Wimmera CMA Cut and Fill Guidelines

Report prepared by:
Wimmera Catchment Management Authority
24 Darlot Street
Horsham, VIC 3400

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Wimmera CMA

www.wcma.vic.gov.au

24 Darlot Street
Horsham 3400
PO Box 479, Horsham 3402
Telephone 03 5382 1544

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Floodplain management responsibilities

The Wimmera CMA is the Floodplain Management Authority for the region (Figure 1). Wimmera CMA plays a role in reducing flood risk by using the combination of planning controls, flood mitigation works and maintenance measures, managing flood-warning systems, and predicting flood severity following heavy rainfall. It is also responsible for advising local Government on the appropriateness of development on flood-prone land. Local Government is the Responsible Authority for land use and development.

Figure 1. Wimmera Catchment

Purpose of these guidelines

Wimmera CMA has compiled these guidelines to minimise flood risks associated with development on flood-prone land.

Development and/or fill on the floodplain can affect flow conveyance and flood storage. This can change flood behaviour by causing flood height and velocity to increase, and may divert floodwater onto other land. Careful consideration to the location of buildings and the placement of fill can reduce these impacts.

There should be no detrimental impacts to nearby properties, particularly properties downstream from the introduction of fill.

Definitions

Fill can include, but not limited to, soil, earthworks, concrete slabs, stumps, retaining walls.

Flood storage is an area of the floodplain or drainage area important for the temporary storage of floodwater that is later discharged as the flood recedes.

Regulations

Victorian and Local Government authorities control the use and development of all land under the *Planning and Environment Act 1987*.

Local Government regulates development in flood-prone areas via the planning-permit system. Local Governments make decisions to grant planning permits according to the land use and development policies and objectives of a municipal planning scheme.

Local Government devises and administers planning schemes, which are the key tools used at the municipal level to control land use and development.

Zones and Overlays

Planning schemes identify land-use zones, which control land use across a municipality. Planning schemes also regulate the types of development that can and can't be permitted within each zone. This is done with planning scheme overlays which establish additional objectives for development of land, beyond the type of land use prescribed by the zone.

Minimisation of flood risk to life and property, maintenance of the character of heritage areas or protection of significant environmental values are examples of additional objectives. Zones and overlays within local government planning schemes are key tools for floodplain management and the control of development in flood-prone areas.

The zones and overlays most relevant to development of flood-prone land are:

Land Subject to Inundation Overlay (LSIO)

The land subject to inundation overlay identifies land prone to relatively low-hazard flooding during floods ranging up to and including the 1% Annual Exceedance Probability (AEP) flood.

A 1% AEP flood refers to the size of a flood that has a 1% chance of occurring in any year. Floodwater is expected to be relatively shallow and slow moving according to the best

available information. Development of land covered by this overlay can be permitted provided development proposals respond appropriately to the degree of flood risk.

Floodway Overlay or Rural Floodway Overlay (FO)

The floodway overlay identifies land prone to relatively high-hazard flooding during floods ranging up to, and including, the 1% AEP flood.

This land is likely to be flooded by relatively deep and fast-moving water that poses a significant hazard to people according to the best available information. The FO commonly applies to the main flow path areas of the floodplain where development should be avoided (if possible) to avoid future flood damage costs. Development can be permitted in some circumstances, provided development proposals respond appropriately to the degree of flood risk.

Special Building Overlay (SBO)

The Special Building Overlay identifies land in urban areas prone to flooding when the water-flow capacity of urban drainage infrastructure is exceeded. Development can be permitted in some circumstances, provided development proposals respond appropriately to the degree of flood risk.

Cut and Fill condition

The *Guidelines for Development in Flood Affected Areas (DELWP 2019)* outline four key objectives against which development proposals are assessed. Objective Three's guiding principle is;

'The natural function of floodplains and overland flow paths to convey and store floodwater must not be compromised.'

Wimmera CMA applies the following condition to help achieve objective three;

1. *'Any earthworks or construction must not reduce the available flood storage on the site. If fill is proposed, a cut and fill balance ratio of 1:1 must be achieved on the site. Any proposed cut areas must be self-draining. If construction reduces flood storage soil will need to be removed from the site equal to the volume lost. Before the commencement of works, volume calculations must be submitted to Wimmera CMA demonstrating how this condition will be achieved.'*

If the above condition is attached to a response you have received from Wimmera CMA, please use these guidelines to help develop a cut and fill plan.

Guiding principles for approval

Wimmera CMA will need to be satisfied that the following guiding principles are adhered to when developing the cut and fill plan;

- There is no reduction in flood storage. A net gain in flood storage is acceptable and encouraged.
- Flood levels or flow velocities do not increase.

- 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 excavated area must be self-draining.

If the amount of fill is substantial, the developer may be required to provide expert advice via a completed hydraulic report demonstrating that the proposed development will not have any adverse impacts on the floodplain and neighbouring properties.

