SDAPP
Sustainable Design Assessment in the Planning Process
10 Key Sustainable Building Categories

Bayside City Council

4.1

Site Permeability

Building design for a sustainable future

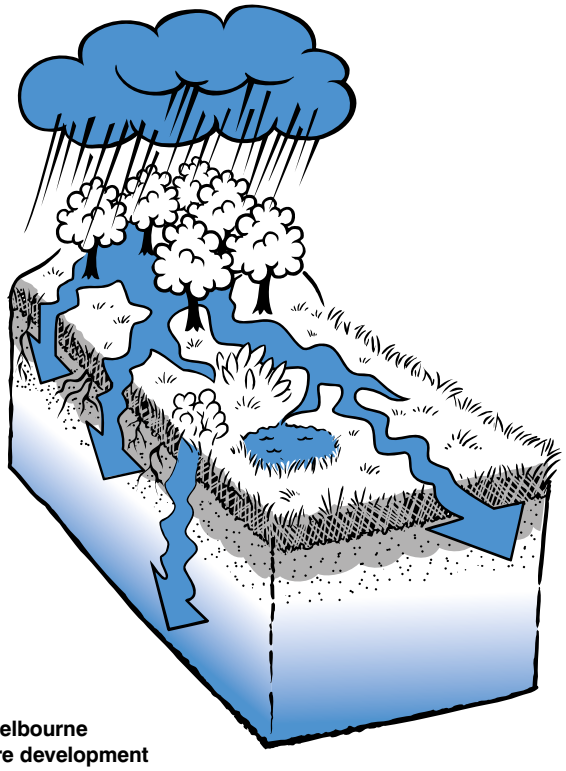
What's included in this fact sheet:

- What is Site Permeability?
- How will consideration of site permeability benefit me?
- How can I increase site permeability?
- Permeable paving
- Design Considerations
- Where can I find out more?
- Mandatory Requirements
- Council's Design Advice

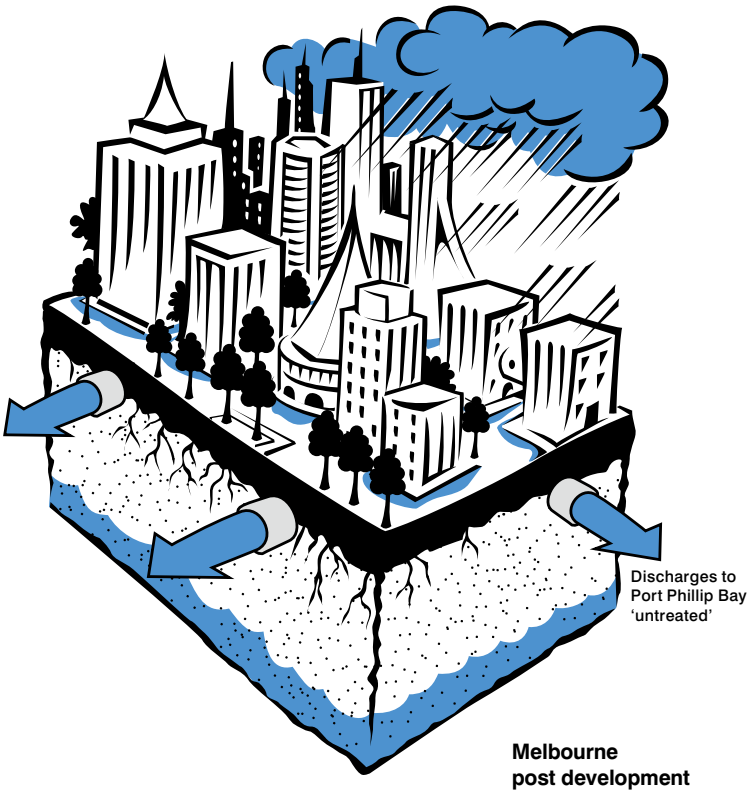
This fact sheet examines the increasing densities in our urban environments which have led to a dramatic reduction in permeable surfaces, through the construction of impervious roads, buildings and car parks. Council encourages you to consider permeable design solutions in your building project to help prevent stormwater run-off, which in turn has capacity implications for drainage infrastructure and can degrade the water quality of Melbourne's rivers, creeks and ultimately Port Phillip Bay.

