State Planning Policy – state interest guidance
Natural Hazards, Risk and Resilience

Technical Manual

Evaluation report: Flood hazards

April 2016
### Outcomes sought:

1. **Identifying natural hazard areas**

<table>
<thead>
<tr>
<th>State Interest Requirements</th>
<th>Guiding questions</th>
</tr>
</thead>
</table>
| 1. Confirm the flooding extent: Across each local government area (LGA) identify the areas that may flood. | (i) Do appropriate and current localised flood studies identify the potential extent of flooding across all the catchments of the LGA?  
   YES – include copies of studies and / or maps.  
   NO – go to (ii)  
(ii) In LGAs where there are no localised flood studies has the state-wide flood mapping been used?  
   YES – go to (iii)  
   NO – Outline the information available to confirm the flood extent.  
(iii) Has the state-wide flood mapping been locally verified?  
   YES – go to (iv)  
   NO – Articulate what steps have been taken to verify.  
(iv) How has the verification been achieved:  
   • Has the extent of flooding been checked with any recorded past historic events or  
   • Has local expert advice or flood recording marks been used?  
   • Other (please explain other methods)  
   YES – complete with outputs achieved.  
   NO – Please discuss with DILGP how best to achieve this requirement. |

**OUTPUTS of this evaluation question:**

1. Map of the potential flood extent for the complete LGA  
2. Compilation of localised flood studies of the LGA
2. Identify flood investigations areas:
   Identify those flood prone areas that overlap with areas of existing development or proposed development

(i) Have existing and proposed settlement/development areas that coincide with the flood extent areas been identified?
   YES – go to (ii)
   NO – See guidance for information on the need for a ‘fit for purpose’ natural hazards study and risk assessment.

OUTPUTS of this evaluation question:
1. A map of existing and proposed settlement/development areas that occur within the flood extent
2. A list of settlement/development areas that have a localised flood study and those that do not have a localised flood study

Outcomes Sought:
2. Include provisions that seek to achieve an acceptable or tolerable level of risk, based on a fit for purpose natural hazards study and risk assessment.

<table>
<thead>
<tr>
<th>State Interest Requirements</th>
<th>Guiding questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Undertake a suitable “fit for purpose” flood investigation:</td>
<td>Note 1 - Options for investigation include:</td>
</tr>
<tr>
<td>For each investigation area, choose a level of investigation that will provide the level of detail</td>
<td>a) State-wide mapping suitable for locations where new development is highly unlikely,</td>
</tr>
<tr>
<td></td>
<td>b) Intermediate investigation for low growth settlements,</td>
</tr>
<tr>
<td></td>
<td>c) Advanced investigation for all other locations with growth.</td>
</tr>
<tr>
<td></td>
<td>Note 2 - The suitability of any existing flood study may require a review to ensure that it provides the required information to complete a flood hazard assessment.</td>
</tr>
</tbody>
</table>
required to make evidence based planning decisions.

<table>
<thead>
<tr>
<th>(i) Have the following factors been considered to determine which type of flood study (intermediate or advanced) is required for each investigation area?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• the current population (both numbers, number of properties and spatial extent) and types of land use exposed to flooding,</td>
</tr>
<tr>
<td>• future development and growth pressures that are foreshadowed,</td>
</tr>
<tr>
<td>• characteristics of potential flood events (for example - depth, velocity and duration of inundation for both past and foreshadowed events),</td>
</tr>
<tr>
<td>• the potential of risk to people and property,</td>
</tr>
<tr>
<td>• emergency evacuation routes,</td>
</tr>
<tr>
<td>• community resilience to flooding, and</td>
</tr>
<tr>
<td>• any other additional factors.</td>
</tr>
</tbody>
</table>

YES – go to (ii)
NO – Articulate what factors have been considered to determine which type of flood study is required for each investigation area:

(ii) The Terms of Reference for each new flood investigation should include a requirement that the flood behaviour characteristics that will be required to complete the risk assessment of the existing and proposed land uses of that catchment are included. Is this the case?

YES – go to (iii)
NO – Please provide a short explanation. DILGP may need to follow up.

(iii) For any flood investigation used, is the input data still the best available?

YES – go to (iv) or (v)
NO – Please provide a short explanation. DILGP may need to follow up.

(iv) Has the investigation analysis in urban areas, at a minimum, produced:

• a map showing ‘areas of hazard’ derived from information and analysis about the likelihood and behaviour of flooding, or
• a map showing the extent of floods for a range of flood events, up to and including the Probable Maximum Flood (PMF) (where applicable)

YES – go to (vi)
NO – Articulate what has been produced during the investigation analysis of urban areas.
(v) Has the investigation analysis in non-urban areas, at a minimum, produced and/or undertaken:

- a flood map based on historic flood levels that have been subjected to a flood frequency analysis to estimate the annual exceedance probability (AEP) of the selected historical flood, or
- a historic flood map without flood frequency analysis, or
- the Interim Floodplain Assessment Overlay that has been locally verified and either accepted or amended by the relevant local government.

