

Repairing Damaged Heritage Buildings

Guidelines for building owners

GUIDELINE 3 – Reconstruction of elements

These guidelines were developed after the Canterbury Earthquake, 4 September 2010. They are intended as guidelines for owners of heritage and character buildings, to assist with repair and maintenance of these buildings, and are applicable following any earthquake or building damage.

Resource consents:

The resource consent processes apply for work to damaged heritage buildings. In all instances property owners of listed heritage buildings need to contact the Council prior to undertaking any work. Where emergency works have been permitted to take place by Council, retrospective consent approval will be required.

Building consents:

Any building work normally requires a building consent. This includes work to alter or demolish a building. Exceptions include minor works. [Click here](#) to find out whether you need a building consent. Further information can also be found on the Department of Building and Housing website www.dbh.govt.nz.



Reconstruction of elements

Wherever possible, elements that have been damaged and removed from the building should be reconstructed. There may also be opportunities to reconstruct items that were previously missing. These might include items such as finials or original windows that have been replaced with more modern joinery.

Reconstruction work should accurately represent original work. It may be necessary to research newspaper articles, books or photographic collections at institutions such as the Christchurch Public Library or the Canterbury Museum. Christchurch City Council also holds files on buildings listed in the Christchurch City Plan. Professional historians, of which there are a number in Christchurch, may also be able to assist.

1 Chimneys

Chimneys are often important architectural features that make a significant contribution to a building's heritage value. Many older buildings in Christchurch are constructed with one or more chimneys, often with ornate and decorative tops. The majority of these chimneys are brick and were either left with the bricks exposed or had a plaster or rough cast finish applied. Some chimneys are stone.

Earlier chimneys that were constructed with lime mortar tend to collapse into piles of individual bricks. Although the bricks may have been damaged, they are relatively easy to clean for reuse.

Later chimneys used cement mortar and these often topple as whole units. These bricks are more difficult to salvage.



Many owners may be reluctant to see chimneys rebuilt due to cost, the fact that they are no longer in use, or that they could collapse again. Following the Canterbury Earthquake 2010, chimneys were sometimes demolished to floor level, bricks removed from site and permanent repairs made to roofs.

Finding solutions As chimneys were often important architectural features they should be reconstructed wherever possible. They can be strengthened as part of this process. Reconstruction is particularly desirable where the house is scheduled in the Christchurch City Plan, Banks Peninsula District Plan or registered by the New Zealand Historic Places Trust.

HERITAGE GUIDELINE 3 – Reconstruction of elements

Funding constraints may preclude reinstatement of all chimneys. In this instance, chimneys that were visible from the road should be reinstated as a priority. There may also be situations where the chimneys may not be able to be accurately replicated for reasons such as safety. In these instances, the decision may have to be made not to rebuild them.

Options for Reconstruction

As a first step, a structural engineer should be commissioned to determine the structural soundness of remaining sections of chimneys.

Sometimes it may be necessary to further reduce the height of the damaged chimney to a point where the chimney is sound. The remaining chimney section could then be capped with a concrete band to provide a secure base on which to construct the new chimney. It may also be necessary to install a structural diaphragm at ceiling level to provide additional bracing.

Once the chimney has been stabilised, discussions should be held with an engineer to determine the best way of reconstructing it. Various options may be available:

- **Rebuild Chimney Using Original Bricks**

Rebuilding the chimney using original bricks fixed to an internal structural system is one option. A new structural system might comprise a steel frame or a series of lightweight precast concrete sections with reinforcing rods grouted in.

- **Rebuild Chimney Using Lightweight Materials**

Rebuilding the entire chimney in a lightweight material may be an option if the chimney was plastered. A new chimney could be built with a timber frame and a traditional or proprietary plaster finish applied. Lightweight concrete sections with a plaster finish may be another option.

- **Rebuild Chimney Using Modified Materials**

Rebuilding the chimney using original materials but reducing their thickness to reduce weight is also feasible. For example, it may be possible to cut back bricks and fix them to a board frame. Companies that specialise in reconstructing such chimneys are now working in Christchurch. The heritage team at the Christchurch City Council can provide further information.

Chimneys located on external walls present additional problems and it may be necessary to demolish these down to ground level. The chimney could be rebuilt using one of the options described above.

Replica fibreglass chimneys may be an option in exceptional circumstances.

See [HERITAGE GUIDELINE 4 – Strengthening of buildings](#).

