

Slope stability

QUICK GUIDE

North Island severe weather events 2023 remediation and repair



Ministry of Business, Innovation and Employment (MBIE)

Hīkina Whakatutuki – Lifting to make successful

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

The Slope stability quick guide is produced by the Building System Performance branch. It is intended to provide information to council staff, building practitioners and homeowners with regards to buildings affected by the North Island severe weather events occurring in 2023 when beginning to consider remediation and repair work to their building.

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Information, examples and answers to your questions about the topics covered here can be found on our website www.building.govt.nz or by calling us free on 0800 24 22 43.

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1. Purpose

The purpose of this quick guide is to provide homeowners and occupiers whose buildings might have been affected in the recent adverse weather events in the North Island in early 2023 with direction on how to go about remediating any damage done to their building, or surrounding areas that might impact the building.

This quick guide should be read in conjunction with any guidance from your local council and / or insurance company, especially if your home has been issued with a red or yellow placard by a Rapid Building Assessor.

This quick guide is for home and building owners affected by the adverse weather events in the North Island in early 2023 when beginning to consider remediation and repair work to their building.

2. Background

Slope and ground stability is important to ensuring the safety of your home or building. During weather events or natural disasters your house or building safety might be affected by ground or foundational failures. This might lead to your house receiving a red or yellow placard following a rapid building assessment, which restricts or bans use of the house because it poses risk to life or safety.

It's important that homeowners know what to do in these situations. Building owners have a responsibility to ensure their buildings remain structurally sound following an event such as major earthquake or flood. If your house has received a placard you must adhere to the guidance received from that placard. It is an offence not to do so. You can find out more about placards and the rapid building assessment system here:

<https://www.building.govt.nz/managing-buildings/managing-buildings-in-an-emergency/information-for-building-owners/>

Guidance detailed below will help you ascertain what remediation work you can do without building consent, and what work does require building consent. After a weather event or natural disaster you will want to remediate the damage done to your property as soon as possible, however there are considerations that will need to be taken before you start any work.

It is encouraged that you take pictures and videos of your building, and anything that might result in building work needing to be done to your building. This includes ground movement and land instability, if this has occurred.

3. Damage to slopes and structures

Slopes and retaining walls can crack, move or even collapse, particularly if they're affected by weather events, earthquakes or other natural disasters.

If you can see slips, ground movement or debris on your property there may be a chance that the land is undermined and may fail. A rapid building assessment will have detailed this if this is something they saw when conducting the assessment. You might, in the first instance, want to contact a geotechnical engineer or another building professional. This is encouraged, as they will be able to assess the situation and help advise on a course

of action, which may require engaging in the services of a professional to ensure the work will achieve code compliance certificate, if Building Consent is required.

Before any of this happens, there are some common warning signs that you should look out for:

- Evidence of movement, such as leaning power poles, trees, or retaining walls, loss or tilting of utilities, collapsed pavements, and loose or broken rocks, soil, or other debris around the house or property.
- The formation of new cracks, undulations, or uneven ground around the building, above and below the building. This may include land beyond the property boundary.
- The development of new cracks and damage to the house, such as cracks in plasterboard or tiles, and doors and windows that are difficult to open. Keep in mind that these symptoms can also occur in humid conditions, so it's important to check for other signs of instability as well.
- Unusual sights and sounds, such as movement of nearby vegetation downhill, sounds of trees cracking, or rocks falling or knocking against each other.
- Discoloured water flowing down the slope or springs emerging from the cracks.

4. Urgent Works

During a state of emergency, transition period or designation, authorised officials may carry out urgent works to buildings that present a risk of injury or death, or a risk to critical infrastructure, when it is necessary to carry out the works without delay to remove or reduce these risks.

Authorised officials may also direct the building owner to carry out works for the long-term use or occupation of a building where this is necessary to remove or reduce risks, and works are needed to make the building safe, sanitary and otherwise suitable to be used or occupied by people on a long-term basis.

Appendix 1 shows examples of what types of slope slips or ground movement can occur, and details what to look out for. There is also information below about building code and building act guidance.

5. Exemptions that may apply to remediate damage to retaining structures

New Zealand's building legislation recognises some building work, including some retaining wall work, as low risk building work which does not require a building consent. However, regardless of whether a building consent is required all work must be carried out in accordance with the requirements of the Building Code.

The list of building work that does not require a building consent is provided under Schedule 1 of the Building Act 2004. There are two exemptions relating to the construction and replacement of retaining walls (Clauses 20 and 41). As a general guide - landslip and ground failure is complex, and you should consider engaging a suitably qualified and experienced geotechnical professional if repairs are necessary due to a significant landslip or slope instability.

Clauses 20 and 41: Retaining walls

- Clause 20: Building work in connection with a retaining wall that:
- retains not more than 1.5 metres depth of ground and
 - does not support any surcharge or any load additional to the load of that ground (for example, a driveway or a building).
- Clause 41: Building work in connection with a retaining wall in a [rural zone](#) if:
- the wall retains not more than 3 metres depth of ground and
 - the distance between the wall and any legal boundary or existing building is at least the height of the wall and
 - the design of the building work is carried out or reviewed by a [chartered professional engineer](#).

