



Flood Guidelines

Guidelines for development in flood prone areas

January 2020

Feedback

We welcome feedback on these Guidelines at any time. Comments in writing should be addressed to:

Statutory Planning Manager
West Gippsland Catchment Management Authority

Mailed to: PO Box 1374, Traralgon VIC 3844
or emailed to: planning@wgcma.vic.gov.au

Enquiries

If you would like to develop in a flood prone area, we encourage you to get our advice before you apply for a Planning or Building Permit. To contact a member of our planning team please phone 1300 094 262 or email planning@wgcma.vic.gov.au.

Address

West Gippsland Catchment Management Authority
16 Hotham Street, Traralgon, Victoria, 3844
PO Box 1374, Traralgon, Victoria, 3844

Telephone

1300 094 262

Website

www.wgcma.vic.gov.au

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PART ONE

Introduction

1 Introduction

These guidelines aim to promote safe and appropriate development in flood prone areas within West Gippsland. If you are a property owner, developer, designer or builder who is seeking approval for a development in the West Gippsland region, then these guidelines are for you.

We encourage you to read these guidelines and contact a member of our West Gippsland Catchment Management Authority (WGCMA) Statutory Planning Team on 1300 094 262 or email planning@wgcma.vic.gov.au before you apply for a Planning Permit. More information about floodplain management in our region and our Flood Advice service is available on our website www.wgcma.vic.gov.au.

The WGCMA provides specialist flood advice and assessment of development, based on the following objectives for development in flood prone areas:



Objective 1: Site safety

Development must not be located where the depth and flow of floodwaters is hazardous.



Objective 2: Site access

Development must not be located where the depth and flow of floodwaters along the access to or from the property is hazardous.



Objective 3: Flood damage

Development must be designed to minimise the potential damage to property due to flooding.



Objective 4: Flood flow

Works or structures must not adversely affect floodwater flow capacity or the physical form of a waterway.



Objective 5: Flood storage

Works or structures must not reduce floodwater storage capacity.



Objective 6: Floodplain and waterway condition

Development must ensure protection of floodplains and the maintenance or improvement of waterway condition including vegetation and physical form.



Objective 7: Water quality

Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas.

2 About flooding

Flooding is a natural hazard which occurs as a result of heavy rainfall, coastal storm surges or inadequate drainage. Floodplains are the area of land that is subject to inundation by floods. Floods are classified by the frequency at which they are likely to occur.

In Victoria, all proposals for development on floodplains are assessed against a flood that, on average, will occur once every 100 years. A flood of this size has a 1% chance of occurring in any given year and is known as either the 100-year Average Recurrence Interval (ARI) flood or the 1% Annual Exceedance Probability (AEP) flood. There is always a possibility that a flood larger in height and extent than the 1% AEP flood may occur in the future.

Types of flooding

Riverine flooding

Riverine flooding is caused when a watercourse or waterbody can't cope with the runoff from a major storm and water spills onto surrounding areas, which are called floodplains. These flows may escape or be released from a lake, river, creek or other natural watercourse or a reservoir, canal or dam. This form of flooding is usually relatively predictable and can be known hours or even days in advance.

Flash flooding

Flash flooding is sudden and unexpected flooding that is often caused by sudden local or nearby heavy rainfall. It is often defined as flooding that peaks within six hours of the causative rain. It is generally not possible to issue detailed flood warnings for flash flooding.

Overland flooding

Overland flows occur as the result of movement of heavier than usual rainfall runoff flowing across the land according to the grade, often to a watercourse. Overland flows may also occur as the result of local runoff exceeding the capacity of an urban stormwater drainage system or flows along poorly defined drainage paths. Overland flooding associated with urban drainage systems is known as stormwater flooding.

Coastal and estuarine inundation

Tidal or storm driven coastal events, resulting in higher than normal sea level, have the potential to inundate adjacent low-lying areas. Estuaries are the locations where rivers flow into coastal waters. These locations are sensitive to a combination of coastal and riverine or overland flooding. Land that is currently above tidal or storm surge levels may be at risk under future climate change scenarios.

Climate change

Climate change is expected to result in significant changes in storm behaviour. The information currently available suggests that extreme rainfall events that drive major flooding are likely to increase over the next few decades.

Victoria's *Planning Policy Framework (PPF)* includes clauses that require assessment of development to consider natural hazards and climate change and the potential impacts of climate change on coastal inundation and erosion.

The '*Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise*' (DSE, 2012) outline the Victorian Government response to the likely impacts of possible sea level rise. The Guidelines include policy direction allowing agreement between councils and Catchment Management Authorities on appropriate flood levels for anticipated sea level rise.

The WGCMA has agreements with each of the Local Government Authorities in the region detailing how the viability of proposals should be assessed in relation to climate change. The WGCMA can provide advice on specific proposals including the impacts of climate change and sea level rise.

3 Planning controls

The Planning Permit and Building Permit systems operate under different pieces of legislation. Planning Permits are legal documents giving permission for a land use or development. Development includes the construction, alteration or demolition of a building or works and the subdivision or consolidation of land. Building Permits relate specifically to the carrying out of building construction.

Most forms of development on flood prone land require a Planning Permit or a Building Permit. A council will seek specialist advice from the relevant floodplain manager during the permit assessment process and will usually impose conditions following this advice when granting a permit. The proposal must satisfy all the conditions on a permit.

Planning and Environment Act 1987

The main instruments to control planning decisions under the *Planning and Environment Act 1987* (Vic) are Planning Schemes. They set out the types of land use or developments that are or are not allowed and for which a permit is required. Planning schemes apply to every part of Victoria. They can be viewed at local council offices and are available on the Department of Environment, Land, Water and Planning, Planning Schemes Online website <http://planning-schemes.delwp.vic.gov.au>.

Zone and overlay controls for flood prone areas require councils to refer Planning Permit applications to the WGCMA so that it can provide specialist advice. This requirement can only be waived if the council believes the proposal satisfies requirements or conditions previously agreed to in writing.

The following zone and overlay provisions, and their related schedules, ensure that the use and development of land subject to flooding is appropriate given the flood risk.

Urban Floodway Zone – Clause 37.03 of the Victoria Planning Provisions

The Urban Floodway Zone (UFZ) applies to riverine flooding in urban areas. Unlike the overlays, the UFZ controls land use as well as development, with land use being restricted to low intensity uses such as recreation and agriculture. Development is generally not encouraged in the UFZ.