2 Parapets

Parapets are important architectural features on many buildings, particularly in the case of commercial buildings where parapets might include architectural details such as pilasters, balusters and ornate cappings. As such, they make a significant contribution to the architectural and heritage value of the building.

Parapets, if they are not strengthened can suffer badly in an earthquake and subsequent after-shocks. In the case of the Canterbury Earthquake in some instances entire sections of the parapets were lost, while elsewhere parapets were loosened and became dangerous.



As with chimneys, owners may be reluctant to see parapets rebuilt due to cost, lack of necessity or the potential for them to collapse again. However, as an important architectural element they should be reconstructed wherever possible. They are also relatively simple to strengthen.

Various options may be available:

- **Rebuild Using Original Materials**

The parapet would need to be tied back to the main structure with structural elements such as steel rods being dowelled into the wall below to provide the required stability. Where this is not possible due to the decorative elements of the parapet, it may have to be tied back to the roof structure.

Where the reconstruction of a brick parapet in its original form is desired, there may be a shortfall of bricks. Demolition bricks from another source may have to be brought in to make up any shortfall. The bricks should be as close to the original as possible in terms of size, colour and texture.

In some instances a concrete band may have to be provided at the head of the wall to provide a secure base for the new parapet. The concrete band should be able to be concealed behind thin brick facings, known as “slips”.

- **Rebuild Using Lightweight Materials**

If a parapet was plastered, a new parapet could be constructed using a timber frame covered with fibre-cement boards with a plaster finish. If the parapet was constructed of brickwork, a new parapet could

HERITAGE GUIDELINE 3 – Reconstruction of elements

comprise a timber frame with a brick veneer. Original elements such as cappings and balusters could be replaced with replica elements in lightweight concrete.

Some companies offer to replicate original features using polystyrene forms covered by a proprietary plaster system. While there may be instances where this method is appropriate, there is some uncertainty regarding the longevity of such systems.

Where parapets are reconstructed using a lightweight system, care will need to be taken to ensure the building remains watertight. Particular attention will need to be paid to the detailing of flashings, internal gutters and roof connections. The advice of an architect should be sought to ensure buildings are watertight.

Sometimes the height of a parapet may be reduced without affecting a building's heritage values. This could be at the rear of a building or where the building is less visible. This is likely to be the exception rather than the rule and the advice of Christchurch City Council's heritage staff should be sought.



3 Gable ends

Gable ends are relatively easy to reconstruct and can be secured to the roof structure as they are rebuilt.

Horizontal tie rods can be built into the masonry as the work proceeds. A steel plate welded to the outer end can be bolted to timber rafters or other structural elements within the roof.

The roof then acts as a diaphragm which resists the force of an earthquake and provides support to the gable end.

If the gable end is above the roof in the form of a parapet, vertical rods, that extend down through the parapet into the wall below, may need to be installed. Another option may be to construct a new structural wall of concrete or timber behind the gable end. The outer skin of stone or brick can then be rebuilt as a veneer and tied to the wall behind.

4 Architectural features

In an earthquake and during aftershocks, architectural features such as pinnacles and stone cappings are likely to fall from masonry buildings. Items made of soft stone such as Oamaru limestone or Charteris Bay sandstone may break as they hit the ground.

Broken pieces of stone details should be retrieved and not thrown away as they can be repaired by pinning the pieces together, or the original can be used to make a replica. Craftspeople capable of carving stone are available in Christchurch.

New limestone can be obtained from Oamaru. Replacing items made from other stones may be more difficult as many of the old quarries are now closed. In some instances, new stone of a similar, but not identical, composition may have to be used. A reputable stonemason should be able to give advice on types of stone that are available.

See [HERITAGE GUIDELINE 4 – Strengthening of buildings](#).



For further information on chimneys please go to [Department of Building and Housing Guidance on house repairs and reconstruction following the Canterbury earthquake](#)

For more information or advice contact: heritage@ccc.govt.nz or call 941 8999.

Go to the complete series [Damaged buildings - Guidelines for heritage building owners](#) : www.ccc.govt.nz/heritagepublications

Heritage Guideline 1 – Safe and secure

Heritage Guideline 2 – Repairs to the heritage building

Heritage Guideline 3 – Reconstruction of elements

Heritage Guideline 4 – Strengthening of buildings

Heritage Guideline 5 – Professional advice and tradespeople

Prepared in conjunction with Dave Pearson, Dave Pearson Architects Ltd.