

targets may be difficult where regional schemes are not available and therefore Clause 3.4.3 (a) (iv) will apply. If preliminary modelling and calculations indicate these targets to be unachievable then consultation with Council's Development Assessment Staff is required to discuss the development's opportunities and possible stormwater management options.

- b Within catchments draining directly to Tuggerah Lakes, a 7-day flooding hydrology target is required. This is deemed to be satisfied through the implementation of stormwater harvesting at local scale i.e. rainwater tanks and at least one indoor re-use. These areas are illustrated in Figure 5 in WSUD Technical Guideline No 1.
- c Some of the wetland areas identified in Figure 2 are also listed for protection under SEPP-14 and thus additional requirements and legislation is to be considered. Refer to WSUD Technical Guideline No1 - Figure 3 for information on SEPP-14 wetlands in Wyong Shire.

The key hydrologic characteristics of natural wetlands and flooding and drying patterns are further explained in WSUD Technical Guideline No 1.

#### **3.4.4 APPLICATION OF THE WETLAND HYDROLOGY OBJECTIVES**

- a Collection and reuse of stormwater is a key means by which to preserve the 30-day and 7-day low flow duration frequency curve and low flow spells frequency curve. This can be implemented at a regional and/or local scale.
- b Meeting the hydrology objectives generally requires the provision of "active" stormwater storages, which are pumped out after each rain event, to maximise the volume available at the start of the next event. The stormwater captured in the active storages may be transferred to reuse applications within a development; however excess stormwater may also need to be exported from the site or catchment. If a regional scheme's design parameters are adopted i.e. a specified stormwater storage and pump rate, then additional modelling and comparison of pre and post development condition is not required.
- c If the development falls outside an existing IWCM Strategy Area and the standard stormwater storage design curves are not adopted (see WSUD Technical Guideline No 4 - Section 3.0), or specific re-use or certain WSUD elements are proposed then modelling and analysis of pre and post development conditions is required. This entails preparation of duration frequency curves for wetland drying hydrology (dry season flows & low flow spells) and flooding hydrology (high flow duration).
- d The objectives for salt marshes are likely to be reliably met by diverting excess stormwater flows around these sensitive ecosystems. This will occur if runoff from the catchment is collected by the stormwater drainage network and piped past the salt marsh, or directed to a channel that bypasses the salt marsh. This may often be the case in areas of existing development, where stormwater has been piped to the lake edge. However even when salt marshes are bypassed, the hydrology objective for estuarine lakes (i.e. preservation of the pre-development 7 day high flow duration frequency curve) still needs to be met. Residential development with rainwater tanks connected to indoor use is deemed to satisfy this requirement. This is implemented through the Deemed to Comply Provisions (see WSUD Technical Guideline No 6).
- e The configuration and sizing of appropriate WSUD measures to meet the hydrologic objectives should be outlined within the Stormwater Management Plan and submitted with any application incorporating modelling, assumptions and results.

Further explanation of hydrology patterns and modelling requirements are presented in WSUD Technical Guideline No 1. Stormwater storage modelling methodology used to satisfy the hydrology objectives is documented in WSUD Technical Guideline No 4.

