Driveways

When completing a concrete driveway – whether as a replacement to an [existing driveway](http://www.masterbuilders.asn.au/building-and-planning/technical-information/driveways#existing) or for a [new dwelling](http://www.masterbuilders.asn.au/building-and-planning/technical-information/driveways#new) – there are [various issues](http://www.masterbuilders.asn.au/building-and-planning/technical-information/driveways#issues) that both contractors and owners should be aware of.

[AS/NZS 2890.1:2004 *Parking facilities – Off-street car parking*](http://infostore.saiglobal.com/store/Details.aspx?DocN=AS538204690662) and the Queensland Development Code [NMP 1.1 *Driveways*](http://www.dsdip.qld.gov.au/resources/laws/queensland-development-code/current-parts/nmp-1-1-driveways.pdf) (previously part 6) provide the general guidelines that contractors should follow.

A summary of the key issues relating to steep driveways is provided below; however, members can also [contact Master Builders](http://www.masterbuilders.asn.au/contact-us) for further guidance and advice.

Existing driveways

As contemporary construction methods rely upon a balanced cut and fill, problems are often realised when the site has a severe slope from the road that can either be up or down. If the driveway is a replacement to an existing, to a certain degree a contractor and the owners are stuck with the existing driveway.

A common scenario requiring an alteration to an existing driveway occurs when the owner buys a new car and discovers that they cannot get it into their garage.

Contractors must always remember that they are governed by the height (RL) of the garage and boundary, as well as the length of the driveway.

The local authorities may or may not allow conditions to be varied on the footpath as well as the crossover.

If the task that is being asked is unreasonable, a commercial decision may need to be made as to whether the job is worth the dispute that will arise when the owner’s expectations are not met.

New dwelling driveways

 If the platform levels from the cut do not achieve a suitable level to provide access to the dwelling, the owner needs to be made aware of the shortcomings of the design and land combination.

The alternatives to this scenario include:

* A redesign to the platform level (which will involve re-engineering of the foundations)
* A redesign to the structure
* An alteration of the building approval to achieve enough room.

If this problem is not addressed at an early stage, one can almost predict the certainty of a dispute as a result of the owners being unable to access the garage with their vehicle.

Contractors should seek the advice of local authorities regarding the grade requirements for the area between the street and the property boundary.

Common issues – steep driveways

**Ground movement**

In clay soils, the moisture content of the soil beneath areas of large paving may change over time, possibly causing movement of the soil and subsequent changes to the paving and adjacent building levels.

The possible effects of this movement on the drainage and adjacent walls should be considered.

**Subgrade**

All topsoil, vegetation, debris and other foreign matter should be removed from the location of the proposed pavement. Any soft, weak, saturated or otherwise unsuitable material should also be removed and replaced by either good quality material from the site or imported roadbase, and compacted in layers using a rammer plate/upright compactor.

All service trenches and other excavations should be backfilled with good quality material from the site or other suitable trench filling material.

The material should be compacted in layers using a rammer plate/upright compactor to avoid future settlement, while being mindful of the installed services and not causing damage to the same.

The subgrade should be dampened prior to placement of the concrete, although this is not required if a membrane and/or sub-base is used.

**Termite barriers**

It is important not to construct the pavement at a level that will obstruct any required visual termite inspection zone nor to damage or ignore chemical barriers if the construction of the dwelling requires it.

**Slip resistance**

Some surface texture is required to provide slip resistance, particularly in wet conditions; however, if the pavement is subject to barefoot traffic the texture should not be too coarse.

Suitable finishes for these applications include wood float, light broom and pebblecrete.

**Grade of pavement**

Steep pavements generally require a coarse surface texture to provide skid and slip resistance, especially if a surface sealer is applied.

Depending on the grade, steel trowelled, polished, stamped and smooth aggregate type finishes may be unsuitable.

Coarse broomed, ribbed, dragged and stencilled finishes would be more suitable. Also, exposed aggregate finishes may require an angular (crushed) stone instead of a smooth rounded stone.

**Abrasion resistance**

Abrasion resistance is the ability of the concrete surface to resist wear and is directly related to the strength of concrete and the quality of the surface finish.

An N20 concrete is satisfactory for most residential paving applications, including typical driveways. For use by heavier pneumatic-tyred vehicles up to 3 tonnes, an N25 concrete is recommended and for vehicles over 3 tonnes, use an N32 concrete.

Attention should also be paid to the length of time the pavement is allowed to cure before use, particularly with exposed aggregate finishes.

**Joints**

Concrete pavements fall into two basic categories:

* Those that allow movement (isolation and expansion joints)
* Those that control cracking of the concrete (control or contraction joints).

Construction joints

Construction joints are used when there is a break in concrete placement, which is rarely required in residential pavement work.

Isolation joints

Isolation joints are used to separate the pavement from any abutting buildings, existing pavements, or rigid structures such as drainage pits, access holes or columns which may cause restraint of the pavement and thereby increase the risk of cracking.

Expansion joints

Expansion joints are used in large areas of paving to accommodate expansion, primarily due to elevated temperatures during periods of hot weather. They should be provided at maximum 15 metre centres.

Control joints

Control joints typically form a weakened plane at which the concrete cracks. Without them, drying shrinkage will result in random cracking.

They should be provided at:

* Maximum three metre centres
* At any changes in shape (e.g. a narrow path attached to a driveway)
* At any changes in direction (e.g. around corners, especially where a re-entrant corner may be formed)
* At any rigid structures (e.g. access holes, pits, columns) that may prevent movement.

**Surface tolerances**

Pavements generally have to meet two independent tolerance criteria:

* Flatness
* Levelness.

Flatness tolerance

Flatness tolerance gives the permitted variation from a three metre straightedge placed on the surface with a tolerance of a maximum deviation or gap of 12mm under a three metre straightedge placed anywhere on the pavement, including on slopes.

Levelness tolerance

The levelness tolerance gives the permitted variation of the slab surface from a fixed external reference point or datum. A reasonable tolerance for the surface of a newly-constructed pavement would be ±10 mm from the designed level or elevation and should be maintained for sloped surfaces.

Need more information?

Visit the [Cement Concrete and Aggregates Australia website](http://www.concrete.net.au/) to access a wide variety of concrete-related resources.