



VULNERABILITY ASSESSMENT TABLE

Historical infrastructure

This table highlights some of the ways historical infrastructure may be vulnerable to the effects of climate change. It is not intended to be comprehensive and the examples of possible management approaches will not be appropriate in all cases. Qualified and experienced heritage specialists should be consulted in undertaking any climate vulnerability or risk assessment of your place.





EXPOSURE — GENERAL

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 Change in seasonal rainfall (chronic)	Increase in rainfall events and their intensity leading to increased frequency and intensity of flooding, erosion and soil degradation	Depends on fabric, construction and local conditions	<ul style="list-style-type: none"> Types of material (e.g. wood, metal, stone) will be affected differently Increased frequency and intensity of flooding will directly impact infrastructure; there will also be indirect impacts through frequent and prolonged saturation of soils Increased water erosion and movement of soils may destabilise structures causing cracking and collapse of structures and associated loss of use 	<ul style="list-style-type: none"> Floods: build defences against flash flooding (divert water), reinforce foundations to avoid collapse in a flood Re-engineer drainage Monitor erosion and increase maintenance and repair regime Consider creation of new flood plains to manage rising water levels
 Increase in mean temperature				
	Increased frequency, duration and intensity of drought events	Loss of ground cover, drying and cracking of soils, and wind erosion	<ul style="list-style-type: none"> Drying, cracking or movement of soils may affect the stability of structures; increasing dryness will affect materials (e.g. wood, metal, stone) in different ways 	<ul style="list-style-type: none"> Monitor cracking and increase maintenance and repair regime to ensure structural integrity





EXPOSURE — GENERAL *continued*

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 <p>More hotter days (>35°C and >40°C)</p>	<p>Increased frequency and intensity of bushfires</p>	<p>Directly related to proximity and/or connectively to bush</p>	<ul style="list-style-type: none"> ○ Damage to or destruction of infrastructure ○ Types of material will be affected differently; loss of vegetation cover, heating and cracking of soils, and increased erosion following a bushfire event may affect the stability of structures and damage access routes ○ Smoke creates carbon build up which can damage most porous building materials 	<ul style="list-style-type: none"> ○ Bushfire planning ○ Retreat: plan for site recording and accept loss or relocation of site where feasible, in consultation with local community ○ Vegetation maintenance regime ○ Prepare defences where possible, such as sprinklers, gutter clearance, wrapping against ember attack etc. ○ Undertake post-bushfire risk assessment for cumulative impacts (e.g. water run-off and erosion) ○ Undertake post-bushfire remediation actions including tree felling, vegetation clearance, firebreaks, grading, etc.
	<p>Heatwaves and extreme temperatures</p>	<p>Soils susceptible to drying and cracking</p>	<ul style="list-style-type: none"> ○ Impacts will vary for different types of materials (e.g. wood, metal, stone) ○ Drying, cracking and movement of soils may affect the stability of structures 	<ul style="list-style-type: none"> ○ Monitor cracking and increase maintenance and repair regime to ensure structural integrity
 <p>More extreme rainfall events (acute)</p>	<p>Flooding, erosion and landslips</p>	<p>Depends on terrain (local conditions)</p>	<ul style="list-style-type: none"> ○ Structural damage or collapse and damage to access routes 	<ul style="list-style-type: none"> ○ Floods: build defences against flash flooding (divert water) and reinforce foundations to avoid collapse in a flood ○ Consider new flood plains ○ Consider nature-based solutions such as plantings to capture and/or divert flood waters





EXPOSURE — COASTAL

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 <p>Sea-level rise</p>	<p>Worsened coastal flooding, storm surge and coastal erosion that over time can result in permanent inundation of low-lying areas</p>	<p>Depends on terrain and potential defences (e.g. sea wall) – refer to local information</p>	<ul style="list-style-type: none"> ○ Potential for inundation and flooding with damage and destruction of infrastructure; depending on the elevation of the structural elements, this may be intermittent during high tide and storm surge events (acute) and eventually permanent 	<ul style="list-style-type: none"> ○ Retreat: plan for site recording and accept loss or relocation of site where feasible, in consultation with local community ○ Protect: add barriers/diversions where possible ○ Consider nature-based solutions such as revegetation of mobile coastal dunes
 <p>More intense or more frequent storms</p>	<p>Coastal erosion impacts</p>	<p>Depends on terrain and potential defences (e.g. sea wall) – refer to local information</p>	<ul style="list-style-type: none"> ○ Potential for storm damage or destruction of infrastructure during storms and through coastal erosion caused by individual and recurring storm events 	<ul style="list-style-type: none"> ○ Increased maintenance and structural integrity regime ○ Consider water attenuation away from buildings/infrastructure




EXPOSURE — URBAN

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 More hotter days	Heat island effect in urban areas can increase local temperatures by several degrees compared to nearby rural areas	Local 'urban heat island' mapping determines specific micro-climate risks	<ul style="list-style-type: none"> Heat stress: types of material will be affected differently Impacts to associated structures or infrastructure may also impact the heritage values 	<ul style="list-style-type: none"> Increased shading by planting or other means (integrated planning) Increased monitoring and repairs regime
 More extreme rainfall events (acute)	Flash flooding	Depends on the nature and condition of stormwater infrastructure	<ul style="list-style-type: none"> Pressure on historic drains and flooding around historic assets, such as bridges 	<ul style="list-style-type: none"> Increased monitoring and repair/upgrading of stormwater infrastructure



EXPOSURE — ALPINE

Climate change variables	Key climate change impacts	Sensitivity of the place to climate change impacts	Examples of impacts on the place and its values	Examples of possible management approaches
 Higher daily minimum temperatures and changes in precipitation	Changed freeze-thaw cycles, reduced snow cover and fewer cold days	Water run-off from new thaw and changing drainage systems	<ul style="list-style-type: none"> Impacts will vary for different types of materials (e.g. wood, metal, stone) 	<ul style="list-style-type: none"> Monitor erosion and increase maintenance and repair regime

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 ISBN 978-0-7311-9226-7 (pdf/online/MS word)
 Author: Extent Heritage. Design: Green Scribble.
 Photograph: Visit Victoria / Jarrod Andrews.

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