

State Planning Policy – state interest guidance

Natural Hazards, Risk and Resilience

Technical Manual

Evaluation report: Landslide hazards

April 2016



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Outcomes sought:

1. Identifying natural hazard areas

State Interest Requirements	Guiding questions
<p>1. Confirm the landslide extent:</p> <p>Across each local government area (LGA) identify the areas that may be subject to landslide.</p>	<p>(i) Do local area landslide studies identify the potential extent of landslides across the LGA?</p> <p>YES – include studies and/or maps. NO – go to (ii)</p> <p>(ii) In LGAs where there are no local area landslide studies has the state-wide 15% slope mapping been used?</p> <p>YES – go to (iii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iii) Has the state-wide 15% slope mapping been locally verified?</p> <p>YES – go to (iv) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iv) How has the verification been achieved:</p> <ul style="list-style-type: none"> • Has the extent of landslides been checked with any recorded past historic events; or • Has local geotechnical expert advice been used; or • Have other local information sources such as geology or indicators of instability been used to indicate possible landslide and then compared with the state-wide 15% slope map for this local location; or • Other (please explain other methods) <p>YES – complete with outputs achieved. NO – Please provide a short explanation. DILGP may need to follow up.</p>

OUTPUTS of this evaluation question:

1. Map of the potential landslide extent for the complete LGA – based on state-wide 15% slope mapping or a combination of local area studies and state-wide 15% slope mapping
2. Where existing, compilation of localised landslide studies of the LGA

<p>2. Identify landslide investigations areas:</p> <p>Identify those landslide prone areas that overlap with areas of existing development or proposed future development.</p>	<p>(i) Have existing and proposed development areas that coincide with the landslide extent areas been identified?</p> <p>YES and existing and proposed development areas coincide with the landslide extent areas – Complete with outputs achieved.</p> <p>YES and existing and proposed development areas do not coincide with the landslide extent areas – No further responses to the evaluation report are required.</p> <p>NO – Please provide a short explanation. DILGP may need to follow up.</p>
<p>OUTPUTS of this evaluation question:</p> <ol style="list-style-type: none"> 1. A map of existing and proposed settlement/development areas that occur within the landslide extent 2. A list of settlement/development areas that have a landslide study and those that do not have a landslide study 	
<p>Outcomes Sought:</p> <ol style="list-style-type: none"> 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. 	
<p>State Interest Requirements</p>	<p>Guiding questions</p>
<p>3. Undertake a suitable “fit for purpose” landslide investigation:</p> <p>For each investigation area identified, choose a level of investigation that will provide the level of detail required to make evidence based planning decisions.</p>	<p>Note 1 - Options for investigation include:</p> <ol style="list-style-type: none"> a) State-wide 15% slope mapping suitable for locations where new development is highly unlikely, b) Landslide inventory, c) Landslide susceptibility study, d) Landslide hazard study. <p>Note 2 – Based on geological and other technical aspects a local government can review if a base slope steeper than 15% would be an alternate base slope for plan making. If a steeper slope can be substantiated for this local government area by a technical investigation as suitable as the landslide trigger slope, then this may take precedence over the state-wide 15% slope threshold.</p> <p>(i) Have the following factors been considered to determine if a landslide study is required for each investigation area?</p>

	<ul style="list-style-type: none"> • the current population (both numbers and spatial extent) and types of land uses (density and land use type) exposed to landslide; • future development and growth pressures that are foreshadowed (refer to Table 1) and; • known characteristics of previous landslides; • changes to water ponding or flow paths or vegetation; and • other additional factors. <p>YES – a local area study is required - go to (ii) or</p> <p>YES – and satisfied that the exposure to landslide is low, and that a local landslide study is not required. The state-wide 15% slope trigger is to be used to require site based assessment if a development application is lodged- Question complete.</p> <p>NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(ii) For each local area landslide investigation has the Terms of Reference included a requirement for utilising the most appropriate landslide behaviour characteristics that will be required to complete the risk assessment of the area for existing and proposed land uses?</p> <p>YES – go to (iii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iii) For each local area landslide investigation has the best available input data been utilised?</p> <p>YES – go to (iv) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iv) Have future increases in rainfall intensity and runoff characteristics been utilised to estimate landslide behaviour in a local area investigation?</p> <p>YES – go to (v) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(v) Has the local area investigation been undertaken by a suitability qualified professional and based on the AGS national Guidelines? (Guidance 3.1.5 (iii))</p> <p>YES – go to (vi)</p>
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	<p>NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(vi) For all the investigation areas is there a public record of :</p> <ul style="list-style-type: none"> • what type of mapping has been undertaken in particular locations, and • if relevant, where future mapping is proposed. <p>YES – complete and with output achieved NO – Please provide a short explanation. DILGP may need to follow up.</p>
<p>OUTPUTS of this evaluation question:</p> <ol style="list-style-type: none"> 1. The LGA landslide mapping utilises local area studies, or 2. The LGA landslide mapping utilises a mosaic or localised landslide studies with some state-wide 15% slope mapping. 	
<p>Outcomes sought:</p> <ol style="list-style-type: none"> 3. Include provisions that require development to: <ol style="list-style-type: none"> 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 	
<p>State Interest Requirements</p>	<p>Guiding questions</p>
<p>4. Confirm the planning scheme provisions that achieve acceptable and/or tolerable levels of risk through the local</p>	<p>(i) Have the locations that require planning scheme provisions to reduce the level of risk been identified?</p> <p>YES – go to (ii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(ii) Have alternate risk management measures including building controls, vegetation and stormwater management, community awareness and</p>

