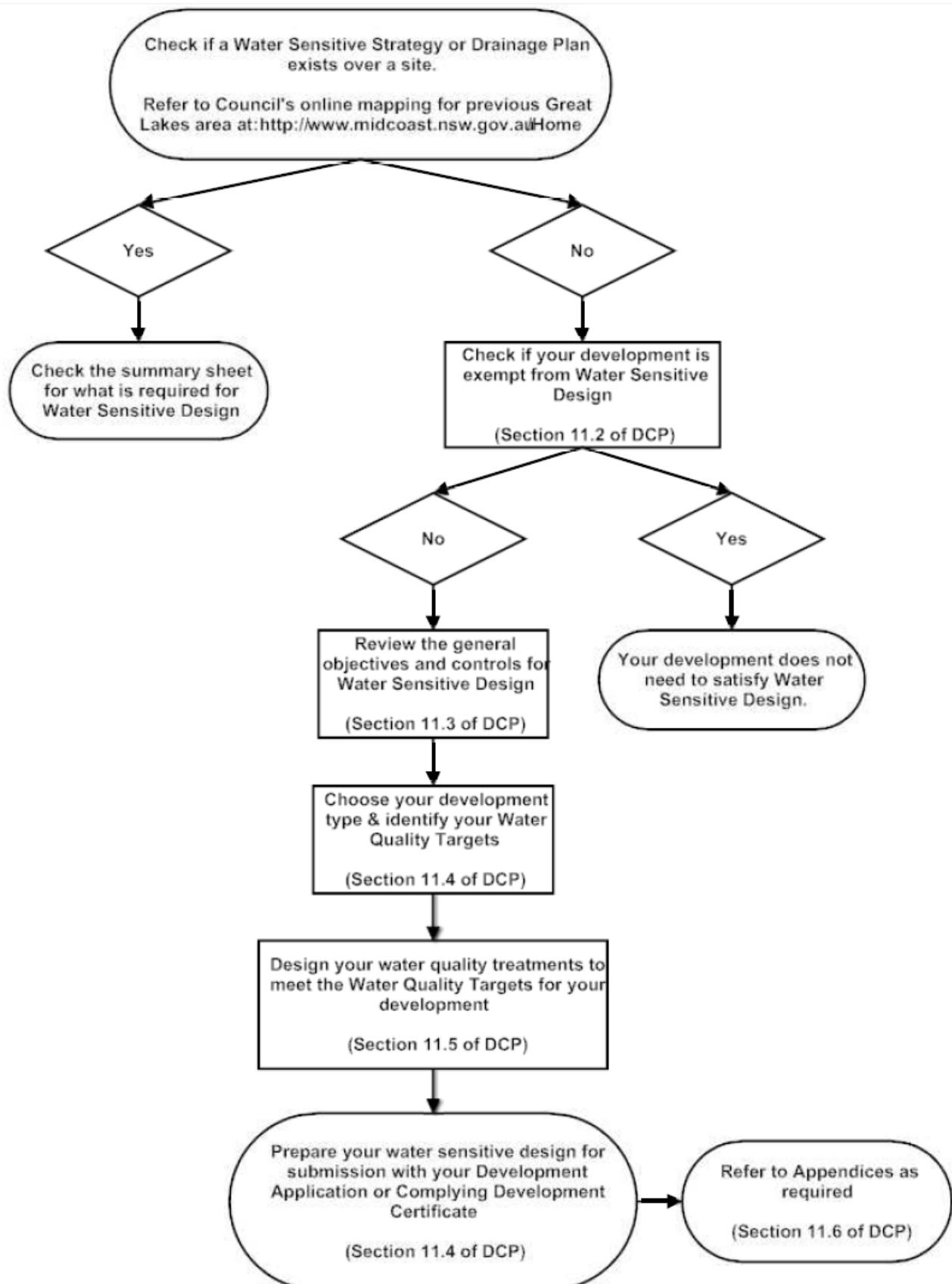


11. Water Sensitive Design

11.1 Flow Chart of Water Sensitive Design Process



11.2 Where do Water Sensitive Design Controls Apply?

Water sensitive design (WSD) controls must be addressed as part of a development application or complying development certificate on sites covered by the Great Lakes Local Environmental Plan 2014.

