

DESIGN
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Island kitchen benches

Designing to include the necessary pipes and services for an island kitchen bench presents some challenges. The following is a guide to help achieve a quality design and Building Code compliance.

KITCHENS ARE an important part of our homes.

They are where we prepare our food, converse with our family and friends.

They are spaces where aesthetics need to combine with functionality.

Island kitchen benches are popular, but they present a design challenge since any pipes and services required must be hidden from view.

As there is nowhere to conceal the pipes and services, these need to be installed under the floor.

The basic island kitchen bench is simply a hygienic work surface.

However, it is common for the island to contain sinks, cooking facilities and extracts. Services required will depend on the facilities provided:

- Sinks – hot and cold water supply from the main supply or an underbench unit, underfloor drainage to the foulwater system.
- Cooking facilities – electricity or gas with power supply.
- Extract – overhead ducted to the outside or downdraft ducted via the floor to the exterior with power supply.
- Dishwasher – power supply, water supply and drainage.

Building Code compliance

Island kitchen benches must be designed, consented and installed to meet the Building Code. This can be achieved using Acceptable Solutions, Verification Methods or a proposed alternative method.

The following Building Code performance criteria, noted under the relevant clauses, apply to island kitchen benches.

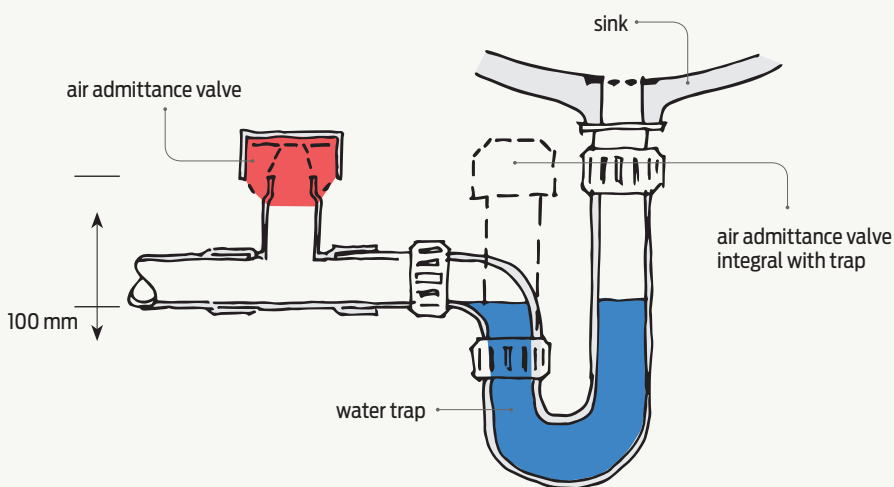


Figure 1 Air admittance valve fitted to discharge pipe.

B2 Durability

Materials must remain functional depending on application – for island benches, a 15-year minimum durability applies to most of the elements incorporated into the design.

C Protection from fire

- Penetrations through inter-tenancy floors must be installed correctly.

E3 Internal moisture

- Areas likely to be splashed or be contaminated must be impervious and easily cleaned.
- Accidental overflow must avoid loss of amenity, or damage to household units or other property.

G3 Food preparation and the prevention of contamination

- Surfaces must be suitable for food preparation.

- Surfaces and linings must be impervious and easily cleaned, free from hazardous substances and exposed elements, located and shaped to avoid accumulation of dirt.

G12 Water supplies

- Where a sink is provided, potable hot and cold water for utensil washing and food preparation is required.
- Adequate water flow rates to sanitary facilities are required.

G13 Foul water

- Wastewater plumbing system must convey foulwater to a drainage system, avoid blockage and leakage, avoid foul air and gases entering buildings and provide reasonable access for maintenance and clearing blockages.

