

# Designing for pothole subsidence

# Introduction

Engineering and architectural considerations can significantly minimise the risk of structures experiencing mine subsidence damage.

Structures and infrastructure are able to be designed to withstand anticipated movements from mine subsidence, with special design and detailing techniques able to be adopted.

Design principles and techniques that allow structures to accommodate ground movement resulting from mine subsidence have been adopted extensively throughout the world since the 1920's.

## What is 'pothole' subsidence

Where shallow underground mining has occurred, there may exist a risk of localised depressions or holes that form when the roof of the abandoned mine fails and falls in. The majority of these types of subsidences are generally small, however the typical design parameter used by Subsidence Advisory is 5,000mm (5 metres).

At the design stage, it is possible to select a type of structure that, with appropriate detailing, will allow the building to accommodate a potential pothole. Designers aim to provide a structure where any damage is non-structural and the building remains:

- a. Safe - no danger to users
- b. Serviceable - available for its intended use, and
- c. Repairable - damaged components repaired economically

## Surface Development Guideline 1 – Historical Mine Workings – Risk of Pothole Subsidence

Subsidence advisory has developed a Surface Development Guideline for these areas, known as Guideline 1. This guideline provides two pathways for foundation design, with specified foundation design options linked to the type of structure being designed, and an option for engineering design of the foundations by a qualified structural engineer.

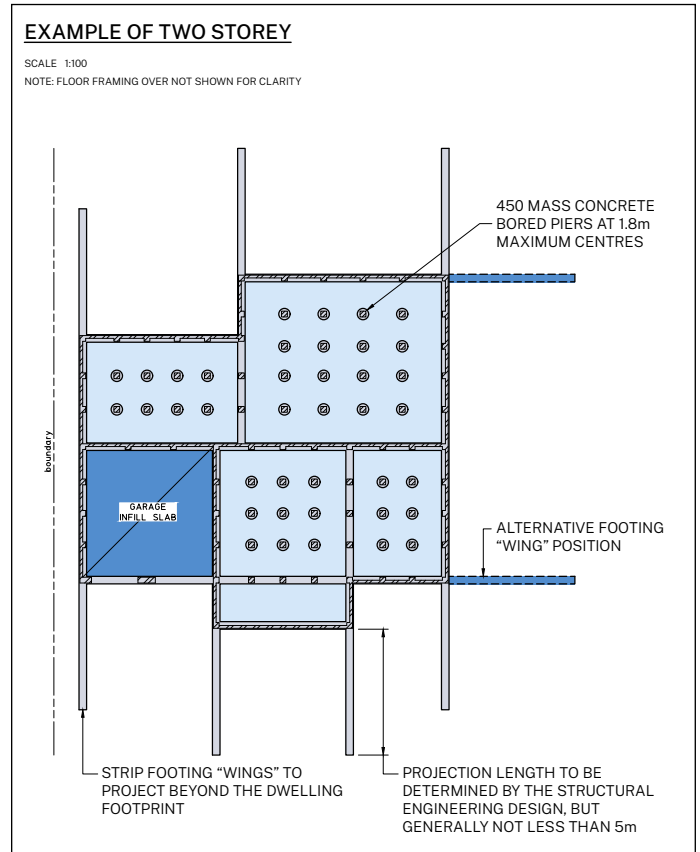
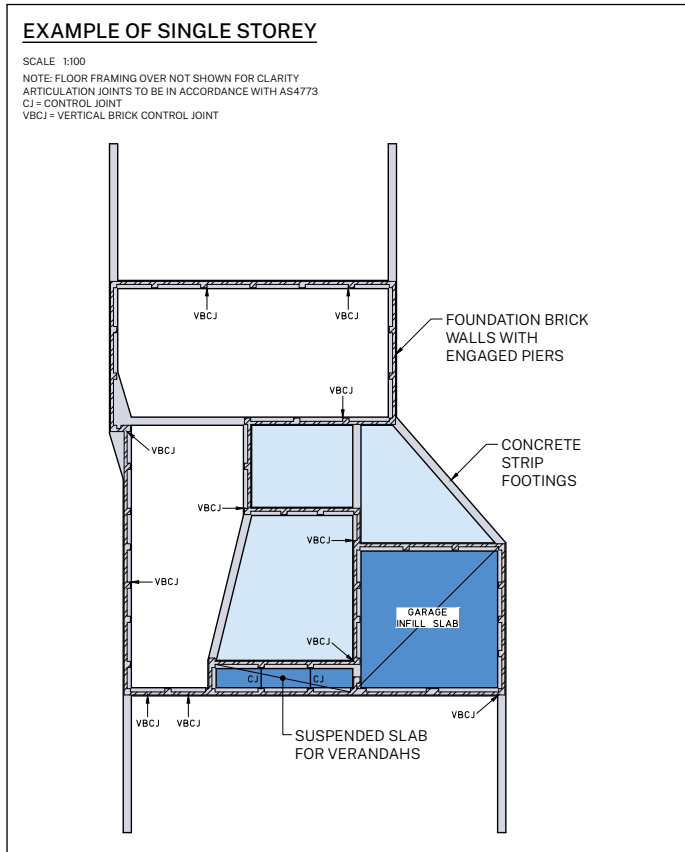
The risk of residential structures sustaining damage can be reduced by adopting incorporating appropriate design mitigation measures such as the use of articulated joints or panelised brickwork, appropriate detailing of connections, and the use of flexible joints between ancillary building elements and the main structure to aid in repairability.