Floodway Overlay– Clause 44.03 of the Victoria Planning Provisions

The Floodway Overlay (FO) applies to riverine flooding in both rural and urban areas where there is a flood risk and there is less need to control land use. Most types of development are not encouraged but buildings and works associated with low intensity uses such as agriculture may be permitted. Key considerations are whether the development will obstruct flood flows or increase flood risk.

Land Subject to Inundation Overlay – Clause 44.04 of the Victoria Planning Provisions

The Land Subject to Inundation Overlay (LSIO) applies to riverine flooding in both rural and urban areas, as well as coastal inundation. Areas covered by the LSIO may have similar or lower flood risk than those covered by UFZ or FO, depending on whether mapping has been developed to delineate the floodway. The planning permit process ensures that the use and development of land in this overlay is compatible with the level of flood risk at the site.

Special Building Overlay – Clause 44.05 of the Victoria Planning Provisions

The Special Building Overlay (SBO) applies to stormwater flooding in urban areas. The purpose of the SBO is to ensure that flood waters are not obstructed or diverted by development. The SBO is only used in limited areas in Gippsland due to a lack of mapping of overland flow paths.

The Planning Scheme also requires the consideration of flood issues for all planning applications regardless of whether a site is affected by a relevant zone or overlay. More information about the Planning Scheme decision guidelines and objectives is available in the Appendix – Decision Guidelines.

Building Act 1993

The *Building Act 1993* governs building activity in Victoria. It sets out the legislative framework for the regulation of building construction, building standards and the maintenance of specific building safety features. The *Building Regulations 2018* are the instrument under the Building Act that control decisions about building. Regulation 153 in the *Building Regulations 2018* seeks report and consent from the floodplain manager for building in areas liable to flooding.

4 Applying for a Planning or Building Permit in a flood prone area

Before making an application for a Planning Permit with your local council, please contact the WGCMA Statutory Planning Team for free specialist flood risk advice by calling 1300 094 262 or email at planning@wgcm.vic.gov.au. The Team can provide advice about flood levels and preliminary development proposals before you formally apply for a permit from your relevant council. Seeking pre-planning permit application advice can significantly speed up the permit process and avoid expensive redesign and document resubmission.

As a minimum, any application for pre-planning permit advice should include the following:

- The location details of the land proposed for development;
- A brief description of the development; and
- A sketch showing the boundaries, layout and scale of the development.

The sketch can be done on an aerial image and should show the development in relation to any existing buildings and works or any other significant feature which would help identify the location and impact of the development.

When making an application to your council Planning Department, you are encouraged to submit fully documented applications to enable efficient assessment and processing.

The following details will assist in our assessment of your application:

- The location details of the land proposed for development;
- The boundaries, dimensions, layout and use of the proposed development and existing buildings and works;
- Surface ground levels to Australian Height Datum (AHD) taken by a licensed Land Surveyor; and
- Floor levels of any existing and proposed buildings to AHD.

The WGCMA Statutory Planning Team check applications when they are received to ensure that all necessary information is included. WGCMA has 21 days in which to ask for any further information, but if no further information is required then it must respond to the relevant council within 28 days.

The WGCMA assesses all applications against the Guidelines contained in this document, and the following National, State and Local Policies, Guidelines and Practice Notes:

- 1 [‘Australian Disaster Resilience Handbook 7’](#) (Australian Institute for Disaster Resilience, 2017)
- 2 [‘Australian Disaster Resilience Guideline 7-3’](#) (Australian Institute for Disaster Resilience, 2017)
- 3 [‘Victorian Floodplain Management Strategy’](#) (Victoria State Government, 2016)
- 4 Council Planning Schemes ([Planning Schemes Online](#)), including the:
 - i Planning Policy Framework
 - ii Local Planning Policy Framework
 - iii Relevant Zones and Overlays

- 5 [‘Guidelines for Development in Flood-Affected Areas’](#) (DELWP, 2019)
- 6 [‘Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise’](#) (DSE, 2012)
- 7 [‘Applying for a Planning Permit under the Flood Provisions – A Guide for Councils, Referral Authorities and Applicants’](#) (DELWP, 2015)
- 8 [‘Victorian Coastal Strategy’](#) (Victorian Coastal Council, 2014)
- 9 [‘West Gippsland Floodplain Management Strategy’](#) (2018-2027)
- 10 [‘West Gippsland Waterway Strategy’](#) (2014-2022)
- 11 [‘West Gippsland Regional Catchment Strategy’](#) (2013-2019)

The Floodway Overlay and Land Subject to Inundation Overlay have their own decision guidelines, which must be considered in the assessment of an application for a Planning Permit. The decision guidelines include (but are not limited to):

- Whether the proposal could be located on flood-free land or land with a lesser flood risk;
- Susceptibility of the development to flooding and flood damage;
- Potential risk to life, health and safety associated with the development. Flood risk factors include:
 - Frequency, duration, extent, depth and velocity of flooding;
 - Warning time available; and
 - Danger to occupants, other residents and emergency personnel if flooding occurs.
- Effect of the development on redirecting or obstructing floodwaters, reducing flood storage, and increasing flood levels and flow velocities.

PART TWO

Assessing Development Proposals

5 Assessment objectives

The 'West Gippsland Floodplain Management Strategy' (2017) sets out a vision for West Gippsland communities to be aware of flooding and actively take measures to manage their flood risks to minimise the consequences to life, property, community wellbeing, the economy and the environment. The strategy sets out the following objectives to achieve this vision:

- Build a flood resilient community – through effective sharing of current information about flood behaviour
- Reduce existing flood risks – through emergency management, flood mitigation infrastructure works and activities, and risk management
- Avoid future flood risks – through effective land use planning and building controls that account for the impacts of climate change
- Manage residual flood risks – through flood insurance, provision of flood risk information, integrated flood emergency management and incident control.