What is Site Permeability?

Permeable sites minimise stormwater run-off by permitting rain water to be absorbed into the soil. A lack of permeability increases flooding in urban areas during storm events affecting not only infrastructure, but our homes as well. Many simple measures can be taken to counter-act this, and good building design should always consider ways in which site permeability can be enhanced or maintained.



Melbourne pre development



Melbourne post development

How will site permeability benefit me?

Providing a contribution to your overall Water Sensitive Urban Design (WSUD) aims, enhancing or maintaining permeability on site can also:

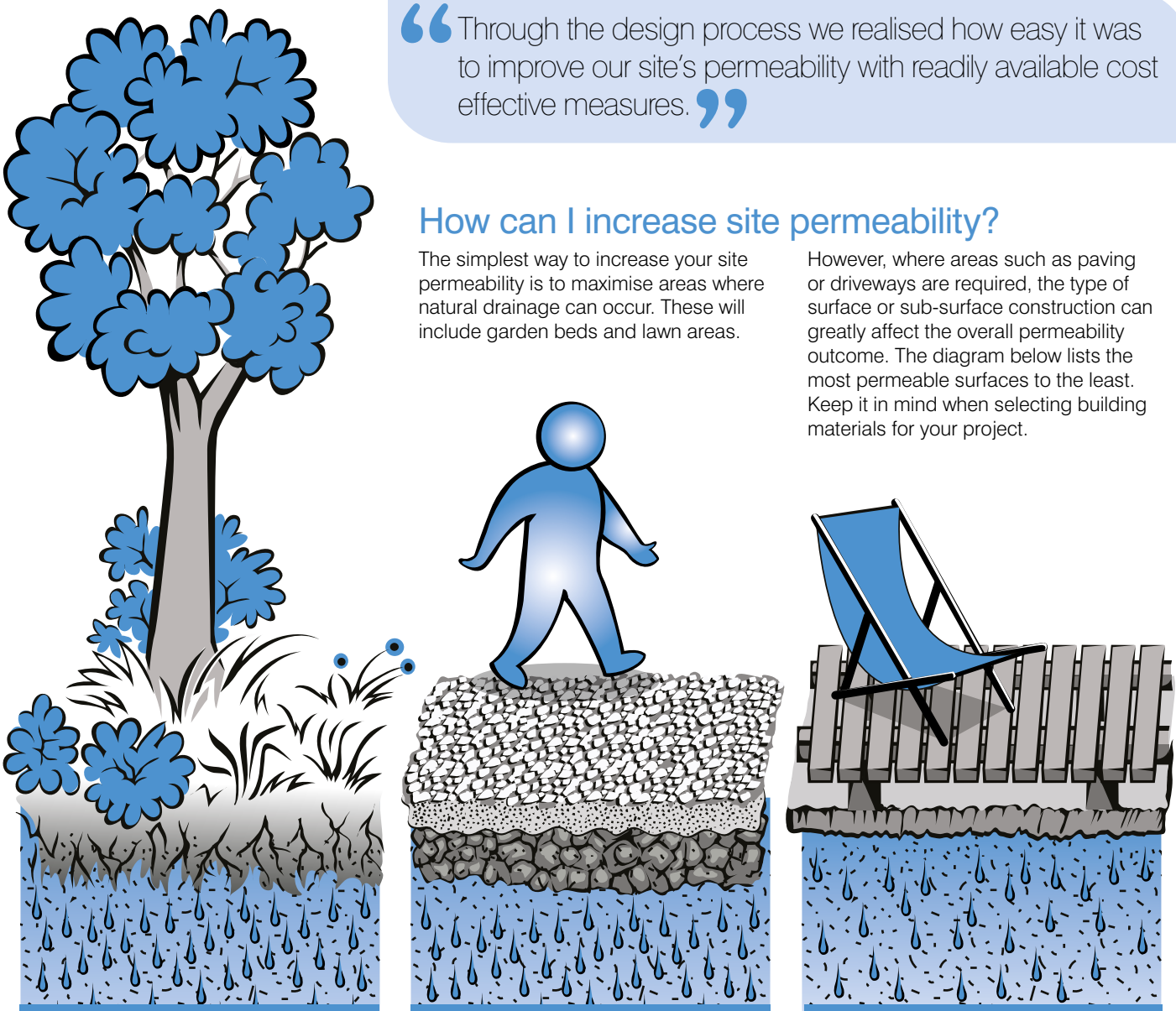
- Reduce the volume of stormwater runoff which can cause localised flooding. Localised flooding can damage homes and property and greatly increase insurance premiums in certain areas
- Reduce pollution of waterways and habitats
- Reduce the need for expensive upgrades to local stormwater infrastructure
- Increase infiltration to sub-soil and allow groundwater recharge. This will not only help maintain groundwater supplies, but also aid local site ecology by ensuring sufficient water reaches tree root zones
- Reduce downstream flooding and stream-bank erosion