Cut and Fill Plan

The following elements must be included in the cut and fill plan submitted to Wimmera CMA to demonstrate that the cut and fill condition has been met.

1. A 1:1 cut/fill calculation must be included in the submitted plan.
2. The area of the proposed fill must be outlined/shaded in a map/aerial image.
3. The area of the proposed cut must be outlined/shaded in a map/aerial image.

Submit the cut and fill plan via email to planning@wcma.vic.gov.au. Wimmera CMA will then assess the submitted plan accordingly. If the plan is approved, Wimmera CMA will stamp the plan. If not, Wimmera CMA will contact the applicant directly to discuss the plan.

A building designer or architect may be able to complete a simplistic cut and fill plan or you may need to engage a consultant with experience in floodplain management. If you are unsure, contact the Wimmera CMA or your local Council.

Calculation

The cut and fill ratio of 1:1 is to demonstrate that flood storage is not reduced by the proposed development.

Cut: Volume of earthworks and/or development removed within the flood extent.

Fill: Volume of earthworks and/or development added within the flood extent.

STEPS:

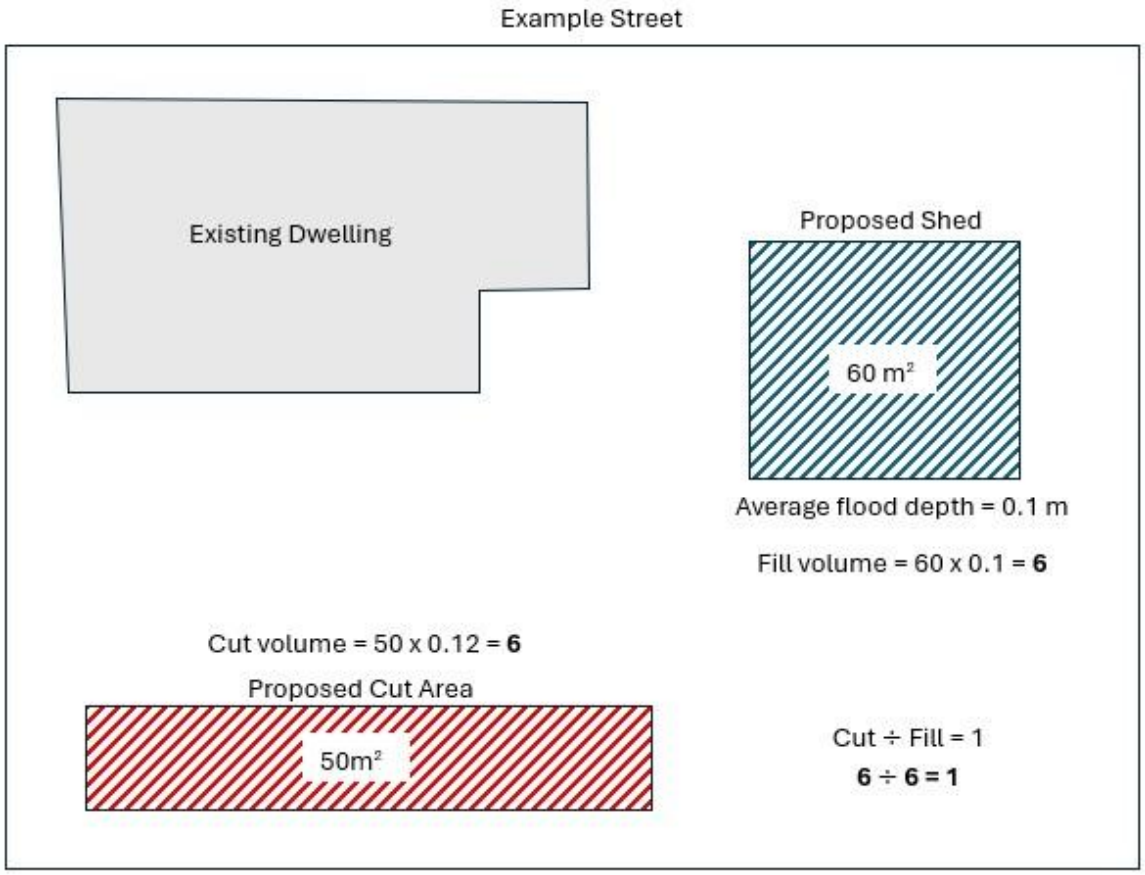
1. **Calculate the volume of flood storage the development is proposed to fill.**
   Fill Volume (m^3) = area of the fill (m^2) x average depth of flood water within the fill area (m)

2. **Calculate the volume of flood storage the development is proposed to cut.**
   Cut Volume (m^3) = area of the cut (m^2) x average depth of the cut site (m)

   How do I know what the average depth of the cut site should be (at a minimum)?
   Average depth to remove (m) = Fill Volume (m^3) ÷ Area of cut site (m^2)