This guideline has been developed with the specific purpose of helping the West Gippsland community meet the third objective which is to avoid future flood risks by ensuring development across our region responds appropriately and consistently to the flood hazard. The WGCMA provides specialist flood advice and assessment of development, based on the following objectives for development in flood prone areas:

Objective 1: Site safety

Objective 2: Site access

Objective 3: Flood damage

Objective 4: Flood flow

Objective 5: Flood storage

Objective 6: Floodplain and waterway condition

Objective 7: Water quality

When assessing development proposals, the WGCMA uses a two-step process. The first step considers Objective 1 and 2, namely the flood hazard at the site and along the access route. This step assesses the proposed development type against the flood hazard criteria presented in Table 1. If the proposed development type meets the flood hazard criteria, the second step ensures that appropriate engineering and other mitigation measures will meet the remaining 5 objectives.

The primary determinate of flood hazard is the flood depth and velocity. The flood risk factors listed in the Decision Guidelines in the Floodway and Land Subject to Inundation Overlays add to the overall hazard and do not diminish it. For example, a long warning time does not reduce the hazard to justify the placement of a building that will accommodate people in an area of extreme flood hazard.

Where development is located on the flood fringe (flood depth less than 300mm) and is not likely to have a detrimental impact on the environmental values of the floodplain, engineering solutions to mitigate the flood risk will be considered. If engineering solutions are to be considered, a two-dimensional flood study must be developed to demonstrate that there will be no adverse impacts on flood behaviour.

Table 1 summarises the flood hazard criteria adopted by the WGCMA for assessing the most common types of development in our region. For information on development types other than those listed in the table above, please contact the WGCMA Statutory Planning Team on 1300 094 262 or email planning@wgcma.vic.gov.au.

More information is available in the VPP Practice Note 'Applying for a Planning Permit under the Flood Provisions' (DEWLP, 2015). A second practice note 'Applying the Flood Provisions in Planning Schemes – A Guide for Councils' (DEWLP, 2015) provides guidance about applying the flood provisions in planning schemes.

The detail of each of the WGCMA objectives for development in flood prone areas are presented in the following sections. These objectives are supported by the objectives presented in the Department of Environment, Land, Water and Planning (DELWP) publication 'Guidelines for Development in Flood Affected Areas' released in February 2019, which are:

- 1 Flood safety
- 2 Flood damage
- 3 Flood impacts
- 4 Waterway and floodplain protection

6 Flood safety

Protect human life and health and provide safety from flood hazard (DELWP, 2019).



Objective 1: Site safety

Development must not be located where the depth and flow of floodwaters is hazardous.

During a flood, people must not be exposed to deep or fast flowing water.

Table 1 overleaf summarises the flood hazard criteria adopted by the WGCMA for assessing site safety for development.



Objective 2: Site access

Development must not be located where the depth and flow of floodwaters along the access to or from the property is hazardous.

People trying to enter or leave a property during a flood must not be exposed to deep or fast flowing water. This includes driveways, roads and footpaths that link a property to a refuge area and aims to safeguard emergency workers as well as residents and visitors.

Table 1 overleaf summarises the flood hazard criteria adopted by the WGCMA for assessing site access safety for development.

Table 1 Summary of WGCMA flood hazard criteria for the most common development types

| Type | Maximum pre-development flood depth* on site and egress | Required finished floor level if flood depth criteria are met |
|--|--|---|
| Accommodation | | |
| Single dwelling on land zoned for residential purposes | 1.2 metres | At or above Nominal Flood Protection Level (NFPL) |
| Single dwelling on land not zoned for residential purposes | 0.3 metres | At or above NFPL |
| Replacement dwelling – increase in footprint less than 20 square metres | n/a | At or above existing finished floor level of dwelling |
| Replacement dwelling – increase in footprint greater than 20 square metres | n/a | At or above NFPL |
| Dwelling extension less than 20 square metres | n/a | At or above existing finished floor level of dwelling |
| Dwelling extension greater than 20 square metres | n/a | At or above NFPL |
| Additional dwelling (incl. Dependent person's unit) | 0.3 metres | At or above NFPL |
| Carport, garage, shed | n/a | At or above existing natural surface level with electrical outlets, high value and hazardous materials located above the NFPL |
| New permanent caravan or cabin sites at an existing caravan park | 0.3 metres | At or above NFPL |
| Accommodation | 0.3 metres | At or above NFPL |
| Subdivision | | |
| New subdivision (infill) | All new lots must have flood depths less than 0.3 metres on lots and egress | All finished floor levels of dwellings must be at or above NFPL |
| New subdivision (greenfield) | All new lots must be flood free and egress must have flood depths less than 0.3 metres | All finished floor levels of dwellings must be at or above NFPL |
| Agricultural buildings | | |
| Small sheds and outbuildings | n/a | At or above existing natural surface level |
| Sheds and outbuildings with large footprint or connected to electricity and/or water | 0.3 metres | At or above NFPL |
| Commercial and industrial buildings | | |
| Industrial building, office, retail building, or warehouse | 0.3 metres | At or above NFPL |

*Flood depths in the table above are only applicable when velocities are low. When velocities are greater than 0.5 metres per second then shallower depths will apply as per **Figure 1 General flood hazard vulnerability curves (AIDR, 2017)**.

For information on other development types, please contact the WGCMA Statutory Planning Team on 1300 094 262 or email planning@wgcma.vic.gov.au

7 Flood damage

Minimise flood damage to property and associated infrastructure (DELWP, 2019).



Objective 3: Flood damage

Development must be designed to minimise the potential damage to property due to flooding.

Developments must be designed to minimise the potential for water to enter and damage properties. Development design should also consider likely flood flow patterns to avoid creating obstructions which would cause floodwater to build up and then overflow.

Development should be located to minimise any flood damage, particularly at locations that are likely to be affected by significant flood velocities or water depths. Where buildings in flood prone areas are supported, depending on the intended use of the building they should be raised on stumps above the Nominal Flood Protection Level (NFPL) or built from materials that can withstand flooding.

8 Flood impacts

Maintain free passage and temporary storage of floodwaters (DELWP, 2019).



Objective 4: Flood flow

Works or structures must not adversely affect floodwater flow capacity or the physical form of a waterway.

Existing flood risks must not be made worse by changes to the flow characteristics of a floodplain, or overland flow path. Development must not decrease the available flow area as this may increase upstream flood levels, downstream flow speed or result in erosion due to concentration of flood flows. An increase in flow speed can create safety hazards and cause erosion across the floodplain or within a waterway.

In most cases, proposals for development of flood prone land will need to be supported by a two-dimensional flood study undertaken by a suitably qualified and experienced professional to the satisfaction of the WGCMA. The WGCMA has an extensive flood study data base and advice should be sought from us on the availability of an existing model and the particular modelling requirements expected.



