 2015; in particular the school hall for student access to shelter, and to run a modified learning program. The Livingstone LDCC was reportedly kept busy making the community safe, restoring essential services and undertaking damage assessment. The shelter clean-up and handover was not identified as an immediate priority for the LDCC. The Principal indicated school teachers and their families spent the weekend cleaning out the shelter, unblocking toilets and removing food waste in an effort to meet the planned Tuesday reopening of the school.

The Yeppoon public cyclone shelter proved an effective strategy for Livingstone Shire Council to mitigate the risk of storm tide and cyclone to exposed coastal communities. The number of evacuees slightly exceeded the design capacity of the shelter, but the facility performed well and suffered little damage. It is unclear whether the Council's 'shelter in

place' messaging contributed to the relatively low demand for the shelter, particularly given that 2,000 people were evacuated from their homes at 4.00am and the majority found alternate accommodation. Overall, the shelter delivered a valuable service to the community; however, the experiences described for the operation and management of the shelter at all levels of activation could have been improved with better understanding and application of the *Yeppoon Cyclone Shelter Sub-plan*.

### Findings

1. The rapid intensifying of Severe Tropical Cyclone Marcia meant the detailed guidance in the *Yeppoon Cyclone Shelter Sub-plan* was not followed, or in some cases, not practical for the Livingstone LDMG, the shelter manager and his team across all levels of activation.
2. Current guidelines and plans for cyclone shelters assume warnings of days, rather than hours. There is scope to re-examine all such documents to ensure they allow for rapidly changing events.
3. There is scope for better use of transportation points, i.e. local shopping centres, to coordinate evacuee travel to and from public cyclone shelters; however the review team recognises the challenges faced by Livingstone LDCC to execute these arrangements at 2.00am following a managed evacuation.
4. The Operations Guidelines and *Yeppoon Cyclone Shelter Sub-plan* requires evacuees to bring their own food; however, there is opportunity to review this guidance, in cases such as this, where people will not have opportunity to purchase or prepare their own food.
5. The roles and responsibilities of the cyclone shelter management team are well documented in the *Yeppoon Cyclone Shelter Sub-plan*; however, a greater focus on identifying redundancies for each position, training and exercising the team together outside of disasters, would ensure effective management of the shelter through all levels of activation.
6. The Livingstone Local Disaster Management Group identified the lack of local capability to form a cyclone shelter management team as a significant risk. They had aired this risk over the preceding months, and had shared it with the Rockhampton District Disaster Management Group eight days prior to Severe Tropical Cyclone Marcia. A formal request for assistance was generated in the hours leading up to impact. The event suggests the need to relook at the staffing model for cyclone shelters - certainly for Livingstone Shire.
7. There is scope for greater collaboration between the school principal, the Livingstone Local Disaster Coordinator and local Department of Housing and Public Works representative through regular meetings, to ensure building maintenance, shelter handover and closure arrangements remain effective.

## Appendix H: Summary of feedback

In addition to substantial engagement during the course of this review, a copy of the draft report was provided to its contributors seeking final feedback. Below is a summary of feedback, which was provided in writing or verbally to the Office of the Inspector-General Emergency Management. The views of contributors have been considered and are represented to the extent relevant and warranted in preparing this report.

### Summary of comments received from stakeholders accountable for recommendations:

<b>Queensland Police Service</b>
The Queensland Police Service notes the findings of the review and supports activities to enhance cyclone and storm tide sheltering arrangement to improve operability and community safety. The Queensland Police Service agrees to support, where appropriate, the implementation of Recommendations 1, 2 and 3 for which it is nominated as support agency.
<b>Department of Housing and Public Works</b>
The Department of Housing and Public Works is generally supportive of the report content and the associated recommendations.
<b>Queensland Fire and Emergency Services</b>
The recommendations are agreed to in principle. [The report is] a valuable program of work that comprehensively identifies and addresses the issues and challenges associated with cyclone and storm tide sheltering arrangements.
<b>Department of Infrastructure, Local Government and Planning</b>
The Department supports the findings and recommendations presented in this report.
<b>Department of the Premier and Cabinet</b>
The Department of the Premier and Cabinet (DPC) is grateful for the opportunity to consider a draft of the Inspector-General of Emergency Management's Review of Cyclone and Storm Tide Sheltering Arrangements, and acknowledges that opportunities exist to improve risk modelling and shelter arrangements and management across Queensland. DPC looks forward to receiving the final report and collaborating with other stakeholders to ensure that Queensland's sheltering arrangements match risks.

### Summary of comments from other stakeholders:

<b>Queensland Ambulance Service, Queensland Health</b>
The Queensland Ambulance Service (QAS) supports the recommended changes within the document. We reaffirm our commitment and practice to ensure that all public cyclone shelters will have a QAS presence during an activation.
<b>Department of Science, Information Technology and Innovation</b>

The Department of Science, Information Technology and Innovation supports the findings and conclusions the report has generated.
<b>Department of Transport and Main Roads</b>
Having contributed to the interview process, the Department of Transport and Main Roads has no further comment.
<b>Department of Aboriginal and Torres Strait Islander Partnerships</b>
The recommendations in the report are supported.
<b>RSPCA Queensland</b>
RSPCA Queensland fully supports the review of cyclone and storm tide sheltering arrangements. RSPCA Qld fully supports the improvement of animal welfare in disasters with the preferred approach being the full implementation of the Queensland Flood Commission of Inquiry Interim Report recommendations and the Queensland Emergency Management Assurance Framework which is an integrated approach consistent with the Disaster Management Act 2003 and Animal Care & Protection Act 2001.
<b>Whitsunday Regional Council</b>
Whitsunday Regional Council (WRC) supports the recommendations made in this Review Report.
<b>Mackay Regional Council</b>
Mackay Regional Council (MRC) supports the recommendations made in this report.