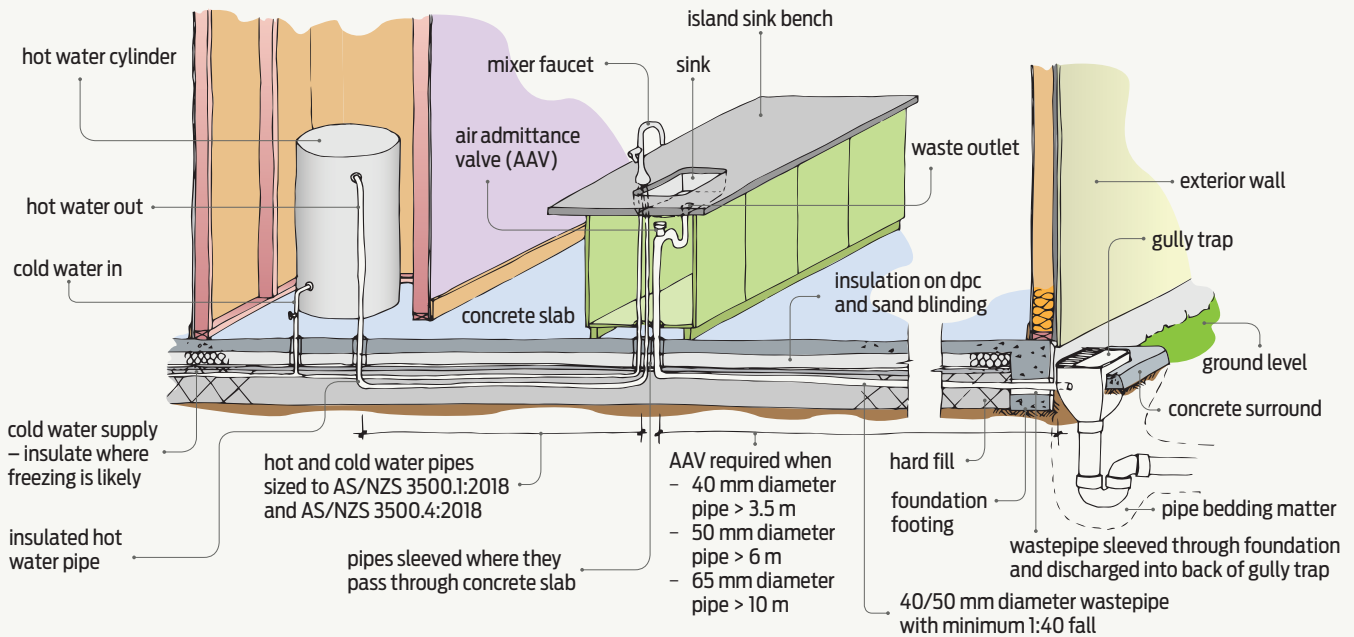


Figure 2 Hot and cold water supply and wastepipes for island kitchen benches.

H1 Energy efficiency

- Energy loss must be limited in hot water heating systems.
- Heat loss must be limited in storage vessels and pipes.

Pipes and services for an island bench

The pipes and services required depend on the functions and facilities the bench is used for. For example, a bench containing a sink and dishwasher, with or without a waste disposal unit, will require pipes for hot and cold water together with a wastepipe and power supply.

Option 1: Minimum for compliance

Sizing the wastepipe using G13/AS1 gives a 40 mm diameter pipe installed at a gradient of 1:40. This pipe will convey wastewater from one or two kitchen sinks with or without a waste disposal unit. When the waste pipe is longer than 3.5 m, it will need venting with an air admittance valve (AAV) on the pipework under the bench (Figures 1 and 2).

The cold water pipe should be sized to AS/NZS 3500.1:2018 *Plumbing and drainage Part 1: Water services*. G12/AS Table 4 can also be used, noting the limitations on pipe lengths. Insulate the pipe with closed-cell foam for

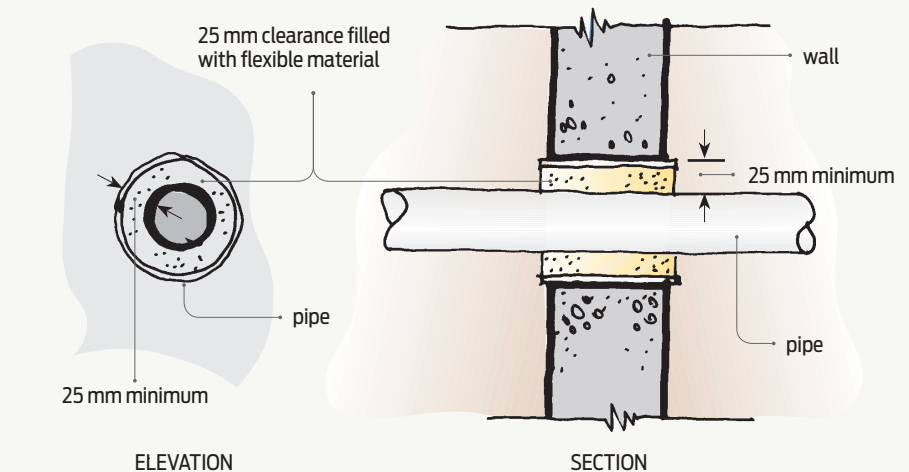


Figure 3 Pipe passing through wall or footing.

protection when installed under a concrete slab and in situations where freezing is likely.

The hot water pipe is sized in the same way as the cold water pipe and is insulated with pipe insulation with an R-value of not less than 0.3 m²°C/W.

Acceptable Solution H1/AS1 references NZS 4305:1996 *Energy efficiency – Domestic type hot water systems*, which gives a maximum length of the hot water pipe to the kitchen sink of 25 m for 10 mm pipe, 12 m for 15 mm pipe and 7 m for 20 mm pipe.

An advantage is, that this is the minimum cost of compliance.

Disadvantages include:

- the wastepipe is not sized for a dishwasher or future installation of a dishwasher
- increased chance of call-backs.

Option 2: Better solution, slightly above Code

Sizing the wastepipe to AS/NZS 3500.2:2018 *Plumbing and drainage Part 2: Sanitary plumbing and drainage* (G13/AS3) gives a 50 mm diameter wastepipe installed at a gradient of 2.5% (1:40). This pipe will convey waste water from one ➤

or two kitchen sinks with or without a waste disposal unit. When the wastepipe is greater than 6 m in length, it will need venting with an AAV located on the pipework under the bench.