Council approved Stormwater Strategy or Drainage Plan

Sometimes a property can be included in a Council approved Stormwater Strategy or Drainage Plan which has considered Water Sensitive Design at the time of subdivision. The Strategy or Plan will set-out the water quality targets for your site and a summary sheet will provide the details of any additional Water Sensitive Design measures that may be required as part of your development.

Where you wish to vary the Water Sensitive Design measures set-out in the summary sheet you may use this section of the DCP to propose alternative water quality treatments to meet the water quality targets of the approved Stormwater Strategy or Drainage Plan.

To check if your property is included in a Council approved Stormwater Strategy or Drainage Plan check Council's online mapping at <http://www.greatlakes.nsw.gov.au/Home>

If there is no Council approved Stormwater Strategy or Drainage Plan associated with your property this section of the DCP will be used to assess Water Sensitive Design for your development.

Exemptions to Water Sensitive Design

Note: sites that are included within a Council approved Stormwater Strategy or Drainage Plan will still need to meet the Water Sensitive Design requirements set out within those documents regardless of the exemptions below.

Single Dwelling or Dual Occupancy

Water Sensitive Design controls do not apply to a house or dual occupancy where;

1. the total footprint of all proposed buildings have a roof area of 500m² or less and;
2. the property is located outside the mapped focus area. Check Council's online mapping to see if your property is located outside of a focus area - <http://www.greatlakes.nsw.gov.au/Home>

Alterations and additions

Water Sensitive Design controls do not apply to alterations and additions;

1. on residential development where the increase to the overall impervious surface is less than 150m²; or
2. for any other type of development where the increase to the overall impervious surface is less than 10%

Note: impervious surfaces include roof area and all other hard surfaces including (but not limited to) driveway, pathways and courtyards that form part of the alterations and additions.

Subdivision

Water Sensitive Design controls do not apply to;

1. boundary adjustments; or
2. Strata subdivision.

11.3 General Objectives and Controls for Water Sensitive Design

Objectives

- To safeguard the environment by maintaining or improving the quality of stormwater run-off.
- To protect and restore aquatic, estuarine and riparian ecosystems.
- To harvest rainwater and urban stormwater runoff for use where appropriate.
- To control the hydrological impacts of development on receiving surface and ground water systems by controlling the frequency, magnitude and duration of flows to preserve, as far as practicable, pre-development groundwater and surface water regimes and interactions.
- To control the impacts of development on channel bed and bank erosion by controlling the magnitude, nature and duration of sediment-transporting flows.
- To promote disconnection of impervious areas to the drainage system by introducing appropriate measures to minimise the rate, frequency and volume of urban runoff events in order to improve WSD performance.
- Wherever possible, water quality measures should be designed and constructed at the subdivision stage for the whole development when complete.