YES – go to (vi)
NO – contact DILGP to discuss alternatives

(vi) Has the localised investigation been undertaken by a suitability qualified professional, who has utilised all the recommended industry technical guides?

YES – go to (vii)
NO – Describe who has undertaken the localised investigation.

(vii) For all the investigation areas is there a public record of:

- what level of mapping has been undertaken in particular locations, and
- where future mapping is proposed, and
- locations where mapping is unavailable or not considered necessary.

OUTPUTS of this evaluation question:

1. The LGA flood mapping utilises localised flood studies, or
2. The LGA flood mapping utilises a mosaic or localised flood studies with some state-wide flood mapping.
### 4. The risk assessment and subsequent planning provisions are developed in a manner consistent with the Risk Management process outlined in AS/NZS ISO 31000:2009

<table>
<thead>
<tr>
<th>(i) Has the risk assessment and subsequent planning provisions been developed in a manner consistent with the Risk Management process outlined in AS/NZS ISO 31000:2009? (Refer to AS/NZS ISO 31000:2009 and supporting guidance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES – go to 5(i)</td>
</tr>
<tr>
<td>NO – It is not mandatory to use this guide, but it is helpful in understanding the risk management process. Please describe what process you have used.</td>
</tr>
</tbody>
</table>

### 5. Identify risks to existing and proposed land uses.

<table>
<thead>
<tr>
<th>(i) To ensure that the function of the floodplain is maintained and that there are no conflicts with land uses, has the flood conveyance and flood storage locations been mapped?</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES - go to (ii)</td>
</tr>
<tr>
<td>NO – Please provide a short explanation. DILGP may need to follow up.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(ii) Has the flood risk been calculated for existing and proposed land uses, based on a combination of different likelihood scenarios and the consequences to people and property of each scenario.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE 1 – Consequence entails an assessment of the exposure, vulnerability and tolerability of people and property to each likelihood scenario</td>
</tr>
<tr>
<td>YES – Complete with output achieved.</td>
</tr>
<tr>
<td>NO – Please provide a short explanation. DILGP may need to follow up.</td>
</tr>
</tbody>
</table>

**OUTPUT of this evaluation question:**

1. A flood risk map for the investigation areas.

### 6. Determine the acceptable, tolerable and intolerable levels of risk for each land use type located in the local government area.

<table>
<thead>
<tr>
<th>(i) Have the acceptable, tolerable and intolerable levels of risk been determined for each land use type?</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES – Complete with output achieved.</td>
</tr>
<tr>
<td>NO – Please provide a short explanation. DILGP may need to follow up.</td>
</tr>
</tbody>
</table>
OUTPUT of this evaluation question:

1. A table of land uses with risk categories of acceptable, tolerable and intolerable. Special consideration should be given to the location of community infrastructure.

Outcomes sought:

Include provisions that require development to:

a) avoid natural hazard areas or mitigate the risks of the natural hazard, and
b) support, and not unduly burden, disaster management response or recovery capacity and capabilities, and
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, and

d) maintain or enhance natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard

<table>
<thead>
<tr>
<th>State Interest Requirements</th>
<th>Guiding questions</th>
</tr>
</thead>
</table>
| 7. Confirm the planning scheme provisions that achieve acceptable and/or tolerable levels of risk through the local government area. | (i) Have locations that require planning provisions to reduce the level of risk been identified?  
YES – go to (ii)  
NO – Please give a short explanation why. DILGP may need to follow up. |
|                             | (ii) Which of the following planning measures have been used at particular locations to achieve acceptable and/or tolerable levels of risk? |
|                             | (a) Avoid natural hazard areas  
• Expand into new areas with acceptable or tolerable risks  
• Intensify existing areas that are acceptable or tolerable  
• Avoid particular land uses in areas that creates an intolerable risk |
<table>
<thead>
<tr>
<th>(b) Accept residual risk in natural hazard areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maintain acceptable or tolerable land uses</td>
</tr>
<tr>
<td>• No further intensification in tolerable areas</td>
</tr>
<tr>
<td>• No further development in areas of intolerable risk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(c) Mitigate risk to an acceptable or tolerable level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Intensify with mitigation through built form responses</td>
</tr>
<tr>
<td>• Include mitigation infrastructure or change to the natural environment that will reduce the risk of a natural hazard</td>
</tr>
<tr>
<td>• Treatment of risks to transport/evacuation routes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(d) Retreat due to intolerable risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Down zone/back zone areas of intolerable risk</td>
</tr>
</tbody>
</table>

**OUTPUTS of this evaluation question:**
The planning scheme provisions are the outputs of this evaluation question – submissions to the State should include:

1. A map or list identifying locations where planning measures are required,
2. A table listing planning measures and other risk management measures that have been used at the various locations,
3. The planning provisions used to ensure that the community is not exposed to an unacceptable level of risk,
4. The hazard and risk information that is available or will be required to achieve the planning provisions,
5. A table of residual risk.

