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2.22 Flood Management

A flood is an overflow or accumulation of an expanse of water that submerges land. In the sense of flowing water, the word may also be applied to the inflow of the tide. Floods are a natural and inevitable event that communities must learn to live with while minimising risks to public health and safety, property and infrastructure.

This section recognises that there are some flooding risks that require development controls and guidelines in order to reduce or eliminate their impacts.

2.22.1 Objectives

- **O1** To maintain the existing flood regime and flow conveyance capacity.
- **O2** To enable the safe occupation of, and evacuation from, land to which flood management controls apply.
- **O3** To avoid significant adverse impacts upon flood behaviour.
- **O4** To avoid significant adverse effects on the environment that would cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of the river bank/watercourse.
- **O5** To limit uses to those compatible with flow conveyance function and flood hazard.

2.22.2 Land affected

This section complements Clause 6.3 (Flood planning) of Marrickville Local Environmental Plan 2011 (MLEP 2011). It applies to land identified on the DCP 2011 Flood Planning Area Map in Appendix 1 and land identified as being flood liable land on the DCP 2011 Flood Liable Land Map in Appendix 2.

For the purposes of this Section of the DCP:

- Flood planning levels (FPLs) are the combinations of flood levels (derived from significant historical flood events or floods of specific annual exceedance probability (AEP) and freeboards selected for floodplain risk management purposes.

  The Standard Flood adopted by Council is the 1% AEP or the 1 in 100 year flood. The Standard Flood has been used to derive the Flood Planning Levels.

The land identified on the DCP 2011 Flood Liable Land Map and on the DCP 2011 Flood Planning Area Map is based on information available to Council when the Plans were prepared. As new information becomes available, the DCP 2011 Flood Planning Area Map and the DCP 2011 Flood Liable Land Map may change.

2.22.2.1 Flood planning level (Cooks River)

The Flood Planning Area (Cooks River) identifies land likely to be affected by the 100-year flood, factoring in a rise in sea level of 400mm to the year 2050, (plus 500mm freeboard) of the Cooks River.
2.22.2.2 Flood planning level (Overland Flow)
The Flood Planning Area (Overland Flow) identifies land (in accordance with Council’s Flood Tagging Policy) likely to be affected by the 100-year flood associated with various locations affected by local overland flooding.

2.22.2.3 Flood liable land
Land identified on the DCP 2011 Flood Liable Map as flood liable land identifies land within a flood planning area, and land likely to be affected by the probable maximum flood (PMF) of the Cooks River. This means that the map identifies some land as being within the Cooks River PMF area, but not within the Cooks River 100-year flood (plus 500mm freeboard) area.

NB The 100-year flood is a flood that has a one per cent probability of occurring or being exceeded in any year. The probable maximum flood (PMF) is calculated to be the maximum flood likely to occur. Freeboard refers to a factor of safety and is expressed as a height above the flood level. Freeboard tends to compensate for factors such as wave action and localised hydraulic effects.

2.22.3 Development affected
Flood management controls apply as follows:
- For land in a flood planning area, the controls apply to all development that requires development consent.
- For land that is flood liable land, but that is not in a flood planning area (land within the Cooks River PMF), the controls also apply to caravan parks, child care centres, correctional centres, emergency services facilities, hospitals, residential accommodation (except for attached dwellings, dwelling houses, secondary dwellings and semi-detached dwellings), and tourist and visitor accommodation.

2.22.4 Cooks River flood classification areas
Flood classifications have been applied to parts of the Flood Planning Area (Cooks River). The flood classifications are:
- Low hazard: Should it be necessary, people and their possessions could be evacuated by truck. Able bodied adults would have little difficulty wading out of the area.
- High hazard: Possible danger to life, evacuation by truck difficult, potential for structural damage, and social disruption and financial losses could be high.