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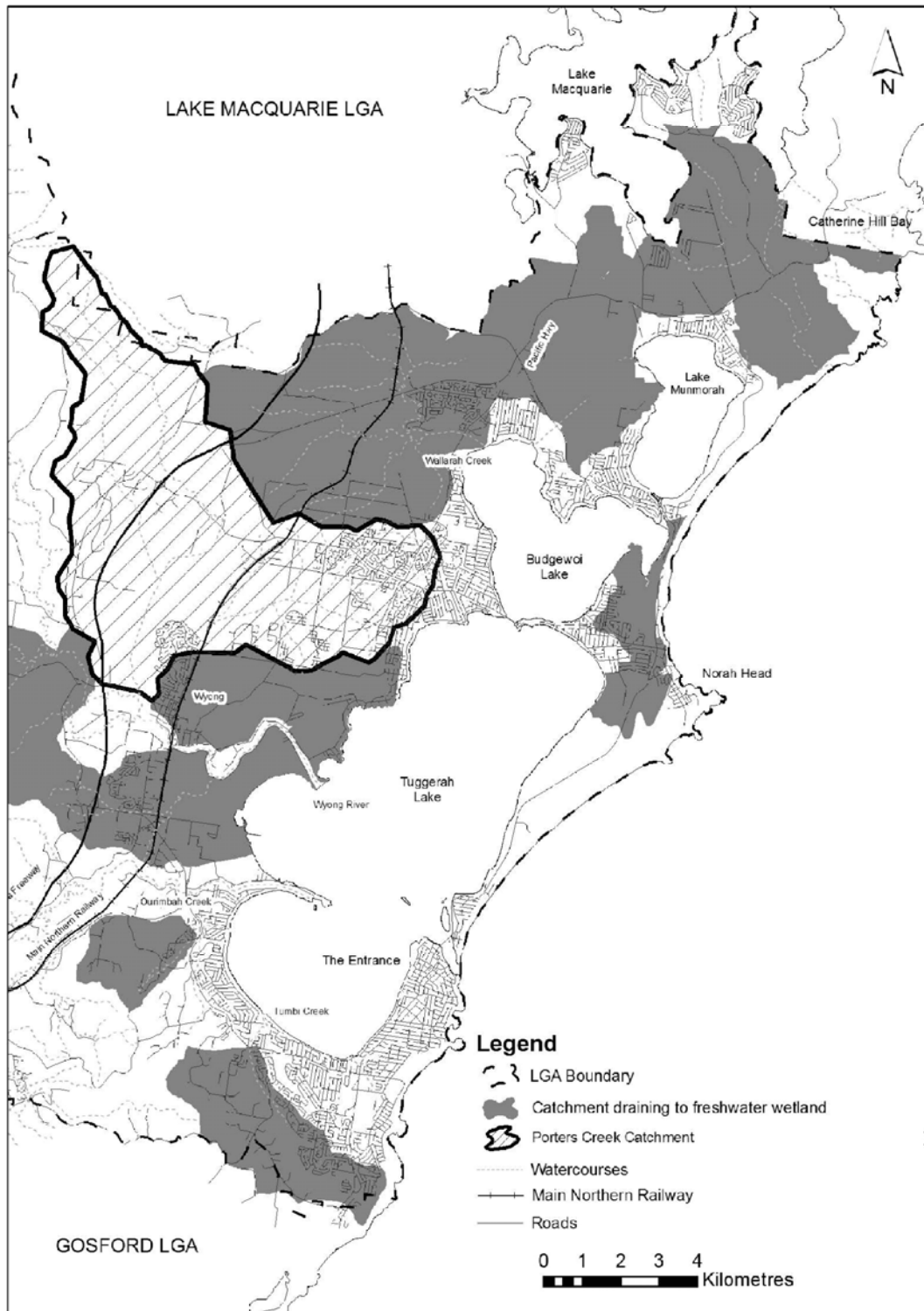


Figure 2: Freshwater wetland catchments in Wyong Shire

## 3.5 Waterway Stability

Waterway stability objectives have been identified to mitigate the impact of urban development on creeks, streams, waterways and natural channels. Wyong Shire's unique landscape also exhibits undefined drainage channels containing sensitive swamp forest which is sensitive to changes in stormwater flows.

Urban development increases the frequency, duration and volume of stormwater runoff, due to the increase in impervious areas within the catchment. A consequence is the potential for increased erosion and wetness of natural waterways and degradation of stream bank vegetation.

### 3.5.1 OBJECTIVE

- a Manage urban stormwater runoff in order to mitigate stormwater impacts on downstream receiving environments and waterways.
- b Limit changes in flow rate, flow duration and flow volume within the receiving waterway as a result of development in order to minimise bed and bank erosion and to preserve riparian vegetation

### 3.5.2 PERFORMANCE TARGETS

- a There are three waterway stability targets which have been identified and described below. Table 2 indicates the location of their application. All developments required to meet the waterway stability objectives need to satisfy Performance Target 1, while the two other targets will need to be satisfied based on the location of a development in a catchment and its proximity to certain types of waterways.

**Table 2: Application of the Waterway Stability Targets**

Performance Targets	Location of Development's Discharge Point is upstream of the following		
	All Receiving Environments	All Creeks and defined waterways	Undefined drainage depressions containing swamp forest. #
1	✓	✓	✓
2		✓	✓
3			✓

# Refer to WSUD Technical Guideline No 2 for further explanation and examples.

- b Performance Target 1 - All Receiving Environments at the edge of a development - the physical nature of flows into receiving environments needs to be preserved. In particular, where the receiving environment naturally receives dispersed flows, concentration of flows should be avoided.
- c Performance Target 2 - Where runoff from the development passes through a Creek or defined waterway - Limit the peak flow in the post-development events within the receiving waterway to the peak flow for the pre-development for the 2-year ARI storm event. Further, the duration of post-developed flows should be no more than 4 times greater than in the pre-developed condition.