<p>government area.</p>	<p>disaster management been considered to reduce the level of risk in conjunction with land use planning measures?</p> <p>YES – go to (iii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iii) Have members of the district or local disaster management group been involved in the risk management planning process?</p> <p>YES – go to (iv) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(iv) Which of the following land use strategies have been used at particular locations to achieve acceptable and/ or tolerable levels of risk?</p> <p>(a) Avoid natural hazard areas</p> <ul style="list-style-type: none"> • Expand into new areas with acceptable or tolerable risks • Intensify existing areas that are acceptable or tolerable • Avoid particular land uses in areas that create an intolerable risk <p>(b) Accept residual risk in natural hazard areas</p> <ul style="list-style-type: none"> • Maintain acceptable or tolerable land uses • No further intensification in tolerable areas • No further development in areas of intolerable risk <p>(c) Mitigate risk to an acceptable or tolerable level</p> <ul style="list-style-type: none"> • Intensify with mitigation through built form responses • Include mitigation infrastructure or change to the natural environment that will reduce the risk of a natural hazard • Treat risks to transport/evacuation routes <p>(d) Retreat due to intolerable risk</p> <ul style="list-style-type: none"> • Down zone/back zone areas of intolerable risk
<p>OUTPUTS of this evaluation question:</p>	

<p>1. The planning scheme provisions are the outputs of this evaluation question – submissions to the State should include:</p> <p>a) A map or list identifying locations where planning measures are required,</p> <p>b) A table listing planning measures and other risk management measures that have been used at the various locations,</p> <p>c) The planning provisions used to ensure that the community is not exposed to an unacceptable level of risk,</p> <p>d) The hazard and risk information that is available or will be required to achieve the planning provisions,</p> <p>e) A table of residual risk.</p>	
<p>5. Confirm that the land use planning scheme provisions have been developed within a broader risk management framework.</p>	<p>(i) In conjunction with planning scheme 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?</p> <p style="padding-left: 40px;">YES – go to (ii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(ii) Have appropriate members of the district or local disaster management group been involved in the risk management planning process?</p> <p style="padding-left: 40px;">YES- go to 6. NO – Please provide a short explanation. DILGP may need to follow up.</p>
<p>6. 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 landslide hazard areas.</p>	<p>(i) Has the strategic framework acknowledged where a landslide hazard is present?</p> <p style="padding-left: 40px;">YES– go to (ii) NO – Please provide a short explanation. DILGP may need to follow up.</p> <p>(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 landslide hazards in particular locations?</p> <p style="padding-left: 40px;">(a) have specific outcomes addressed development avoiding and mitigating risks to:</p> <ul style="list-style-type: none"> • Personal safety • Property damage • Infrastructure functioning effectively during and after an event <p style="padding-left: 40px;">(b) have specific outcomes addressed:</p> <ul style="list-style-type: none"> • Protecting natural processes and landforms • No worsening of the severity or impact of the landslide hazard