Objective 5: Flood storage

Works or structures must not reduce floodwater storage capacity.

Flood storage is the area available to temporarily store water during a flood. If this area is filled or developed it may displace floodwater causing higher flood levels elsewhere. Works or structures must not reduce floodwater storage capacity or displace floodwater. The aim is to prevent higher flood levels on adjoining properties or displacement of floodwaters to downstream reaches and properties.

Cumulative impacts are critical when considering flood storage. While a single development may not measurably reduce flood storage, many similar developments will. The WGCMA respond to around 800 floodplain proposals every year and requires fill to be minimised to ensure flood behaviour does not change over time.

As for Objective 4, proposals for development of flood prone land will, in most cases, need to be supported by a two-dimensional flood study undertaken by a suitably qualified and experienced professional to the satisfaction of the WGCMA. The WGCMA has an extensive flood study data base and advice should be sought from us on the availability of an existing model and the particular modelling requirements expected.

9 Floodplain and waterway protection

Protect and enhance the environmental features of waterways and floodplains (DELWP, 2019).



Objective 6: Floodplain and waterway condition

Development must ensure protection of floodplains and the maintenance or improvement of waterway condition including vegetation and physical form.

Clause 13.03-1S (Floodplain management) of the Planning Policy Framework (PPF) states the following objective –

To assist the protection of:

- *Life, property and community infrastructure from flood hazard.*
- *The natural flood carrying capacity of rivers, streams and floodways.*
- *The flood storage function of floodplains and waterways.*
- *Floodplain areas of environmental significance or of importance to river health*

Orderly planning requires floodplains to be protected to ensure they can continue to provide their natural flood carrying capacity and flood storage functions and protect areas of environmental significance and areas of importance to river health. Periodic inundation of floodplains is important to replenish sediment and nutrients and to allow recharge of groundwater systems. Development that impacts on these values directly or is likely to contribute to cumulative impacts will not be supported.

The 'West Gippsland Waterway Strategy' (2014-2022) states that 'riparian corridors along waterways play an important role in maintaining and improving waterway health'.

Waterway condition is assessed by the quality and quantity of vegetation (both in-stream and on land), the physical form of the bed and banks, the quality and quantity of water within the waterway and the level of connection to wetland and floodplain areas. Applications will be assessed against their contribution to the maintenance or improvement of waterway condition, including whether they demonstrate things such as:

- Protecting vegetation – both in-stream and on land;
- Reducing the concentration of flows into waterways;
- Incorporating self-sustaining systems that minimise the costs of maintenance.

Wetlands are a particularly important environmental asset in our region and the WGCMA does not support development in or filling of any priority or important wetlands as identified in the 'West Gippsland Waterway Strategy' (2014-2022).

In addition to any Planning Permit you may need from Council, all works within 30 metres of a designated waterway require a Works on Waterways permit issued by the WGCMA under the *Water Act 1989*. An application form is available on the WGCMA website www.wgcma.vic.gov.au.

**Objective 7: Water quality****Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas.**

Where development has the potential to influence waterway health, applicants must demonstrate how they intend to maintain or improve stormwater and run-off quality and volumes in accordance with best practice standards. For large subdivisions, stormwater treatment and management should be conceptually designed prior to finalisation of lot layout, to ensure that appropriate land is set aside for this purpose. Stormwater quality works should be undertaken prior to the works commencing for the development that they will treat. Detailed guidance on waterway management planning is available in the references at the end of this document.

Any proposed discharge of stormwater requiring a direct connection to a designated waterway will require a Works on Waterways permit issued by the WGCMA under the *Water Act 1989*. An application form is available on the WGCMA website www.wgcma.vic.gov.au.

PART THREE

Design Responses

Accommodation

In the *Victoria Planning Provisions*, the term 'accommodation' refers to "land used to accommodate persons" (Clause 73.03). The WGCMA applies the criteria below to all accommodation types defined under Clause 73.03, which includes dwellings, camping and caravan parks, corrective institutions, dependant person's units, group accommodation, host farms, residential aged care facilities, residential buildings, residential villages and retirement villages.

The WGCMA assess the flood hazard of a development location using Table 1 Summary of WGCMA flood hazard criteria. Table 1 has been developed using the Flood Hazard Vulnerability Curves shown in Figure 1 below and the DELWP *Guidelines for Development in Flood Affected Areas* (2019). The Flood Hazard Vulnerability Curves set hazard thresholds that relate to the vulnerability of the community when interacting with floodwaters.

The Flood Hazard Vulnerability Curve shown in Figure 1 is taken from the *Australian Disaster Resilience Handbook Collection guideline 7-3 Flood Hazard* (AIDR, 2017).

As seen in Table 1, for most development types the flood hazard criteria specify a maximum flood depth of 0.3 metres on the site and over the egress route. This is based on the upper limit of the H1 Flood Hazard Vulnerability Curve (refer to Figure 1).

For single dwellings on residentially zoned land, the maximum acceptable flood depth on the site and egress route is 1.2 metres, based on the upper limit of the H3 Flood Hazard Vulnerability Curve. This maximum flood depth of 1.2 metres is only applicable when flood velocity is low (i.e. less than 0.5 metres per second).

The upper limit of the H3 Flood Hazard Vulnerability Curve is considered appropriate in existing urban areas as Councils' Municipal Emergency Management Plans have identified those areas subject to significant flood hazard and have put in place appropriate measures to manage the existing level of flood risk.

Where flood velocities are greater than 0.5 metres per second, the flood depth criteria in Table 1 may be critical. When this is the case, the assessment of the flood safety criteria will be based on the applicable Flood Hazard Vulnerability Curve.

As shown in Table 1, proposals which seek to intensify the flood risk through subdivision or additional dwellings will be assessed against the H1 Flood Hazard Vulnerability curve.