The identified areas, and their flood classifications, are:
1. Riverside Crescent/Tennyson Street area (Marrickville and Dulwich Hill): Low hazard to high hazard.
2. Illawarra Road/Wharf Street area (Marrickville): Low hazard to high hazard.
3. Carrington Road area (Marrickville): Low hazard.
4. Bay Street area (Tempe): Low hazard to high hazard.
2.22.5 Controls

General

C1 For proposed development, consideration must be given to such matters as the likely depth and nature of possible floodwaters, flood classification of the area (where applicable) and the risk posed to the development by floodwaters.

C2 The applicant must demonstrate:
   i. That the development will not increase the flood hazard or risk to other properties and that details have been provided of the structural adequacy of any buildings works associated with the development with regard to the effects of possible floodwaters;
   ii. That the proposed building materials are suitable;
   iii. That the development is sited in the optimum position to avoid floodwaters and allow evacuation; and
   iv. That all electrical services associated with the development are adequately flood proofed.

C3 All applications for development must be accompanied by a survey plan including relevant levels to AHD (Australian Height Datum). Consideration must be given to whether structures or filling are likely to affect flood behaviour and whether consultation with other authorities is necessary.

C4 Compliance with flood management controls must be balanced by the need to comply with other controls in this DCP.

Controls for new residential development

C5 Floor levels (Flood Planning Levels) of habitable rooms must be a minimum of 500mm above the standard flood level at that location. For areas of minor overland flow (a depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.

C6 Any portion of buildings below the Flood Planning Level must be constructed from flood compatible materials (See Schedule 1).

C7 Flood free access must be provided where practicable.

Controls for residential development – minor additions

C8 Once-only additions with a habitable floor area of up to 30m² may be approved with floor levels below the Flood Planning Level at that location if the applicant can demonstrate that no practical alternatives exist for constructing the extension above the standard flood level.

C9 Additions greater than 30m² will be considered against the requirements for new residential development (refer C5, C6, and C7).

C10 Any portion of buildings below the Flood Planning Level must be constructed from flood compatible materials.

Controls for non-habitable additions or alterations

C11 All flood sensitive equipment must be located above the Flood Planning Level at that location.

C12 Any portion of buildings below the Flood Planning Level must be built from flood compatible materials.
Controls for new non-residential development

C13  Floor levels (except for access-ways) must be at least 500mm above the standard flood level, or the buildings must be flood-proofed to at least 500mm above the standard flood level. For areas of minor overland flow (a depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.

C14  Flood-free access must be provided where practicable.

Controls for non-residential development – additions

C15  Where the proposed development is for an addition to an existing building within the Flood Planning Area, the development may be approved with floor levels below the Flood Planning Level if the applicant can demonstrate that all practical measures will be taken to prevent or minimise the impact of flooding. In determining the required floor level, matters which will be considered include:
   i.  The nature of the proposed landuse;
   ii.  The frequency and depth of possible flooding;
   iii.  The potential for life and property loss;
   iv.  The suitability of the building for its proposed use; and
   v.  Whether the filling of the site or raising of the floor levels would render the development of the site impractical or uneconomical.

C16  Any portion of the proposed addition below the Flood Planning Level must be built from flood compatible materials.

Controls for change of use of existing buildings

C17  Development consent for change of use of an existing building with floor levels below the Flood Planning Level will only be given where there is no foreseeable risk of pollution associated with the proposed use of the building in the event that the standard flood occurs.

C18  In determining whether to grant development consent for change of use of an existing building with floor levels below the standard flood level, consideration will be given to whether the proposed development would result in increased flood risk for the property on which the building is located, or other land. In this regard, the following matters will be considered:
   i.  The nature of the proposed use and the manner in which it is proposed to be carried out within the building or on the land; and
   ii.  The foreseeable risk of pollution associated with the proposed use of the building/land in the event that the standard flood occurs.

Controls for subdivision

C19  Development consent for the subdivision of flood liable land may depend on whether the land to which the proposed development relates is unsuitable for any development made likely by the subdivision, by reason of the land likely to be subject to flooding.

C20  Development consent for the subdivision of flood liable land may depend on whether the carrying out of the subdivision and any associated site works would:
   i.  Adversely impede the flow of flood water on the land or land in its vicinity;
ii. Imperil the safety of persons on that land or land in its vicinity in the event of the land being inundated with flood water; and

iii. Aggravate the consequences of flood water flowing on that land or land in its immediate vicinity with regard to erosion or siltation.