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- d Performance Target 3 - Where runoff from the development passes through an undefined drainage depression containing swamp forest - Preserve the existing hydrology by ;
- Maximising stormwater harvesting and re-use in order to preserve the pre-development hydrology
- i. Minimising impervious surfaces connected to the drainage network
  - ii. Limiting waterway crossings, but if essential, they should be designed to avoid concentrating flows.
  - iii. Ensure appropriate delivery of flows entering the riparian corridor as dispersed sheet flow

### 3.5.3 APPLICATION OF THE WATERWAY STABILITY OBJECTIVES

- a. In 'All Receiving Environments' dispersed flows can be maintained with the use of level spreaders or similar measures. Even where urban development concentrates flows into stormwater drainage pipes, a level spreader installed at the pipe outlet can restore dispersed flow conditions. Such devices are to be identified in the Stormwater Management Plan and detail design information presented at Construction Certificate stage.
- b. In 'All Creeks and defined waterways' limiting of flows (peak and duration) from the post-development to the pre-developed conditions can be partly achieved by implementation of stormwater harvesting and adequate re-use. On-site detention may also be required in addition to stormwater harvesting to ensure that 'stream forming flows' are maintained. This storage can be co-located with the stormwater treatment devices required to achieve the Stormwater Quality objectives and/or with on site flood detention facilities, where required. This is to be identified in the Stormwater Management Plan and detail design information presented at Construction Certificate stage.
- c. Complying with the targets for 'Undefined drainage depressions' will require the following;
- d. Maximise stormwater harvesting and re-use to reduce the volumes of stormwater flows entering undefined drainage depressions. A water balance analysis is required to be provided to demonstrate optimal harvesting and re-use.
- e. Dispersing flows before discharging into the waterway, similar to the requirements for 'All Receiving Environments' stated in Section 3.5.3(a) above.
- f. Limiting flows before discharging into the waterway, similar to the requirements for 'All Creeks and defined waterways' stated in Section 3.5.3(b) above.
- g. Guidance on meeting these objectives is contained in the supporting WSUD Technical Guidelines No 2, 3 and 4.

## 4.0 WSUD MAINTENANCE PROVISIONS

- a WSUD elements require maintenance in order to perform in accordance with their design intent. It is considered essential that provisions are made for maintenance of WSUD elements at the planning and design phase irrespective of ownership being private or Council. This section outlines the necessary considerations and requirements in relation to operation and maintenance of WSUD elements.
- b Some WSUD elements in the private realm will require a Positive Covenant and a Restriction on Use to be placed on the property title in order to bind all current and future owners to specific maintenance requirements.

### 4.1 Maintenance Requirements

- a Maintenance requirements for vegetated stormwater treatment measures include:
  - i. During the plant establishment period (first two years): weed removal and replanting may be required
  - ii. Periodic maintenance should include: removal of accumulated sediments, litter and debris, weeding and replanting as required.
  - iii. Three-monthly inspections are recommended for most stormwater treatment measures

A defects liability period will apply to WSUD elements in accordance with Council's requirements for landscaping projects. The developer and/or owner are then responsible for maintenance of the WSUD element(s) after practical completion is certified and prior to transfer of the asset into Council ownership.
- b Operation and maintenance requirements of storage tanks, including rainwater tanks and treated stormwater storage tanks is as follows;
  - i. For rainwater tanks, inspect the roof and gutters, first flush device and inlet/overflow screens each 3-6 months. If necessary, roofs and gutters should be cleaned, overhanging vegetation should be pruned, first flush devices and screens should be cleaned.
  - ii. Each 2-3 years, inspect all tanks for sludge accumulation. De-sludging may be periodically required.
  - iii. Where pumps are used, consult the manufacturers for maintenance requirements.
- c Operation and maintenance requirements of gross pollutants traps (GPTs) are as follows;
  - i. Routine quarterly inspection and/or in accordance with manufacturer's recommendations
  - ii. Cleaning and appropriate disposal of gross pollutants to ensure there is sufficient capacity to capture and retain pollutants in the next runoff event. Notwithstanding manufacturer's recommendations, at least 50% capacity should be maintained within the GPT.