	<ul style="list-style-type: none"> • Development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and <p>(c) have land use strategies identified locations where risks are being avoided, mitigated or accepted, as identified in the risk assessment.</p> <p>(iii) The strategic framework integrate landslide 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 natural hazards in particular locations. Has this been done?</p> <p>Opportunities include:</p> <p>(a) settlement pattern theme identifies:</p> <ul style="list-style-type: none"> • where landslide hazard areas avoided or mitigated <p>(b) natural environment theme addresses:</p> <ul style="list-style-type: none"> • protecting natural processes and landforms, and • no worsening of the severity or impact of the hazard <p>(c) community identity and diversity theme addresses:</p> <ul style="list-style-type: none"> • the ability for resilient social infrastructure to function effectively during and after a landslide hazard event, and • the ability for social infrastructure to provide emergency shelters <p>(d) natural resources and landscape theme addresses:</p> <ul style="list-style-type: none"> • protecting natural processes and landforms, and • no worsening of the severity or impact of the hazard <p>(e) access and mobility theme addresses:</p> <ul style="list-style-type: none"> • providing for effective disaster response and recovery through evacuation routes, access for emergency services and the supply of essential goods and services <p>(f) infrastructure and services theme addresses:</p> <ul style="list-style-type: none"> • resilient critical and community infrastructure that can function effectively during and after a landslide event <p>(g) economic development theme addresses:</p>
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	<ul style="list-style-type: none"> • a resilient economy that will be able to operate after a landslide event
<p>7. A local planning instrument should map or identify natural hazard areas.</p>	<p>(i) Has a local planning instrument mapped or identified landslide hazard areas?</p> <p>(ii) How has the mapping or identification of landslide hazard areas been utilised to:</p> <ul style="list-style-type: none"> • Identify locations where land use strategies will be used to avoid or mitigate the risks associated with landslide • Trigger specific landside related provisions in a zoning code • Trigger a landslide overlay code • Trigger building requirements <p>(iii) Have the strategic plan maps, zone maps, local plan maps and overlay maps in schedule 2 of the planning scheme reflected the land use strategies identified in the risk assessment and strategic framework?</p> <p>(iv) has the mapping or identification of landslide hazard areas been made available to the community?</p>
<p>8. A local planning instrument will clearly articulate how it addresses landslide hazards through the zoning.</p>	<p>(i) Has the local planning instrument clearly articulated how it addresses landslide hazards through zoning by:</p> <p>(a) Including a table of assessment that reflects the strategic framework and risk assessment</p> <ul style="list-style-type: none"> • has the table of assessment reflected the land use strategies in the strategic framework by appropriately triggering landslide related provisions • are the levels of assessment associated with landslide provisions as low as practicable, based on the risks to people and property and the information available <p>(b) not including matters that are already covered by the building assessment provisions, unless otherwise allowed under the <i>Building Act 1975</i></p> <p>(c) If landslide provisions are addressed in a zone code rather than an overlay code:</p> <ul style="list-style-type: none"> • have the risks associated with landslide been appropriately addressed in the purpose, performance outcome and acceptable solutions of the zone code • have the zone codes addressed the performance outcomes, or similar

<p>9. If a local planning instrument includes an overlay code it should address natural hazards and associated risks to people, property, economic activity, social wellbeing and the environment.</p>	<p>(i) Has a landslide overlay code been included?</p> <p>YES – go to (ii)</p> <p>NO – go to (iv)</p> <p>(ii) If a local planning instrument includes an overlay code has it addressed the risks associated with landslide to people, property, economic activity, social wellbeing and the environment by articulating the following or similar performance outcomes:</p> <ul style="list-style-type: none"> • the development is compatible with the level of risk associated with the landslide hazard, and • the development siting, layout, design and access addresses the risks associated to personal safety from the natural hazard, and • the development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and • the development is resilient to landslide hazard events by ensuring siting and design accounts for the potential risks of natural hazards to property, and • the development directly, indirectly and cumulatively avoids an unacceptable increase in severity of the landslide hazard and does not significantly increase the potential for damage on the site or to other properties, and • the development avoids the release of hazardous materials as a result of a landslide event, and • natural processes and the protective function of landforms and/or vegetation are maintained in landslide hazard areas. <p>(iii) Does the overlay code include matters that are already covered by the building assessment provisions, unless otherwise allowed under the <i>Building Act 1975</i>?</p> <p>(iv) If there is no overlay code, explain how the risks associated with landslide have been avoided or mitigated in the planning scheme and why an overlay code was not used.</p>
<p>OUTPUT of this evaluation question:</p>	

1. The planning scheme provisions are the outputs of this evaluation question.	
Outcome sought:	
4. 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
10. Siting of the infrastructure is compatible with the level of risk.	<p>(i) The site is not subject to landslide hazard, either internally or from sloping land above the site.</p> <p>(ii) Has a site-specific geotechnical analysis, prepared by a registered professional engineer demonstrated that the site is not subject to landslide risk?</p> <p>YES – go to 11.</p> <p>NO – Please provide a short explanation. DILGP may need to follow up.</p>
11. Where landslide hazard areas cannot be avoided, the risks associated with landslide must be mitigated to acceptable or tolerable levels.	<p>(i) Has a site-specific geotechnical analysis demonstrated that the risks associated with landslide have been mitigated by addressing the stability of buildings and structures in relation to landslide</p> <p>YES – no further information required.</p> <p>NO – Please provide a short explanation. DILGP may need to follow up.</p>
12. A business continuity plan includes the level of immunity achieved by siting and design, and how the required level of service will be achieved during and immediately after a landslide hazard	<p>(i) Is a business continuity plan relevant to the community infrastructure?</p> <p>(ii) Has a business continuity plan been developed by an appropriately qualified professional?</p> <p>(iii) Has the business continuity plan been developed in consultation with relevant local or district disaster management committee representatives?</p>

<p>event.</p>	<p>(iv) Is the business continuity plan consistent with relevant standards?</p> <p>(v) Does the business continuity plan?</p> <ul style="list-style-type: none"> • articulate the role of the community infrastructure during and immediately after a landslide hazard event • outline how the required level of service will be achieved during and immediately after a landslide hazard event that affects the infrastructure
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