

Land development



Flooding is a natural process and can happen at anytime.
It is important to understand the type of flooding that may impact you and your property.

Flood is a natural hazard

In any given year, it is estimated there are over 200,000 properties across the region that have at least a 1% chance of flooding. The annual average damage caused by flooding in the region has been estimated at \$735.5 million.

Building large scale infrastructure to reduce flooding remains an important tool, however it is not the only mechanism. It is essential that we continue to innovate and broaden the suite of resilience measures available for managing flooding. Other tools such as town planning, community education programs and flood warning systems can provide a more effective way to manage flood impacts.¹

Some types of flooding have more severe impacts or are more hazardous to people than others. When considering community safety, more hazardous flooding is addressed as a priority over the less hazardous flooding.

Depending on the consequence of the flooding, addressing the flood risk may come in the form of:

- education and awareness
- community preparedness
- conditions placed on proposed developments
- flood mitigation
- drainage maintenance works.

When it comes to 'nuisance' flooding, there can be numerous causes, including:

- blocked drainage pits or pipes
- a lack of exiting drainage infrastructure
- areas of flat land
- surrounding soils (e.g. low permeability soil in parks and gardens).

In new developments, roads are designed to convey the 'gap' flow, meaning a portion of the additional flow that doesn't fit in the drainage network which is generally designed for more frequent rainfall events. Some instances of nuisance flooding can be easily resolved through routine maintenance, while others may require drainage upgrade works or modifications to road, kerb, and footpath levels. Some contributors to nuisance flooding may be outside of the control of a specific authority, such as soil conditions or internal works undertaken on private property.



Yering (David Hannah)

¹ Communicating Flood risk to the Community, Melbourne Water

Flood risk assessment

Flood risk considers how likely and how serious a flood could be, such as how much property damage it could cause, and the safety risks it poses. Flood risk affects how suitable an area is for development, however, development can still occur in flood-prone areas, with conditions and restrictions.

Figure 1 - Assessment and prioritisation of flooding (adapted from 'Flooding', City of Kingston)



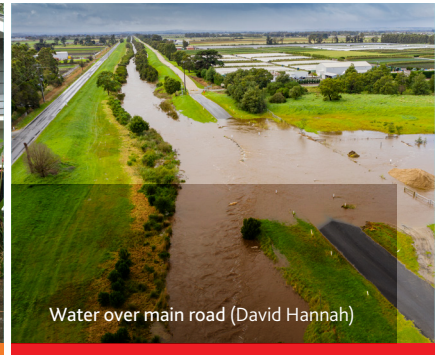
Low Priority

Flooding of local roads



Moderate Priority

Significant flooding of private property, flooding of a main road (not dangerous)



High Priority

Flooding of a house, habitable, building, garage, shed above floor level, flooding of a main road that could cause a serious accident

How do councils assess the priority of flooding reports and the urgency of improvements to the stormwater system?

Councils are allocated an annual budget to spend on drainage improvements across the municipality. Due to various factors it is not possible for councils to fix every drainage issue in the municipality in any one year. Therefore councils have developed

a system to be able to rank flooding incidents as they occur, so that any remedial works required can be prioritised accordingly for future work programmes. Council engineers assess the priority of drainage issues according to their likely severity and frequency. Descriptions of Low, Moderate and High priority incidents are provided above.



South Melbourne Beach flood damage (Brett Hartwig)



The Yarra River, Abbotsford

Developing in flood prone areas

There are four key objectives that Melbourne Water assesses when considering planning proposals within flood affected areas. These objectives are set out in the Victorian Government's state-wide *Guidelines for Development in Flood Affected Areas* (Department of Environment, Land, Water and Planning DELWP, 2019).

The objectives include:

- flood safety: protecting human life and health
- flood damage: minimising flood damage to property and infrastructure
- offsite impacts: maintaining free passage and temporary storage of floodwaters
- waterway and floodplain protection: protecting and enhancing environmental features of waterways and floodplains

The intent of the guidelines is to facilitate safer development, lowering the chance of flooding between properties and making the community safer overall. Flood mapping information helps authorities understand and manage how often, how severely, and where floods can happen. It helps plan for safer future development.²

Figure 2 - Guidelines for Development



Guidelines for Development in Flood Affected Areas, 2019

Special Building Overlays and Land Subject to Inundation Overlays

- Special Building Overlays (SBO) are used to show areas that are at risk of flooding when the capacity of Melbourne Water and council infrastructure is exceeded.
- Land Subject to Inundation Overlays (LSIO) are used to show areas that are subject to overland flow from waterways. These areas have a lower flood risk than those covered by an Urban Floodway Zone (UFZ) or Floodway Overlays (FO).



Upgraded drainage, Burke Road, South reserve

Using best-available information

When handling planning and building applications, Melbourne Water and councils need to use the most recent information available. This might mean that they have undertaken flood modelling and mapping, but don't have a formal planning referral process in place yet.

It is important to communicate well so that flood model outputs can be applied prior to amending the planning scheme. If planning officers know that buildings or properties are likely to be in a future overlay or within a flood extent, they can send these planning applications to the engineering team for review.

Council may then talk to the applicant about the potential flood risks and issues, even though they may not have the necessary planning scheme triggers in place to set conditions. Building regulations are another way for council to use the flood modelling results. Through the building permit process, building surveyors can ask for more information based on the flood modelling results. This could include changes in how the building is built so that it can better handle flooding, or by raising the floor levels.