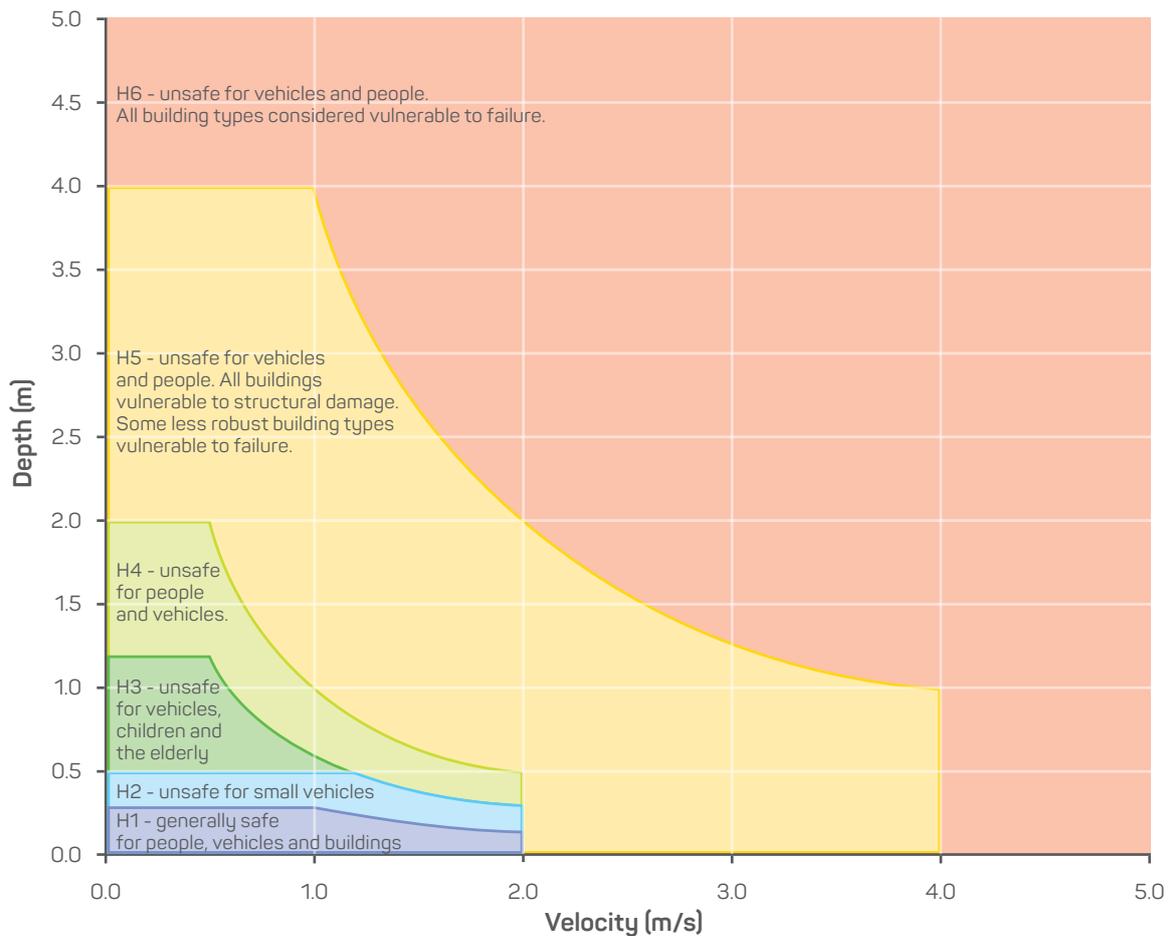


Figure 1 – General flood hazard vulnerability curves (AIDR, 2017)

Where dwelling sites meet the WGCMA criteria for flood depth over the site and vehicle egress, the finished floor level of the dwelling must be at or above the relevant Nominal Flood Protection Level (NFPL) at that location. The NFPL includes a freeboard above the 1% AEP flood level and is the minimum height required to protect a building or its contents from 1% AEP flood waters. To maintain the free passage of floodwaters, stumps rather than fill must be used to raise the finished floor level of a dwelling up to the NFPL where this is required. Any enclosure of the sub-floor must be of an open style that allows for the free passage of flood waters under the dwelling.

The Victoria Planning Provision Planning Practice Note 11 'Applying for a planning permit under the flood provisions – a guide for councils, referral authorities and applicants' (2015) allows an extension to an existing dwelling of less than 20 square metres to be constructed at the existing floor level. Any extension greater than 20 square metres must be constructed above the applicable 1% AEP flood level.

Building materials located below the NFPL can be susceptible to damage during inundation which can compromise the safety and function of the building. This should be taken into consideration in the selection of materials used in construction below the NFPL, with a preference to use flood resistant materials where possible.

New permanent caravan or cabin sites have a similar function to dwellings and similar safety issues. The WGCMA does not support intensification of existing caravan parks or development of new caravan parks where the relevant criteria are not met.

Flood Warning and Flood Emergency Response Plans

The Bureau of Meteorology (BOM) issues Flood Warnings for several locations across West Gippsland. These warnings are one part of a total flood warning system and are provided so that existing communities can respond appropriately to an imminent flood.

The *'Australian Disaster Resilience Handbook 7 Managing the Floodplain: A Guide to Best Practice Flood Risk Management in Australia'* (AIDR, 2017) considers that flood warning systems and emergency management plans are designed to assist existing communities at risk, not to facilitate or justify the expansion of those communities at risk or the development of new at-risk areas.

The WGCMA does not accept the presence of a BOM Flood Warning or the subsequent production of a flood emergency response plan as justification for development to occur in areas that do not meet the WGCMA flood safety criteria as summarised in Table 1.

Subdivisions

The WGCMA does not support greenfield development that will result in the creation of new lots that are flood prone or lots that do not have safe vehicle access. All new greenfield residential lots must be flood-free during a 1% AEP flood event and flood depth over the vehicle egress route during a 1% AEP flood event from the property to a refuge area, where emergency facilities are located, must not exceed 0.3 metres.

The WGCMA supports infill subdivision where flood depth during a 1% AEP flood event does not exceed 0.3 metres over a property or 0.3 metres over the vehicle egress route from the property. Each lot must provide a flood-free building envelope.

Proposals for the subdivision of flood prone land will need to be supported by a two-dimensional flood study undertaken by a suitably qualified and experienced professional to the satisfaction of the WGCMA. The flood study will need to demonstrate the 1% AEP flood extent and depth of flooding for all waterways on the proposed development site and that the proposal meets the relevant safety criteria for the subdivision.

Proposals for subdivision must also consider the health and protection of any floodplain areas, designated waterways and wetlands, as well as management of stormwater.