Cut and Fill Plan examples

Example 1



Volume = Area x Depth

Fill Volume m^3 (proposed shed) = 60 m^2 x 0.1 m = 6 m^3

Cut Volume m^3 = 50 m^2 x 0.12 m = 6 m^3

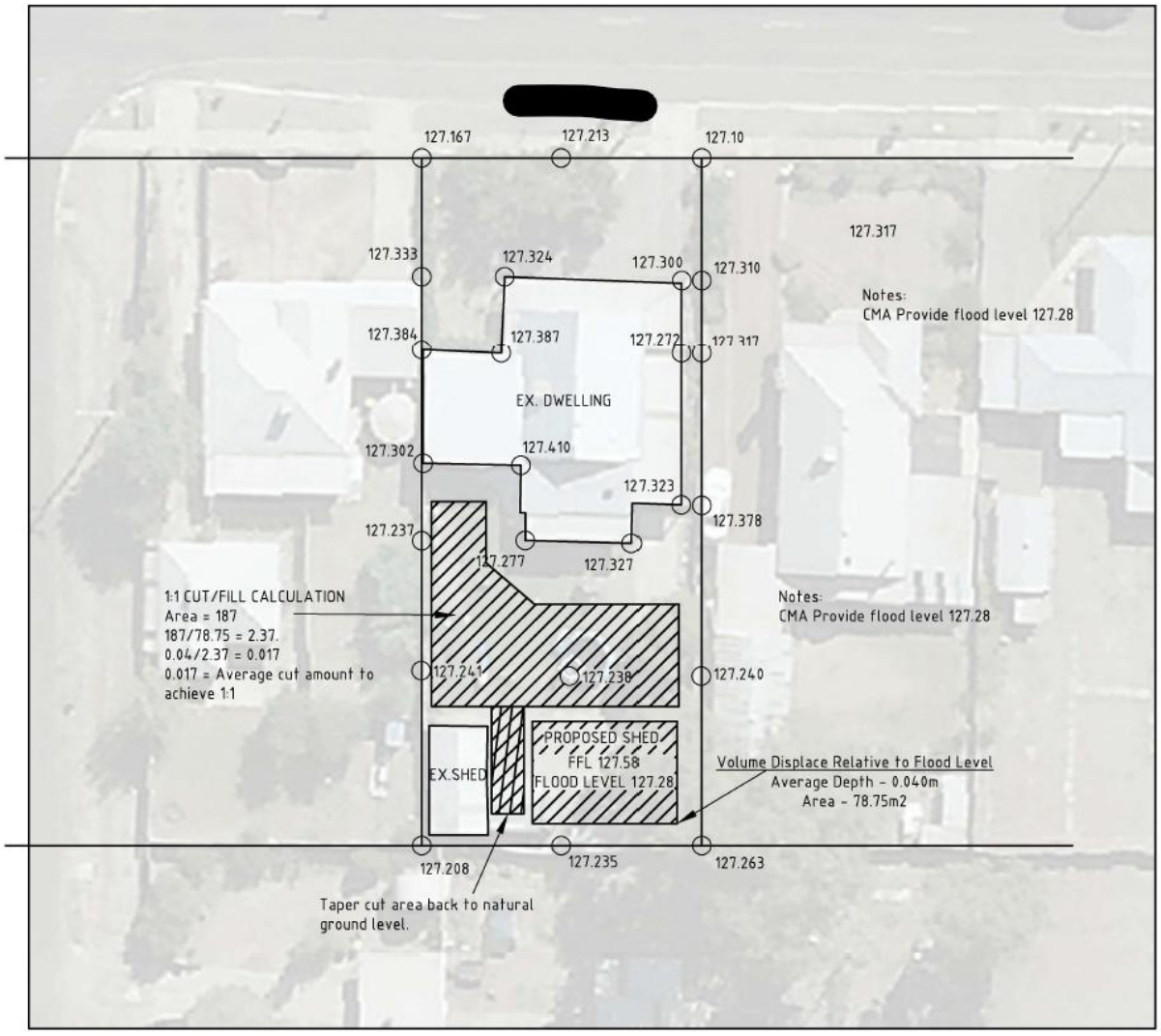
6 m^3 / 6 m^3 = 1:1 cut/fill ratio achieved

How do I know what the average depth of the cut site should be (at a minimum)?

Average depth to remove (m) = Fill Volume (m^3) ÷ Area of cut site (m^2)

Average depth to remove (m) = 6 m^3 ÷ 50 m^2 = 0.12 m

Example 2



<u>Volume = Area x Depth</u>

Fill Volume m^3 (proposed shed) = 78.75 m^2 x 0.040 m = 3.15 m^3

Cut Volume m^3 = 187 m^2 x 0.017 m = 3.18 m^3

Therefore, **3.18m^3 - 3.15 m^3 = net flood storage gain of 0.03 m^3**

How do I know what the average depth of the cut site should be (at a minimum)?

Average depth to remove (m) = Fill Volume (m^3) ÷ Area of cut site (m^2)

Average depth to remove (m) = 3.15 m^3 ÷ 187 m^2 = 0.017 m