8. Confirm that the land use planning provisions have been developed within a broader risk management framework.

(i) In conjunction with land use planning provisions, have additional risk management measures including building controls, mitigation infrastructure, early warning systems, community awareness and disaster management been considered to reduce the level of risk?

   YES – go to (ii)
   NO – Please provide a short explanation. DILGP may need to follow up.

(ii) Have appropriate members of the district or local disaster management group been involved in the risk management planning process?

   YES – go to (9)
| 9. The strategic framework will set the vision and land use direction for the planning scheme and forms the basis for ensuring that only appropriate development occurs in flood hazard areas. | (i) Has the strategic framework acknowledged if a flood hazard is present?  

(ii) Does the strategic framework including a theme relating to natural hazards including specific outcomes and land use strategies to build community resilience and avoid and/or mitigate the risks associated with flooding in particular locations?  

(a) have specific outcomes addressed development avoiding and mitigating risks to:  
   - Personal safety  
   - Property damage  
   - Infrastructure functioning effectively during and after an event  

(b) have specific outcomes addressed:  
   - Protecting natural processes and landforms such as the function of the floodplain  
   - No worsening of the severity or impact of flooding  
   - Development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and  

(c) have land use strategies identified locations where risks are being avoided, mitigated or accepted, as identified in the risk assessment.  

(iii) The strategic framework should integrate natural hazards into other relevant themes by including specific outcomes and land use strategies to build community resilience and avoid and/or mitigate the risks associated with flooding in particular locations. Has this been done? |
|---|---|
| 10. A local planning instrument should map or identify natural hazard areas. | In the nomination of the Defined Flood Event (DFE) the following needs to be considered:  
   - Existing and proposed land uses  
   - Risk to people and property  
   - Disaster management  
   - Community resilience  
   - Economic considerations  

(i) Has the local planning instrument mapped or identified flood hazard areas?  

(ii) How has the mapping or identification of flood hazard areas been utilised?  

   - to identify areas that are outside the natural hazard area |
### Evaluation report: Flood hazards

<table>
<thead>
<tr>
<th>11. A local planning instrument should clearly articulate how it addresses flood hazards through the zoning.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(i)</strong> Has the local planning instrument clearly articulated how it addresses flood hazards through zoning by:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(a) Including a table of assessment that reflects the strategic framework and risk assessment</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>• has the table of assessment reflected the land use strategies in the strategic framework by appropriately triggering flood related provisions</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>• are the levels of assessment associated with flood provisions appropriate, based on the risks to people and property and the information available</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(b) not including matters that are already covered by the building assessment provisions, unless otherwise allowed under the Building Act 1975</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(c) If flood provisions are addressed in a zone code rather than an overlay code:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>• have the risks associated with flooding been appropriately addressed in the purpose, performance outcome and acceptable solutions of the zone code</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>• have the zone codes addressed the performance outcomes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. If a local planning instrument includes an overlay code it should address natural hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(i)</strong> Has a flood overlay code been included?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>YES – go to (ii)</td>
</tr>
</tbody>
</table>
and associated risks to people, property, economic activity, social wellbeing and the environment.

<table>
<thead>
<tr>
<th>13. If a planning scheme policy is included in a planning scheme to address flooding it should articulate how it addresses flood hazards.</th>
<th>NO – go to (iv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ii) If a local planning instrument includes an overlay code has it addressed the risks associated with natural hazards to people, property, economic activity, social wellbeing and the environment by articulating the following or similar performance outcomes:</td>
<td></td>
</tr>
<tr>
<td>• the development is compatible with the level of risk associated with the natural hazard, and</td>
<td></td>
</tr>
<tr>
<td>• the development siting, layout, design and access addresses the risks associated with flood to personal safety, and</td>
<td></td>
</tr>
<tr>
<td>• the development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and</td>
<td></td>
</tr>
<tr>
<td>• the development is resilient to natural hazard events by ensuring siting and design accounts for the potential risks of natural hazards to property, and</td>
<td></td>
</tr>
<tr>
<td>• the development directly, indirectly and cumulatively avoids an unacceptable increase in severity of the natural hazard and does not significantly increase the potential for damage on the site or to other properties, and</td>
<td></td>
</tr>
<tr>
<td>• the development avoids the release of hazardous materials as a result of a natural hazard event, and</td>
<td></td>
</tr>
<tr>
<td>• natural processes and the protective function of landforms and/or vegetation are maintained in natural hazard areas.</td>
<td></td>
</tr>
<tr>
<td>(iii) Does the overlay code include matters that are already covered by the building assessment provisions, unless otherwise allowed under the Building Act 1975?</td>
<td></td>
</tr>
<tr>
<td>(iv) If there is no overlay code, explain how the risks associated with flooding have been avoided or mitigated in the planning scheme and why an overlay code was not used</td>
<td></td>
</tr>
</tbody>
</table>

13. If a planning scheme policy is included in a planning scheme to address flooding it should articulate how it addresses flood hazards.