Hot and cold water pipes are designed and installed to AS/NZS 3500 and AS/NZS 3500.4

Advantages include:

- only marginal increase in cost
- wastepipe size will take the discharge from a dishwasher
- larger wastepipe size is less likely to block.

A disadvantage is that the additional diameter of the wastepipe may make installation harder in a limited number of situations.

Option 3: Best future-proofed solution

Sizing the waste pipe to AS/NZS 3500.2:2018 (G13/AS3) offers a choice of two sizes – 50 mm as per option 2 or 65 mm at 2.5% gradient (1:40) when designing to drainage principles.

The 65 mm wastepipe has advantages as branch drain venting is required when it is greater than 10 m in length.

Hot and cold water pipes are designed and installed to AS/NZS 3500.1:2018 and AS/NZS 3500.4:2018.0. In this option, the pipes are installed to allow for maintenance or replacement, such as in a duct.

Advantages include:

- the cost increase can be offset against the long-term access to the pipes for alteration and maintenance
- waste pipe size will take the discharge from a dishwasher
- larger pipe size is less likely to block
- better access to clear blockages should they occur.

A disadvantage is that the additional diameter of the wastepipe may make installation harder in some situations.

Installation of pipework

The hot and cold waterpipes serving the island kitchen bench will connect to hot and cold water services supplying other sanitary facilities in the house.

This connection is likely to be in a wall if the installation is on a concrete floor or under the floor if on a timber floor.

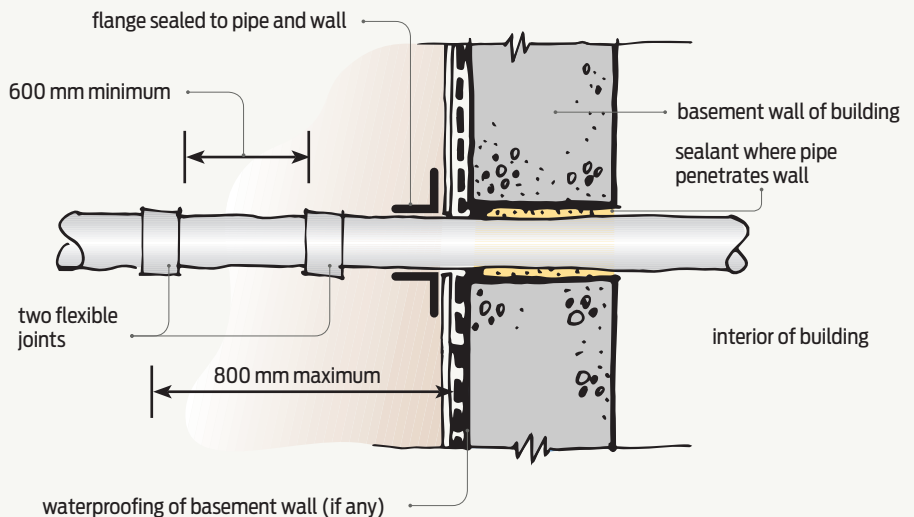


Figure 4 Pipe passing through below-ground external wall.

The wastepipe will connect either to a stack, over a gully dish or directly to the drain.

Timber floors

When the island kitchen bench is installed on a timber-framed floor, the pipes and services can be installed between or under the joists, depending on the direction of their travel relative to the joist layout.

It is possible for the pipes to run through the joist. However, structural design and additional joist strengthening may be required.

Concrete floors

Installing the pipes and services through a concrete floor is more difficult and requires more thought at the design stage as they have to be installed before the slab is poured. Concrete floors above a basement or garage allow for the installation of the pipes supported from the underside of the concrete.

Where there is another tenancy below the concrete floor, the penetration through the floor will have to be sealed to comply with Building Code clauses E3 *Internal moisture*, G6 *Airborne and impact sound* and C *Protection from fire*. Also consider legal access to the apartment below for when it may be required for maintenance.

Where the concrete floor is slab on ground, the pipes will need to be installed under the slab and secured in place before the concrete is placed. Accurate placement of the pipes and

risers is necessary to avoid expensive and time-consuming relocation of pipes.

Installation guidelines and checklist

Follow these guidelines (see Figure 2):

- Wastepipes must be installed with even gradient and no flatter than the minimum gradient.
- Pipes should be installed with the minimum possible number of joints under the floor.
- Penetrations through the floor must be sealed.
- Penetrations through concrete must be installed to allow for movement through the slab or footing (Figures 3 and 4).
- Pipes installed below a slab on ground must be installed in sand or pea metal.
- Where a duct or purpose-built trench or chase is used, it should also contain electrical and gas services.
- Where an underbench water heater is installed, provision for the heater drain and temperature/pressure relief valve drain should be allowed. Note that some modern underbench water heaters vent via a proprietary tap supplied with the unit.
- The waterproof membrane installed under concrete slabs must not be damaged or punctured. Seal all pipe penetrations through the waterproof membrane with pressure-sensitive tape. ◀