**Controls for filling of land within the Flood Planning Area**

**C21** Development consent will not be granted to filling of flood ways or high flood hazard areas. Consideration will only be given to granting development consent to the filling of other flood liable land where:

i. Flood levels are not increased by more than 100mm by the proposed filling.

ii. Downstream velocities are not increased by more than 10% by the proposed filling.

iii. Proposed filling does not redistribute flows by more than 15%.

iv. The potential for cumulative effects of possible filling proposals in that area is minimal.

v. The development potential of surrounding properties is not adversely affected by the filling proposal.

vi. The flood liability of buildings on surrounding properties is not increased.

vii. The filling creates no local drainage flow/runoff problems.

**NB** The above criteria can only be addressed by the submission of a detailed flood study prepared by an appropriately qualified professional. Such a flood study should include hydrologic (relating to rainfall and runoff) and hydraulic (relating to water flow in water courses) analysis of the floodplain and the effects of the proposed filling on flood levels. The report should address the seven matters listed in C21. Data to be collected for the flood study should include survey cross-sections of the river system (where applicable) to provide representative topographic information. The flood study should be calibrated against recorded flood data, inconsistent data should be identified, and discrepancies should be explained.

**Controls for land uses on flood liable land indentified on the DCP 2011 Flood Liable Land Map**

**C22** A site emergency response flood plan must be prepared in case of a PMF flood.

**C23** Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the State Emergency Service (SES) or other authorised emergency services personnel.

**C24** Reliable access for pedestrians or vehicles must be provided from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF.

**Controls for underground garages**

**C25** Freeboard protection of 500mm must be provided above the standard flood within the internal driveway prior to descending into the underground garage.

**C26** Suitable pumps must be provided within the garage to allow for the drainage of stormwater should the underground garage become inundated during flooding.
C27 Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the SES or other authorised emergency services personnel.

C28 Reliable access for pedestrians or vehicles must be provided from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF.

### 2.22.6 SCHEDULE 1 – Flood compatible materials

<table>
<thead>
<tr>
<th>Building component</th>
<th>Flood compatible material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooring and sub-floor</td>
<td>• concrete slab-on-ground monolith</td>
</tr>
<tr>
<td></td>
<td>• suspended reinforced concrete slab</td>
</tr>
<tr>
<td>Floor covering</td>
<td>• clay tiles</td>
</tr>
<tr>
<td></td>
<td>• concrete, precast or in situ</td>
</tr>
<tr>
<td></td>
<td>• concrete tiles</td>
</tr>
<tr>
<td></td>
<td>• epoxy, formed-in-place</td>
</tr>
<tr>
<td></td>
<td>• mastic flooring, formed-in-place</td>
</tr>
<tr>
<td></td>
<td>• rubber sheets or tiles with chemicals-set-adhesive</td>
</tr>
<tr>
<td></td>
<td>• silicone floors formed-in-place</td>
</tr>
<tr>
<td></td>
<td>• vinyl sheets or tiles with chemical-set adhesive</td>
</tr>
<tr>
<td></td>
<td>• ceramic tiles, fixed with mortar or chemical-set adhesive</td>
</tr>
<tr>
<td></td>
<td>• asphalt tiles, fixed with water resistant adhesive</td>
</tr>
<tr>
<td>Wall structure</td>
<td>• solid brickwork, blockwork, reinforced, concrete or mass concrete</td>
</tr>
<tr>
<td>Roofing structure</td>
<td>(for situations where the relevant flood level is above the ceiling)</td>
</tr>
<tr>
<td></td>
<td>• reinforced concrete construction</td>
</tr>
<tr>
<td></td>
<td>• galvanised metal construction</td>
</tr>
<tr>
<td>Doors</td>
<td>• solid panel with water proof adhesives</td>
</tr>
<tr>
<td></td>
<td>• flush door with marine ply filled with closed cell foam</td>
</tr>
<tr>
<td></td>
<td>• painted metal construction</td>
</tr>
<tr>
<td></td>
<td>• aluminium or galvanised steel frame</td>
</tr>
<tr>
<td>Wall and ceiling linings</td>
<td>• fibro-cement board</td>
</tr>
<tr>
<td></td>
<td>• brick, face or glazed</td>
</tr>
<tr>
<td></td>
<td>• clay tile glazed in waterproof mortar</td>
</tr>
<tr>
<td></td>
<td>• concrete</td>
</tr>
<tr>
<td></td>
<td>• concrete block</td>
</tr>
<tr>
<td></td>
<td>• steel with waterproof applications</td>
</tr>
<tr>
<td></td>
<td>• stone, natural solid or veneer, waterproof grout</td>
</tr>
<tr>
<td></td>
<td>• glass blocks</td>
</tr>
<tr>
<td></td>
<td>• glass</td>
</tr>
<tr>
<td></td>
<td>• plastic sheeting or wall with waterproof adhesive</td>
</tr>
<tr>
<td>Insulation windows</td>
<td>• foam (closed cell types)</td>
</tr>
<tr>
<td></td>
<td>• aluminium frame with stainless steel rollers or similar corrosion and water resistant material</td>
</tr>
<tr>
<td>Nails, bolts, hinges and fittings</td>
<td>• brass, nylon or stainless steel</td>
</tr>
<tr>
<td></td>
<td>• removable pin hinges</td>
</tr>
<tr>
<td></td>
<td>• hot dipped galvanised steel wire nails or similar</td>
</tr>
</tbody>
</table>
## SCHEDULE 1: Flood compatible materials (cont.)