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## 4.2 Maintenance Access & Schedules

- a Access to WSUD elements is essential in order to perform routine inspection and maintenance activities. Consideration of maintenance and appropriate access is required at the concept design stage and is to be documented on DA plans. Council should be contacted to ascertain Wyong Shire Council's maintenance capability in respect to selection of appropriate WSUD elements and design considerations.
- b A maintenance schedule(s) is to be provided at the time of Practical Completion. This schedule is to detail the necessary maintenance activities and intervention levels that are required for each WSUD element and it should cover at least a ten year period. The information should include but not be limited to the cleaning frequency of GPTs, subsoil line flushing, inspection for scour & erosion at key areas, capacity at key outlet and overflow points, plant health, vegetation maintenance for conveyance, weed management, filter media replacement etc.

## 4.3 Positive Covenant and Restriction of Use on WSUD elements

For developments requiring a Positive Covenant and/or Restriction of Use, the applicant shall be responsible for the following;

- a To ensure on-going future maintenance of WSUD elements applicants shall create a "Positive Covenant" and "Restriction on the Use of Land" under Section 88B of the Conveyancing Act 1919, burdening the property with the requirement to maintain the WSUD elements. The terms of the instruments are to be generally in accordance with the Council's "terms of Section 88E instrument for protection of WSUD elements" in accordance with Council's standard terms and definitions.
- b Create all required easements, rights-of-carriageway, positive covenants, restrictions-on-use or other burdens/benefits, the applicant must submit an original instrument under Section 88E of the Conveyancing Act with the plan of subdivision or transfer plan. Wyong Shire Council must be named as the authority empowered to release, vary or modify the terms of the plan. This is to be completed prior to the issue of the Occupancy or Subdivision Certificate.
- c A registered surveyor is to provide certification and a "Works-As-Executed drawing" to Council that all physical structures are fully contained within the lot and proposed easements. This is to be completed prior to issue of the Occupancy or Subdivision Certificate.

### 4.3.1 WSUD ELEMENTS TO BE INCLUDED

The various types of WSUD elements that are to be included in the Positive Covenant are rainwater tanks, swales, rain gardens, gross pollutant traps, silt and grease arrestors, bio-retention systems, constructed wetlands, infiltration devices and permeable paving. Some of these WSUD elements will also require a Restriction on the Use of Land.

### 4.3.2 DEVELOPMENT TO WHICH THIS APPLIES

The requirement to create a Positive Covenant and/or a Restriction on the Use of Land applies to the following types and extents of development: residential flat buildings and commercial and industrial development assessed under this DCP Chapter.

A subdivision WSUD Strategy that does not adopt the Deemed to Comply Provisions specified in this DCP Chapter for individual lots is required to denote the specified WSUD elements on the plan of subdivision. For instance if the assumed water conservation and water quality elements at lot scale exceed the Deemed to Comply requirements outlined in Section 2.2.2.1(f), then a positive covenant and restriction of use is to be placed on each affected lot and this is to be denoted on the plan of subdivision.

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**4.3.3 DEVELOPMENT TO WHICH THIS DOES NOT APPLY**

The requirement to create a Positive Covenant and Restriction on the Use of Land does not apply to the following types and extents of development: residential alterations and additions, residential single and dual occupancy dwellings, residential flats up to 4 dwellings and commercial and industrial alterations and additions. Maintenance of these WSUD elements is still required however it is not enforced through a positive covenant and restriction of land use.

DRAFT

DCP 113 FLOOD PRONE LAND DEVELOPMENT 2005

9

DCP No.  
113

# Flood Prone Land Development Control Plan

draft

Date of commencement:



DCP No.  
113

# Flood Prone Land Development Control Plan

*Draft*

This Development Control Plan (DCP) may be amended from time to time by Council. Proposed amendments are required to be advertised and exhibited in draft form and any submissions received must be considered by Council before the amended plan is adopted. People using this DCP should ensure that they have the current copy of the plan, including any amendments. If in doubt, please check with Council's Customer Service Centre.

Adopted as per council resolution Dated:	
Effective:	
Certified in accordance with the Environmental Planning and Assessment Act 1979 and Regulations	General Manager:
	Dated:

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