In all cases, councils can use the *Guidelines for Development in Flood Affected Areas* (Department of Environment, Land, Water and Planning DELWP, 2019) to help make decisions on how to use the flood model outputs for proposed development.

² *Flood Assessment Framework: Decision Making and Mitigation Prioritisation Process* (2010), Melbourne Water

Communicating flood risk to the community

When communicating flood risk to the community, it is important to provide clear, accurate, and timely information. Here are some guidelines that may help:

- use simple, non-technical language and avoid jargon
- provide information on the potential impacts of flooding, including:
 - areas that may be affected
 - depth and velocity of floodwaters
 - potential for damage to property and infrastructure
 - how long the area is flooded for
- provide information on how to prepare for a flood, including what to do before, during, and after a flood event
- use multiple channels to communicate information, including social media, websites, local media, mailouts for those most affected, and community meetings
- work with local emergency services and community organisations to ensure that information is consistent and coordinated. Issuing flood warnings to the community is done by Bureau of Meteorology and VICSES
- provide regular updates as the situation changes and be transparent about any uncertainties or limitations in the information available
- encourage community members to share information with their networks and to take an active role in preparing for and responding to flood events.³

Figure 3 - Flood level warnings

A minor flood warning means floodwater can:

- reach the top of the river banks
- come up through drains in nearby streets
- cover low-lying areas including riverside areas
- cover minor roads, tracks and low level bridges
- spread across land and rural properties



A moderate flood warning means floodwater can:

- exceed river banks and flood low-lying areas
- start to threaten buildings, roads, rail and power
- require evacuation in some areas
- affect some low-lying caravan parks
- cover main roads



A major flood warning means floodwater can:

- cause widespread flooding
- threaten more houses and businesses
- cause properties and areas to be isolated
- disrupt major roads and transport routes
- require widespread evacuations



Flood modelling improves land use planning for community safety and resilience

Land use planning plays a critical role in ensuring that future housing growth and development does not put more people at risk of extreme flooding. Without appropriate flood risk planning, a range of social and economic impacts could result, including loss of life and livelihood. New properties and renovations can be better protected from flooding by including flood-related overlays in planning schemes.



Wetland at Gavin Park, Pascoe Vale

In some councils, planning schemes require new buildings or extensions to be assessed against the requirements set out in the planning scheme.

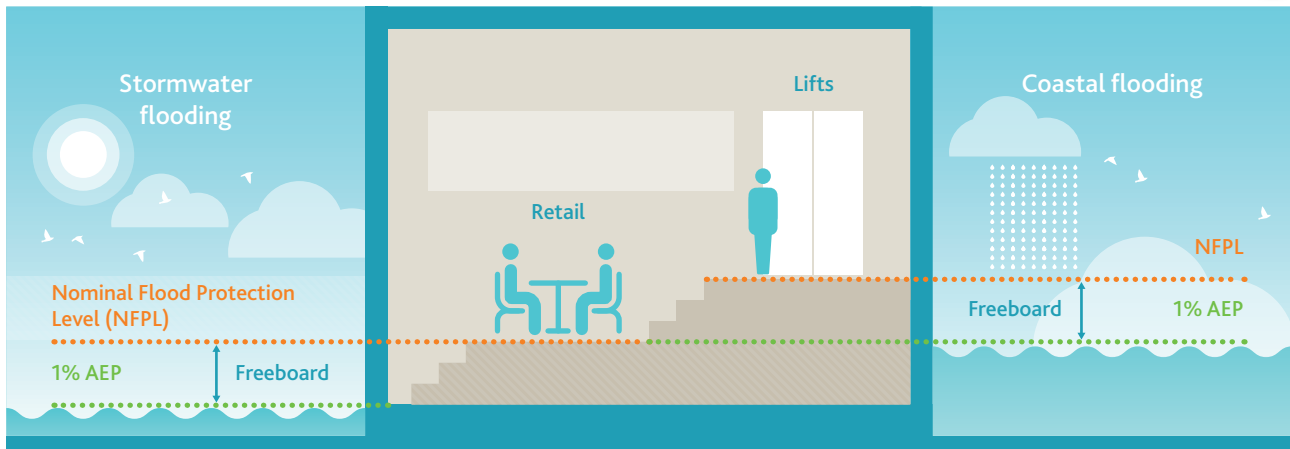
The primary purpose is to help the property and nearby properties have a level of protection from flooding by considering things such as:

- existing or planned drainage
- on-site water/flood detention
- use of alternative materials
- viability of basement construction
- safe entry and exit
- floor level requirements
- how the proposed changes impact flooding on adjacent properties and roads.

Planning controls provide more certainty, clarity and guidance to property owners, developers, and other stakeholders in flood-prone areas.

Melbourne Water have a free Flood Resilient Guide to Retrofitting Your Home, available for download from our website here: <https://www.melbournewater.com.au/water-and-environment/flooding-advice/prepare-flooding>

Figure 4 - Design Guide for flood affected areas in Fisherman's Bend



Good Design Guide for Flood Affected Areas in Fisherman's Bend, Arden and Macaulay
(Melbourne Water, City of Melbourne, City of Port Phillip, 2021)

Figure 5 - Flood related planning overlays: LSIO and SBO



Flood related planning overlays: Land Subject to Inundation Overlay and Special Building Overlay.
Source: VicPlan