<table>
<thead>
<tr>
<th>(i) Has a flood planning scheme policy been included?</th>
<th>YES – go to (ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO – go to (iii)</td>
<td></td>
</tr>
</tbody>
</table>
(ii) Has the planning scheme addressed flooding by specifying:
- for development proposed on land susceptible to flooding, outline what additional information an applicant should provide to the assessment manager as part of the development application, or
- for development proposed on land where the potential for flooding is unknown, requires an applicant to provide:
  - as part of the development application, information to enable an assessment of whether the subject land is susceptible to flooding, and
  - upon a determination the subject land is susceptible to flooding, more detailed information, to allow an assessment of the flood risk.

(iii) If a flood planning scheme policy has not been included, clearly explain why.

Outcome sought:
Facilitating the location and design of community infrastructure to maintain the required level of functionality during and immediately after a natural hazard event.

State Interest Requirements | Guiding questions
---|---
14. Siting of the infrastructure is compatible with the level of hazard, (see table: flood immunity levels for community infrastructure). | (i) Is the community infrastructure located in an area with a compatible level of hazard, (see table in Technical manual – community infrastructure and natural hazards)?
  YES – Go to 16.
  NO– Please give a short explanation why. DILGP may need to follow up.

15. Where flood areas cannot be avoided, the risks associated with | (i) Have the following performance outcomes been achieved:
  (a) People and social wellbeing
  - the individual piece of infrastructure or the infrastructure network is able to achieve the required level of service during and after a broad
flooding must be mitigated to acceptable or tolerable levels.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Safety and security</td>
<td></td>
</tr>
</tbody>
</table>
- range of events
  - siting, layout, access (efficient evacuation and access for emergency services) and disaster management plans respond to the flood hazard potential and maintains personal safety
  - infrastructure siting supports, and does not unduly burden disaster management response or recovery capacity and capabilities
| (b) Property and economic | 
- infrastructure is resilient to flood hazard events by ensuring siting and design account for the potential risks of natural hazards to property
- infrastructure is economically feasible considering the likelihood of flooding and the design lifespan of the infrastructure, initial design and construction costs as well as recovery costs if the infrastructure is damaged during a flood event
- the individual piece of infrastructure or the infrastructure network is able to achieve an acceptable level of functionality during and immediately after a natural hazard event to minimise the impact on relevant economies (local regional, state, national)
- culturally or historically significant material is protected from the risks associated with flooding
| (c) Environmental | 
- development directly, indirectly and cumulatively avoids an unacceptable increase in the severity of the flood hazard and does not significantly increase the potential for damage on the site or to other properties, and
- development avoids the release of hazardous materials as a result of a flood hazard event, and
- natural processes and the protective function of landforms and/or vegetation are maintained or managed in flood hazard areas
- development avoids environmental and other impacts on the surrounding area and properties

YES – Go to 16.

NO - Please give a short explanation why. DILGP may need to follow up.

16. A business continuity plan includes the level of immunity achieved by siting and design and how the required level of

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Has a business continuity plan been developed by an appropriately qualified professional?</td>
<td></td>
</tr>
<tr>
<td>(ii) Has the business continuity plan been developed in consultation with relevant local or district disaster management committee representatives?</td>
<td></td>
</tr>
<tr>
<td>Service will be achieved during and immediately after a more severe flood event.</td>
<td>(iii) Is the business continuity plan consistent with relevant standards?</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>(iv) Does the business continuity plan:</td>
<td></td>
</tr>
<tr>
<td>• articulate the role of the community infrastructure during and immediately after a natural hazard</td>
<td></td>
</tr>
<tr>
<td>• articulate the level of immunity to be achieved by siting and design</td>
<td></td>
</tr>
<tr>
<td>• articulate the levels of service that will be maintained during and immediately after a range of natural hazard events, for example 1%, 0.5%, 0.2% and 0.05% AEP and including the immunity level achieved through siting and design</td>
<td></td>
</tr>
<tr>
<td>• how the required level of service will be achieved during and immediately after a natural hazard event that is greater than the siting and design immunity.</td>
<td></td>
</tr>
</tbody>
</table>