<table>
<thead>
<tr>
<th>Electrical and mechanical equipment</th>
<th>Heating and air conditioning systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>For development constructed on land to which this section of the DCP applies, the electrical and mechanical materials, equipment and installation must conform to the following requirements:</td>
<td>Where viable, heating and air conditioning systems should be installed in areas and spaces of the development above maximum flood level. When this is not feasible, every precaution must be taken to minimise the damage caused by submersion according to the following guidelines:</td>
</tr>
<tr>
<td><strong>Main power supply</strong></td>
<td><strong>Fuel</strong></td>
</tr>
<tr>
<td>Subject to the approval of the relevant authority the incoming main commercial power service equipment, including all metering equipment, must be located above the relevant flood level. Means must be available to easily disconnect the dwelling from the main power supply.</td>
<td>Heating systems using gas or oil as fuel must have a manually operated valve located in the fuel supply line to enable fuel cut-off.</td>
</tr>
<tr>
<td><strong>Wiring</strong></td>
<td><strong>Installation</strong></td>
</tr>
<tr>
<td>All wiring, power outlets, switches, must be to the maximum extent possible, located above the maximum flood level. All electrical wiring installed below this level must be suitable for continuous underwater immersion and must contain no fibrous components. Each leakage circuit-breaker (core balance relays) must be installed. Only submersible type splices must be used below maximum flood level. All conduits located below the relevant designated flood level must be so installed that they will be self-draining if subjected to flooding.</td>
<td>Heating equipment and fuel storage tanks must be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. All storage tanks must be vented to an elevation of 600mm above the relevant flood level.</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td><strong>Ducting</strong></td>
</tr>
<tr>
<td>All equipment installed below or partially below the relevant flood level must be capable of disconnection by a single plug and socket assembly.</td>
<td>All ductwork located below the relevant flood level must be provided with openings for drainage and cleaning. Self-draining may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, a closure assembly operated from above relevant flood level must protect the ductwork.</td>
</tr>
<tr>
<td><strong>Reconnection</strong></td>
<td></td>
</tr>
<tr>
<td>Should any electrical device and/or part of the wiring be flooded it must be thoroughly cleaned or replaced and checked by an approved electrical contractor before reconnection.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 1 - DCP 2011 Flood Planning Area Map

See the attached map.
Appendix 2 - DCP 2011 Flood Liable Land Map

See the attached map.