> “Through the design process we realised how easy it was to improve our site’s permeability with readily available cost effective measures.”

How can I increase site permeability?

The simplest way to increase your site permeability is to maximise areas where natural drainage can occur. These will include garden beds and lawn areas.

However, where areas such as paving or driveways are required, the type of surface or sub-surface construction can greatly affect the overall permeability outcome. The diagram below lists the most permeable surfaces to the least. Keep it in mind when selecting building materials for your project.



1. Garden Bed

Natural ground

2. Gravel

Permeable sub-base layer or membrane

3. Decking

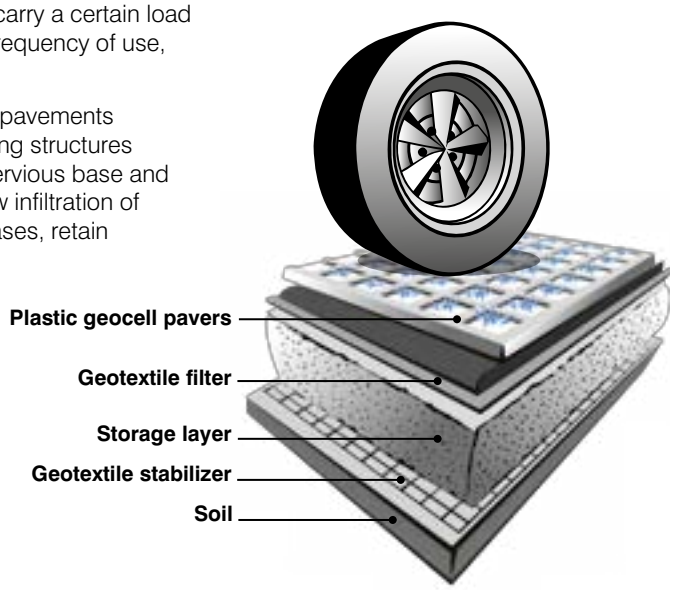
Unmade ground below, or with permeable treatment.

How to increase site permeability?

Permeable paving

Whilst most increases in site permeability can be achieved without specialist treatment, in some situations measures such as porous/permeable paving may be required. For example, where paving is required to carry a certain load capacity with a high frequency of use, such as a car park.

Porous or permeable pavements supporting load bearing structures are comprised of a pervious base and sub-base. These allow infiltration of water, and in some cases, retain polluting particles.