These features should be considered by the designer when detailing structures for pothole areas. Typical design features such as those mentioned above are shown in Attachment A & B.

Note these typical design features are able to be incorporated into the design requirements contained in [Guideline 1](#).

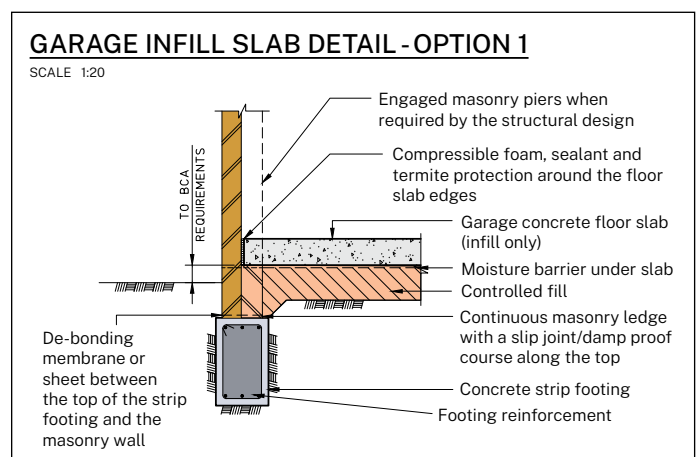
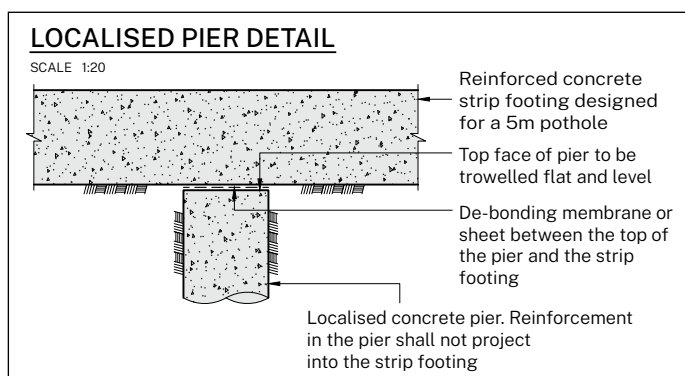
# Attachment A

## Typical pothole footing beam plan



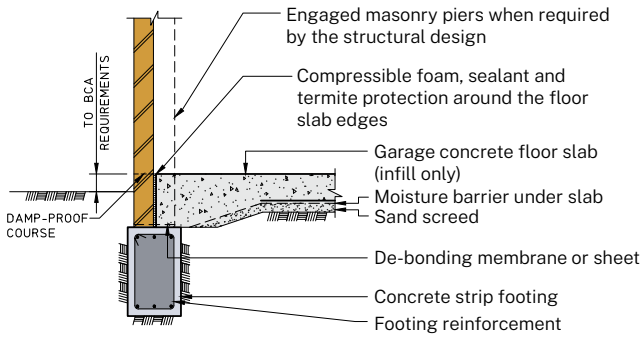
# Attachment B

## Typical design detail



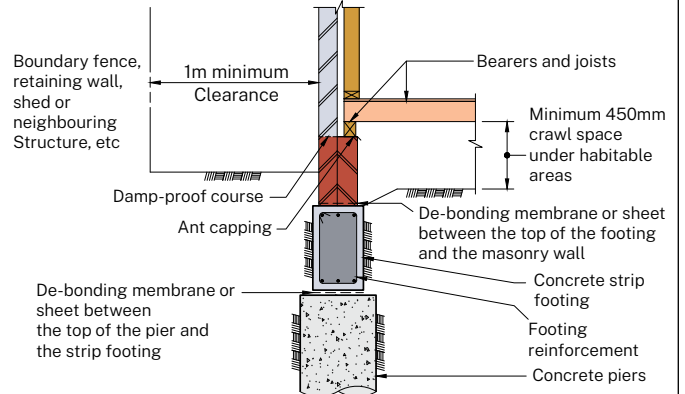
### GARAGE INFILL SLAB DETAIL - OPTION 2