Sheds and outbuildings

Sheds and outbuildings which are not connected to electricity and water, with small footprints, may be constructed at the natural surface level. Sheds should be located away from active flow areas and orientated to minimise potential impacts on flow paths. Access ways should not obstruct flood flow or storage.

Sheds and outbuildings with large footprints and those connected to electricity and water may require a higher level of protection. The WGCMA requires that electrical outlets be fixed above the NFPL. Any high value and/or hazardous materials must be stored at or above the NFPL. The WGCMA may require a finished floor level of the building at the NFPL where a higher level of protection is necessary.

Building materials located below the NFPL can be susceptible to damage during inundation which can compromise the safety and function of the building. This should be taken into consideration in the selection of materials used in construction below the NFPL, with a preference to use flood resistant materials where possible.

Fences

Impermeable fences in active flow paths may not be supported as they can obstruct flood flows and alter flood behaviour. Fences that do not impede flows (by being open style, contain break-away panels or gaps) up to the 1% AEP flood level may be supported. In high flow velocity areas, additional design requirements may be advised. The movement of floodwaters and potential impacts of flood debris should be taken into consideration during fence design.

Cut and fill

Some development proposals seek to balance fill with compensatory excavation. The WGCMA does not support the placement of fill on the floodplain, whether imported or sourced via cut from within the site, unless a flood study demonstrates that the fill will not impede floodwaters and that any compensatory excavation is fully active during a flood. Filling should be limited to the fringe of the floodplain where depth is less than 0.3 metres.

The '*Guidelines for Development in Flood Affected Areas*' (DELWP, 2019) provide advice that in order for floodplain managers to support the use of cut and fill they will need to be satisfied that:

- Flood levels or flow velocities do not increase. A range of floods must be considered.
- The area excavated, and the area filled do not significantly change the cross-sectional area perpendicular to the flow.
- The excavated area is not filled before the arrival of the flood peak.

The WGCMA considers that where a property contains flood-free land, development should be limited to that part of the land in preference to raising the level of low-lying land for development.

Stormwater Management

Where development has the potential to influence waterway health, applicants must demonstrate how they intend to maintain or improve stormwater run-off quality and volumes in accordance with best practice standards. For large subdivisions, stormwater treatment and management should be conceptually designed prior to finalisation of lot layout, to ensure that appropriate land is set aside for this purpose. Stormwater quality works should be undertaken prior to the works commencing for the development that they will treat.

In October 2018, Amendment VC154 made changes to the *Victoria Planning Provisions*, which extends the previous stormwater management requirements for residential subdivision and apartment developments to include all commercial and industrial subdivisions and developments, all public use developments and all residential multi-dwelling developments. Further information about Amendment VC154 is available at www.planning.vic.gov.au.

Waterways

Clause 14.02-1S (Catchment planning and management) of the *Planning Policy Framework* (PPF) seeks to assist the protection and restoration of catchments, water bodies, groundwater and the marine environment. One of the strategies set out in Clause 14.02-1S to achieve this is the retention of natural drainage corridors with vegetated buffer zones at least 30 metres wide along each side of a waterway.

Designated waterways should be protected, vegetated and maintained into the future. To ensure the long-term protection of designated waterways and to minimise future maintenance requirements for any reserves created over the waterways, a Waterway Management Plan is required for development proposals within the vicinity of a waterway. Existing flow paths and natural floodplain features must be retained in most instances.

Waterway Management Plans must include a plan detailing landscaping and a maintenance schedule. The landscape plan should include at a minimum the planting zones, plant types and densities, cross sections of planting and details of inlets, outlets and other features. The maintenance schedule should include establishment actions, a maintenance plan including inspection details, the short-, medium- and long-term actions and identify the responsible parties. Waterway planting should make use of indigenous species consistent with the prevailing Ecological Vegetation Class (EVC).

The protection of human life must be prioritised in bushfire affected areas in accordance with Clause 13.02-1S of the PPF. This does not justify ignoring or nullifying other policy considerations such as the requirement to provide 30 metres vegetated buffers along waterways under Clause 14.02-1S. If conflict arises, the development layout will need to respond appropriately to both requirements and ensure that any dwellings or new lots are appropriately located to reflect the risk associated with the vegetated waterway.

Please contact the WGCMA Statutory Planning Team on 1300 094 262 or email planning@wgcma.vic.gov.au for further advice regarding Waterway Management Plans.

APPENDIX

Decision Guidelines

| | Flood safety | | Flood damage | Flood impacts | | Waterway and floodplain protection | |
|---|--------------|-------------|--------------|---------------|---------------|------------------------------------|---------------|
| | Site safety | Site access | | Flood flow | Flood storage | Waterway condition | Water quality |
| PPF 13.03-15 Floodplain management To help protect: | | | | | | | |
| Life, property and community infrastructure from flood hazard | ✓ | ✓ | ✓ | | | | |
| The natural flood carrying capacity of rivers, streams and floodways | | | | ✓ | | | |
| The flood storage function of floodplains and waterways | | | | | ✓ | | |
| Floodplain areas of environmental significance or of importance to river health | | | | | | ✓ | ✓ |
| Planning Scheme Clause 65 Approval of an application or plan | | | | | | | |
| <i>Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate</i> | | | | | | | |
| • The effect on the amenity of the area | | | | | | ✓ | |
| • Factors likely to cause or contribute to land degradation, salinity or reduce water quality | | | | | | | ✓ |
| • Whether the proposed development is designed to maintain or improve the quality of stormwater within and exiting the site | | | | | | | ✓ |
| • The extent and character of native vegetation and the likelihood of its destruction | | | | | | ✓ | |
| • Whether native vegetation is to be or can be protected, planted or allowed to regenerate | | | | | | ✓ | |
| • The degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard | ✓ | ✓ | ✓ | ✓ | | | |