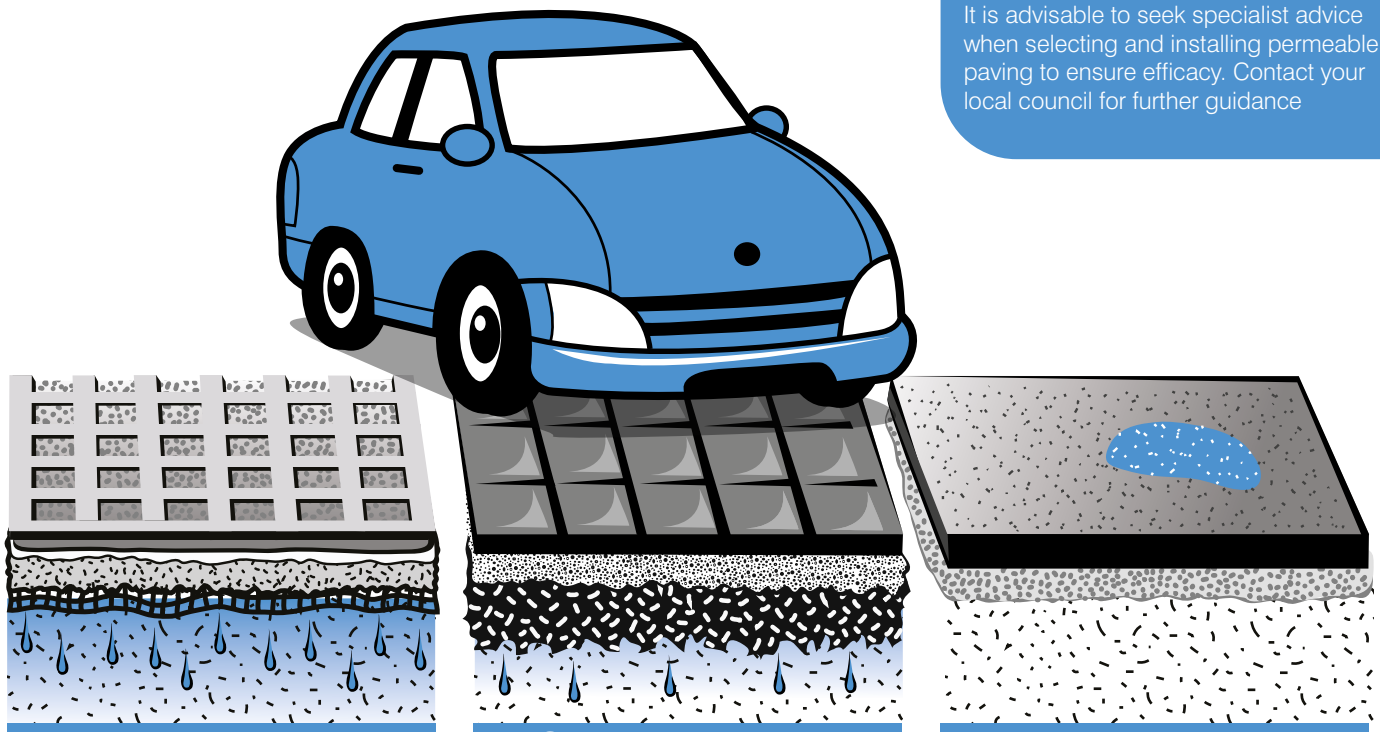


Design Considerations

Whilst use of permeable paving can have many beneficial outcomes, not all sites are suitable for its installation. In addition, lack of maintenance can lead to clogging which in turn reduces infiltration levels. Therefore, to ensure effectiveness of permeable paving, the following site conditions must be considered:

- What is the primary design purpose? Flood mitigation, water quality improvement, water conservation
- Depth to groundwater table
- Soil type
- Soil depth
- Type of traffic (weight and volume)
- Slope
- Design life
- Maintenance and clogging
- Local regulations
- Adjacent infrastructure

It is advisable to seek specialist advice when selecting and installing permeable paving to ensure efficacy. Contact your local council for further guidance



4. Permeable paving

Typically used where pavement is required to have a load bearing capacity such as:

- Car parks
- Driveways
- Streets with low traffic volumes
- Public squares

5. Concrete or brick pavers

Spacing to allow drainage. If not possible, slope paving to drain to garden beds, swales etc.