SCALE 1:20



### ACCESS REQUIREMENTS FOR REPAIRS

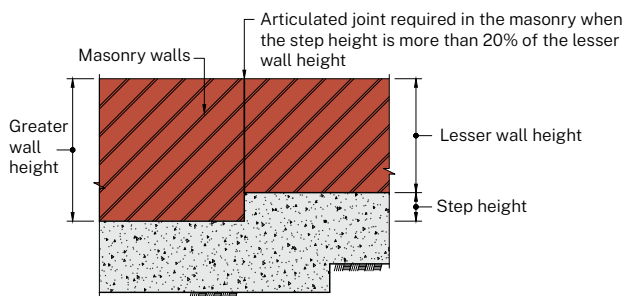
SCALE 1:20



### ARTICULATION AT CHANGE IN HEIGHT

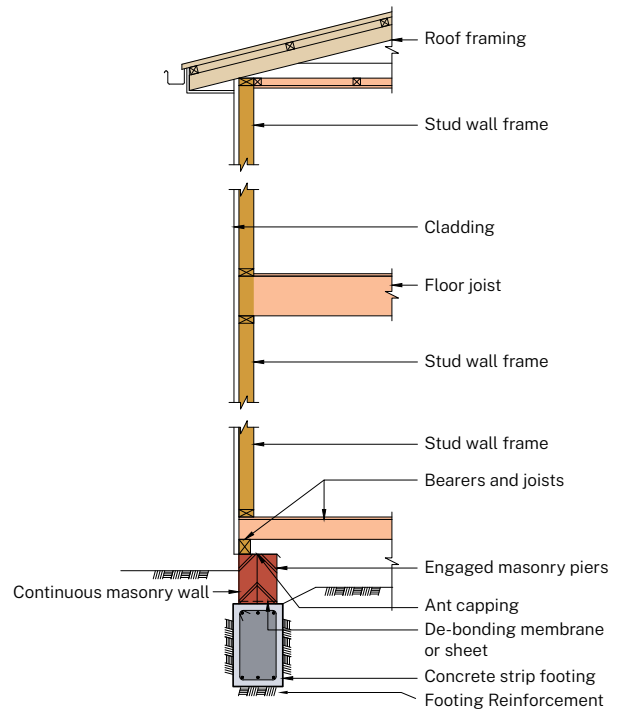
SCALE 1:20

NOTE: JOINTS IN MASONRY SHALL COMPLY WITH AS4773



### TYPICAL SECTION THROUGH 2 STOREY LIGHT WEIGHT FIBRE BOARD CLAD WITH APPLIED FINISH

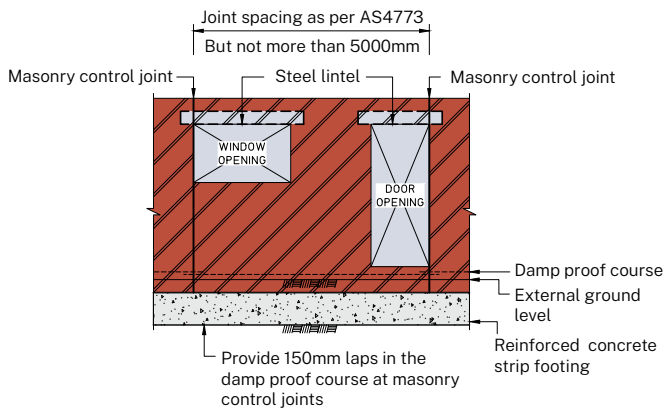
SCALE 1:20



### ARTICULATION AT CHANGE IN HEIGHT

SCALE 1:50

NOTE: JOINTS IN MASONRY SHALL COMPLY WITH AS4773



### TYPICAL SECTION THROUGH BRICK VENEER FOUNDATION

SCALE 1:20