Decision Guidelines *continued...*

| | Flood safety | | Flood damage | Flood impacts | | Waterway and floodplain protection | |
|--|--------------|-------------|--------------|---------------|---------------|------------------------------------|---------------|
| | Site safety | Site access | | Flood flow | Flood storage | Waterway condition | Water quality |
| Urban Floodway Zone (UFZ) Decision guidelines: | | | | | | | |
| The local floodplain development plan or flood risk report | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Any comments of the relevant floodplain management authority | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Floodway Overlay (FO) Decision guidelines: | | | | | | | |
| The local floodplain development plan or flood risk report | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Any comments of the relevant floodplain management authority | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| The Victorian River Health Strategy (2002) and any relevant regional health strategy and associated wetland plan | | | | | | ✓ | ✓ |
| Land Subject to Inundation Overlay (LSIO) Decision guidelines: | | | | | | | |
| The local floodplain development plan or flood risk report | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Any comments of the relevant floodplain management authority | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| The existing use and development of the land | ✓ | ✓ | ✓ | | | | |
| Whether the proposed use or development could be located on flood-free land or land with a lesser flood hazard outside this overlay | ✓ | ✓ | ✓ | | | | |
| The susceptibility of the development to flooding and flood damage | ✓ | ✓ | ✓ | | | | |
| The potential flood risk to life, health and safety associated with the development. Flood risk factors to consider include: | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <ul style="list-style-type: none"> The frequency, duration, extent, depth and velocity of flooding of the site and accessway | ✓ | ✓ | ✓ | | | | |
| <ul style="list-style-type: none"> The flood warning time available | ✓ | ✓ | ✓ | | | | |
| <ul style="list-style-type: none"> The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded | ✓ | ✓ | | | | | |

Decision Guidelines *continued...*

| | Flood safety | | Flood damage | Flood impacts | | Waterway and floodplain protection | |
|---|--------------|-------------|--------------|---------------|---------------|------------------------------------|---------------|
| | Site safety | Site access | | Flood flow | Flood storage | Waterway condition | Water quality |
| <ul style="list-style-type: none"> The effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities | | | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> The effect of the development on river health values including wetlands, natural habitat, stream stability, erosion, environmental flows, water quality and sites of scientific significance | | | | | | ✓ | ✓ |
| <p>Practice Note 11 A council or floodplain management authority should consider the following decision guidelines when deciding or commenting on an application</p> | | | | | | | |
| <ul style="list-style-type: none"> A development must be consistent with: <ul style="list-style-type: none"> the SPPF (Clause 13.02) any flood-related statements made in the MSS (Clause 21) and local planning policies (Clause 22) of the planning scheme any flood-related guidelines incorporated in the planning scheme any regional catchment strategy or floodplain management strategy adopted by the CMA any local floodplain development plan adopted by a council any other development guidelines agreed to by the council and the floodplain management authority the potential impact of an extreme event larger than the 100-year ARI flood on life, health, safety and damage | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <ul style="list-style-type: none"> Emergency facilities should be located above the 100-year ARI flood level, and preferably above the PMF level | ✓ | ✓ | | | | | |
| <ul style="list-style-type: none"> The possibility of relocating that development to land which is flood-free or which has a lesser risk | ✓ | ✓ | ✓ | | | | |
| <ul style="list-style-type: none"> Residential, commercial and industrial buildings are not generally an appropriate development on floodway land in view of their potential for flood hazard and for obstruction of flood flows | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <ul style="list-style-type: none"> Significant earthworks, such as levee banks, channel banks and raised roads are not appropriate on floodway land in view of their potential for obstruction of flood flows | | | | ✓ | ✓ | | |

Decision Guidelines *continued...*

| | Flood safety | | Flood damage | Flood impacts | | Waterway and floodplain protection | |
|---|--------------|-------------|--------------|---------------|---------------|------------------------------------|---------------|
| | Site safety | Site access | | Flood flow | Flood storage | Waterway condition | Water quality |
| <ul style="list-style-type: none"> The incremental long-term effects of developments. While a single development may not cause a significant change, the cumulative effect of several similar developments may be substantial | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| <ul style="list-style-type: none"> The design of buildings should adopt flood-proofing measures that minimise the physical effects of flooding on the building structure and its contents | | | ✓ | | | | |
| <ul style="list-style-type: none"> Activities that generate or store significant quantities of nutrients or noxious or hazardous materials should not be located on land subject to inundation; for example, sewage treatment and pumping plants, intensive animal industries, sanitary landfill depots and food-processing plants | | | | | | ✓ | ✓ |
| <ul style="list-style-type: none"> A development should be refused if it is likely to cause an unacceptable increase in flood risk in the following situations: <ul style="list-style-type: none"> – it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site – it relies on low-level access to and from the site – it is likely to increase the burden on emergency services and the risk to emergency personnel – it is likely to increase the amount of flood damage to public or private assets – it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another – it is likely to obstruct flood flows or reduce natural flood storage. The capacity of land subject to inundation to convey and store floodwater must be maintained – it is likely to be detrimental to natural habitats, waterway stability, water quality or sites of significance – if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Glossary

1% AEP flood: a large flood having a 1% chance of occurring in any given year.

Accommodation: land used to accommodate persons, which includes dwellings, as per Clause 73.03 of the Victoria Planning Provisions.

Annual Exceedance Probability (AEP): The likelihood of occurrence of a flood of a given size or larger happening in any one year. AEP is usually expressed as a percentage, e.g. 1% AEP.

Average Recurrence Interval (ARI): A statistical estimate of the average number of years between the occurrences of a flood of a given size or larger. The ARI of a flood event gives no indication of when a flood of that size will occur next.

Building envelope: The area on a site where new buildings or extensions to existing buildings are proposed.

Catchment: The area of land draining to a site. It always relates to a specific location and includes the catchment of the main stream and tributary streams.

Coastal flooding: Flooding of low-lying areas by ocean waters caused by higher than normal sea level, due to tidal or storm-driven coastal events, including storm surges in lower coastal waterways.

Design flood: The flood selected for design and planning purposes that is used to define the flood zone. In Victoria, for most types of development, this is the 1% AEP flood (or 100-year ARI flood).

Development: The construction or exterior alteration or exterior decoration of a building; the demolition or removal of a building or works; the construction or carrying out of works; the subdivision or consolidation of land, including buildings or airspace; the placing or relocation of a building or works on land; and the construction or putting up for display of signs or hoardings (*Planning and Environment Act, 1987*).

Emergency services facilities: buildings expected to remain fully functional during floods up to the Probable Maximum Flood. They include ambulance stations, fire stations and police stations.

Flood: For these guidelines, the covering of normally dry land by water. The insurance industry considers flooding to be water that has escaped or been released from the normal confines of: (a) a lake, river, creek or other natural watercourse, whether or not altered or modified; or (b) any reservoir, canal, or dam.

Flood prone land: Land inundated by the 1% AEP flood from time to time.