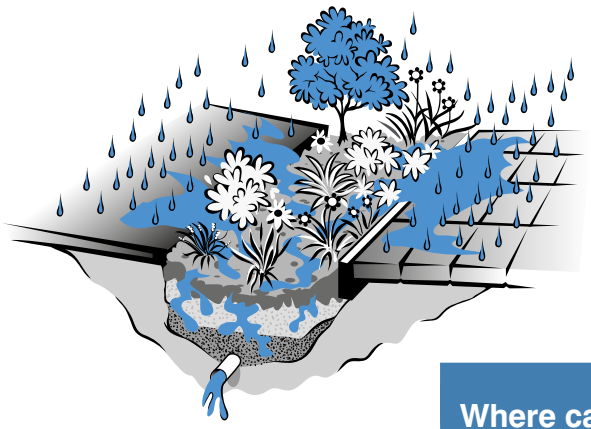
6. Non-porous concrete, tarmac etc.

Where porous/permeable paving cannot be applied, slope hardstand drainage towards swales and grassed buffer zones to reduce stormwater run-off.

Further design options

Garden Beds and Swales

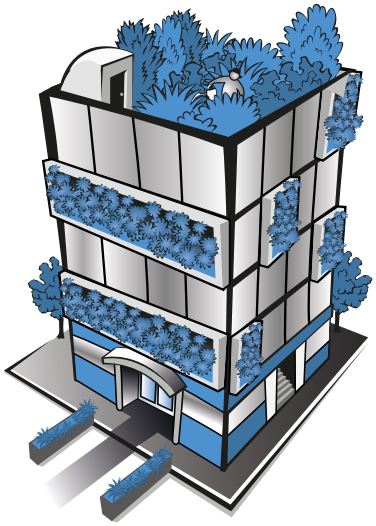
To improve permeability of semi and non porous surfaces consider sloping small area surfaces to a garden bed. For larger sites such as car parks, an engineered swale with a drainage component can be utilised to reduce and treat discharge to the stormwater system.



Alternative design options

In situations where it is not possible to improve your site's ground level permeability, there are other options available to reduce stormwater quality and flow. This may include inner urban sites which have been built on boundary to boundary.

Such measures may include raingardens, rainwater tanks, green walls and roofs. The latter may provide additional benefits such as open space amenity to building occupants, an increased ecological contribution, increased insulation and reduction in urban heat island effect.



Mandatory Requirements and Council's Design Advice

Mandatory requirements
Council WSUD Policies, Site permeability requirements in local planning schemes. Confirm these requirements before lodging your planning application.

Council's Design Advice
Landscape design that maintains or enhances infiltration of stormwater on site. Show on planning application drawings:

- Percentage site permeability
- Location of garden beds/lawns
- Location and extent of paving/ hardstand areas
- Type of paving and hardstand areas
- Cross-sections for stormwater treatment type. E.g. permeable paving, raingardens etc.
- Slope/direction of run-off from hardstand areas to garden beds, swales or buffers

Information in reports – SDA/SMP:

- Type of paving proposed
- Suitability for site conditions
- Indicative maintenance regime

Where can I find out more?

Resources and Tools:
Water Sensitive Urban Design:
www.melbournewater.com.au

Sustainable Gardening in the City of Melbourne guide:
City of Melbourne
www.melbourne.vic.gov.au

Stormwater Management Education Programmes:
Clearwater
www.clearwater.asn.au

Maintaining Water Sensitive Urban Design Elements:
Environmental Protection Authority
www.epa.vic.gov.au

Permeable Paving Design tools:
LockPave and PermPave software
www.cmaa.com.au

Green Roofs and Walls Design Guide:
https://www.melbourne.vic.gov.au/community/greening-the-city/green-infrastructure/Pages/growing-green-guide.aspx

Other Fact Sheets in this series are also available to provide guidance on the 10 Key Sustainable Building Categories. For further information on site permeability, consider the Fact Sheets entitled:

- Stormwater Management
- Green Roofs, Walls and Facades

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