A rural zone is: Any zone or area (other than a rural residential area) that, in the district plan of the territorial authority in whose district the building work is to be undertaken, is described as a rural zone, rural resource area, rural environment or by words of similar meaning.

Exempt Building work – Examples

Ground improvement

Various ground improvement techniques can be applied to stabilise land and protect against further erosion. The need for a building consent approval will depend on the intention of the ground improvement and the relationship with the permanent load paths of the structure to be protected.

For example - if a cliff top property loses land as a result of a landslip, it may be necessary to stabilise the ground between the building and the adjacent cliff. This need may be urgent based on the likelihood and consequence of the building's foundations being undermined. If the foundations are already undermined, permanent underpinning works may be required. A building consent should be obtained underpinning works and/or ground improvement within the zone of influence of the foundations. This is typically taken as soils within 45 degrees of the bottom of the foundations.

The schedule 1 exemption would apply in cases where the proposed ground improvement is outside the zone of influence of the foundations and do not form part of the permanent load path of the building.

Erosion Control, such as geosynthetic mesh facings

Geosynthetic mesh facings in combination with rock bolting and/or soil nailing can be effective to reduce the rate of erosion and protect against shallow failures. These measures can be particularly effective for short timeframes and support the re-establishment of vegetation.

Erosion control measures are building work which is typically exempt from building consent as they do not change or replace the permanent load paths of a building.

Temporary Drainage

Temporary drainage to collect and convey surface water flows (and groundwater) away from an active landslip while permanent stabilisation/erosion protection is arranged would typically be exempt building work. Such drainage is likely to need to be formalised with time.

Passive Rockfall Protection Systems.

Passive Rockfall protection systems and its associated design currently sits outside the remit of schedule 1 exemptions. Therefore, proposed building works which includes the design of passive rockfall protection systems will require building consent application. It is also recommended that you will seek specialist advise prior to building work.

For further information regarding the compliance pathway for rockfall protection systems, please refer to section 5.1 of the guidance "Rockfall: Design Considerations for Passive Protection Structures".

For detailed descriptions of what work does not require a building consent, please refer to the [Building work that does not require a building consent](#) guidance.

Appendix 1



The landslide has exposed the concrete foundations. The supporting soil around and below the foundation has been lost. The loss of support is evidenced with sagging visible of the decking.



A shallow slip has exposed the foundations, as well as the once buried underground services. The soil around the front piles has been lost or reduced. The capacity of the deck to resist horizontal force may be compromised



A slip has occurred. The foundations have been exposed and rotated which has compromised the building's structural integrity.

The red square highlights tilting of the foundation piles and nearby garden retaining wall, suggesting further movement may be imminent.

The tilted vegetation shows the direction of the slip.



Photograph shows an alternative view to the photograph above, and better illustrates the extent of damage and the surrounding environment.

The timber retaining wall has broken, and no longer provides support to the building foundations. The damage to the retaining wall highlights the significant force and displacement taking place.



A landslide has occurred below a building and a carport. This photo shows an evacuation of soil, and damage to the buildings, including loss of vertical and lateral support to the corner deck piles. The carport structure has visibly slumped. Lateral support to the foundations needs to be considered.



The photo shows the upper times decking has disconnected due to the land slip. Other piles also show signs of movement to varying degrees.



The photo shows the formation of a head scarp* and land slicing, indicating a slumping slope failure with potential for further slips. The base of the failure may show bulging of the land. The damage also reveals tilting and displacement of the fence.

*Main scarp / head scarp refers to a steep surface on the undisturbed ground around the periphery of the slide, caused by the movement of slide material away from undisturbed ground. The projection of the scarp surface under the displaced material becomes the surface of the rupture.



The photo shows a landslip below a building. Horizontal support to the retaining wall immediately below the building has been compromised. The foundation of the concrete wall has lost support and further failure is likely to occur soon.



Slope debris has partially buried the building. The debris has loaded the external wall of the house.



The strength of the external wall of the building has been significantly exceeded and has bulged inward. Internal linings have cracked and the horizontal strength of the building has been compromised.



The building has been affected by failure of an adjacent retaining wall. The rotation indicates that the lateral strength of the building has been significantly exceeded.



The photo shows a rippled or tiered surface, which suggests possible surface creep and the possibility of further movement. Buildings above and below this area of instability may be affected by this creep movement and should be inspected by a suitably experienced professional for damage.



The photo shows a buckle in the asphalt surface at the bottom of a hill, indicating the potential for a slumping failure along the slope and the possibility of more slips in the future.



The photo provides a different view of a head scarp forming above the property. Combined with the buckling of surface asphalt seen in a previous photo, this suggests the instability may extend across the building platform.



The photo shows a formed crack and an offset in the storm drainpipe. This indicates ground movement which may affect the building foundations and could be worsened by concentrated stormwater discharge into the displaced ground. Further movement may occur.



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