Floodplain: Low-lying land adjoining a waterway (e.g. an open river creek or drainage path) that is covered by water when the river overflows during floods. The extent of the floodplain is defined as the area of land inundated during a Probable Maximum Flood.

Floodplain management authority: In Victoria, a Catchment Management Authority or Melbourne Water.

Flood-resistant materials: Materials used in building construction that are capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage.

Flow: The rate of flow of water measured in volume per unit time; for example, cubic metres per second (m³/s). Flow is different from the speed or velocity of flow, which is a measure of how fast the water is moving, for example metres per second (m/s).

Freeboard: The height above the design flood level. It is a factor of safety typically used in relation to the setting of floor levels, apex of underground carpark entrances and so on. Freeboard compensates for a range of factors, including wave action and localised flow effects. It can also compensate for uncertainties in the accuracy of the 1% AEP flood level estimate.

Greenfield development: For these guidelines, greenfield development refers to intensification of development of a completely different nature to that associated with the former land use. It can be for residential, industrial or commercial purposes.

Infill development: For these guidelines, refers to the development of a vacant block of land within an existing township boundary that are generally surrounded by other developed properties.

Inundation: The covering of land by water.

Nominal Flood Protection Level (NFPL): The applicable 1% AEP flood level plus the applicable freeboard.

Outbuilding: a building subordinate to but separate from a main building.

Overland flooding: Inundation by local runoff caused by heavier than usual rainfall. It can be the result of local runoff exceeding the capacity of an urban stormwater drainage system or water backing up urban stormwater drainage systems. In rural settings it can also be flow overland on the way to waterways.

Refuge area: A location where emergency relief and recovery services can be accessed.

Riparian zone: Land that adjoins a river, creek, estuary, lake or wetland.

Riverine flooding: The covering of normally dry land by water that has escaped or been released from: the normal confines of a lake, river, creek or other natural watercourse (whether or not altered or modified); or a reservoir, canal or dam.

Runoff: The amount of rainfall that is not intercepted, captured or absorbed into the ground during a storm and that subsequently runs along the ground surface. It is also known as rainfall excess.

Planning Policy Framework: The principles, policies and strategies for how land is to be used and developed in Victoria. It includes mandatory state-wide components. For example, the State planning policy for floodplain management is to protect life, property and community infrastructure, and to protect areas of environmental significance and river health. The policy requires land affected by a 1% AEP flood to be identified in Planning Scheme maps and for planning decisions to avoid intensifying the impacts of flooding through inappropriately located uses and developments.

Stormwater flooding: overland flooding associated with urban drainage systems.

Storm surge: A rise above the normal sea level along a shore resulting from strong onshore winds and or reduced atmospheric pressure. Storm surges can be formed by intense low-pressure systems.

Subdivision: the division of land into two or more parts which can be disposed of separately (*Subdivision Act 1988*). For these guidelines, subdivision also includes proposals to set aside building envelopes or fill pads.

Waterway: Rivers and streams, their associated estuaries and floodplains (including floodplain wetlands) and non-riverine wetlands.

Victoria Planning Provisions: A comprehensive set of standard planning provisions, including compulsory State policies and strategies, and zones and overlays used locally. They provide a standard format and consistent policies and controls for all Victorian planning schemes.

Works: Includes any change to the natural or existing condition or topography of land including the removal, destruction or lopping of trees and the removal of vegetation or topsoil.

References

Australian Disaster Resilience Handbook 7, 2017, *Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia*, 3rd edition, Australian Institute for Disaster Resilience, Commonwealth of Australia.

Australian Disaster Resilience Guideline 7-3, 2017, *Flood Hazard*, Australian Institute for Disaster Resilience, Commonwealth of Australia.

West Gippsland Catchment Management Authority, 2012, *West Gippsland Regional Catchment Strategy 2013-2019*.

West Gippsland Catchment Management Authority, 2013, *Flood Guidelines – Guidelines for development in flood prone areas*.

West Gippsland Catchment Management Authority, 2013, *West Gippsland Waterway Strategy 2014-2022*.

West Gippsland Catchment Management Authority 2017, *West Gippsland Floodplain Management Strategy 2018-2027*.

Department of Environment, Land, Water and Planning, *Victoria planning provisions*, Victorian Government <http://planning-schemes.delwp.vic.gov.au/schemes/vpps>

Department of Environment, Land, Water and Planning, 2015, *Planning practice note 11: Applying for a planning permit under the flood provisions*, Victorian Government. <https://www.planning.vic.gov.au/resource-library/planning-practice-notes>

Department of Environment, Land, Water and Planning, 2015, *Planning practice note 12: Applying the flood provisions in planning schemes*, Victorian Government <https://www.planning.vic.gov.au/resource-library/planning-practice-notes>

Department of Environment, Land, Water and Planning, 2016, *Victorian Floodplain Management Strategy*, Victorian Government.

Department of Environment, Land, Water and Planning, 2019, *Guidelines for Development in Flood Affected Areas*, Victorian Government.

Department of Sustainability and Environment, 2012, *Guidelines for coastal catchment management authorities, assessing development in relation to sea level rise*, Victorian Government.

Legislation and regulations

State of Victoria 1987, Planning and Environment Act, <http://www.legislation.vic.gov.au>

State of Victoria 1988, Subdivision Act, <http://www.legislation.vic.gov.au>

State of Victoria 1989, Water Act, <http://www.legislation.vic.gov.au>

State of Victoria 1993, Building Act, <http://www.legislation.vic.gov.au>

State of Victoria 2015, Planning and Environment Regulations, <http://www.legislation.vic.gov.au>

State of Victoria 2017, Climate Change Act, <http://www.legislation.vic.gov.au>

State of Victoria 2018, Building Regulations, <http://www.legislation.vic.gov.au>

State of Victoria 2018, Marine and Coastal Act, <http://www.legislation.vic.gov.au>



Traralgon Office
16 Hotham Street
Traralgon VIC 3844

Telephone 1300 094 262
Facsimile 03 5175 7899

Leongatha Office
Corner Young & Bair Streets
Leongatha VIC 3953

Telephone 1300 094 262
Facsimile 03 5662 5569

Correspondence
PO Box 1374, Traralgon 3844

Email
westgippy@wgma.vic.gov.au

Website
www.wgma.vic.gov.au