Controls

1. All development must meet the relevant targets set-out in the Stormwater Quality Targets Table within this section of the DCP, except in the instance of a Council approved Stormwater Strategy or Drainage Plan which will specify the targets to be met for identified parcels of land.
2. Water Quality Treatments intended to meet the relevant Stormwater Quality Targets are to be calculated and designed in accordance with this section of the DCP, except in the instance of a Council approved Stormwater Strategy or Drainage Plan which may prescribe the measures to satisfy water quality.
3. Additional stormwater drainage measures may be required by Council to address potential flood issues related to the development. Instances where additional requirements may apply include;
 - a. development density that is greater than a dual occupancy; or
 - b. development in areas where there is insufficient capacity in existing stormwater infrastructure to absorb the increased stormwater runoff.
4. Wherever practical, water quality treatments are to be designed as part of any additional stormwater flow modification measures such as detention and infiltration in such a way as to retain, treat and infiltrate runoff events.
5. Water quality treatments should be integrated into landscaped areas to fit within the built environment of the development.
6. Water quality treatments cannot be constructed within;
 - a. drainage or sewer easements except for privately owned inter-allotment drainage; or
 - b. private open space areas.
7. Water quality treatments may be constructed within the building setback areas.
8. All water quality treatments should be designed in response to environmental constraints to ensure they;
 - a. do not contribute to increased flooding risk;
 - b. comply with flood related development controls; and
 - c. withstand storm surge and inundation.
9. Water quality treatments can be any shape or size to fit in with the remainder of the house and lot, as long as the area is consistent with that calculated to meet the relevant Water Quality Treatments.

11.4 Development Type

11.4.3 Intensive Livestock or Intensive Agriculture

Stormwater Quality Targets

Note: sites that are part of a Council approved Stormwater Strategy or Management Plan may have different Stormwater Quality Targets to meet. To check if your property is included in a Council approved Stormwater Strategy or Management Plan go to Council's online mapping at <http://www.greatlakes.nsw.gov.au/Home>

Development Type	Target Reduction Loads (based on increased pollution generated from development without treatment)			
	Gross pollutants	Total Suspended Solids	Total Phosphorus	Total Nitrogen
<ul style="list-style-type: none"> ➤ Intensive Livestock ➤ Intensive Plant Agriculture 	90%	80%	60%	45%
<p>Tip: check the dictionary in the Great Lakes Local Environmental Plan 2014 for definitions of Intensive Livestock and Intensive Plan Agriculture - http://www.legislation.nsw.gov.au</p>				

Water Sensitive Design Strategy (Intensive Livestock and Intensive Agriculture)

Intensive livestock and intensive agriculture is defined within the dictionary of the Great Lakes Local Environmental Plan 2014 and requires a Water Sensitive Design Strategy specific to this form of development.

A Water Sensitive Design Strategy (WSDS) is a written report detailing management of water quality for the proposed development. The requirements for the strategy will depend on the nature and scale of the development and it is recommended that discussions are held with Council prior to submitting an application. Expert agronomic and water quality advice may be required to develop the Water Sensitive Design Strategy. As a minimum, the Water Sensitive Design Strategy is to include the following detail:

1. **Site context** - identify sub-catchments, surface and subsurface hydrology, soil type and nutrient status, topography and receiving environments (both within and downstream of the site). Include any relevant previous studies.
2. **Proposed development** - describe the proposed development at the site, including site boundaries, land uses, livestock densities (where relevant), nutrient application rates (where relevant), operational strategies (e.g. paddock rotation) and infrastructure.
3. **Stormwater management** - this section should demonstrate how the Water Quality Targets will be met. Depending on the scale and nature of the development the following details are to be submitted;
 - a. a nutrient budget for the site based on the soil type and nutrient status;
 - b. a description of the proposal land management practices and stormwater treatment measures and their location;
 - c. justification for the proposed land management practices and stormwater treatment measures based on agronomic advice and stormwater quality results of MUSIC modelling (or similar). Details of all assumptions that have been used in the assessment must be included.

Application Requirements

Developments that require a WSD Strategy will need to include the Strategy as part of a Development Application along with the completed checklist for large scale developments (available from Council's website). Additional assistance in the preparation of a Water Sensitive Design Strategy is available from Council's website along with examples of how to apply the development requirements from this section to large scale developments.

11.5 Design of Water Quality Treatments

11.5.1 Water Sensitive Design Strategy and MUSIC Modelling

Sites that have a Water Sensitive Design Strategy based on MUSIC modelling generally employ a broad range of water quality treatments and the design of the water quality treatments are developed as part of a strategy. A stormwater plan, detailing the design and location of the proposed treatments will need to be submitted to Council with the development application.

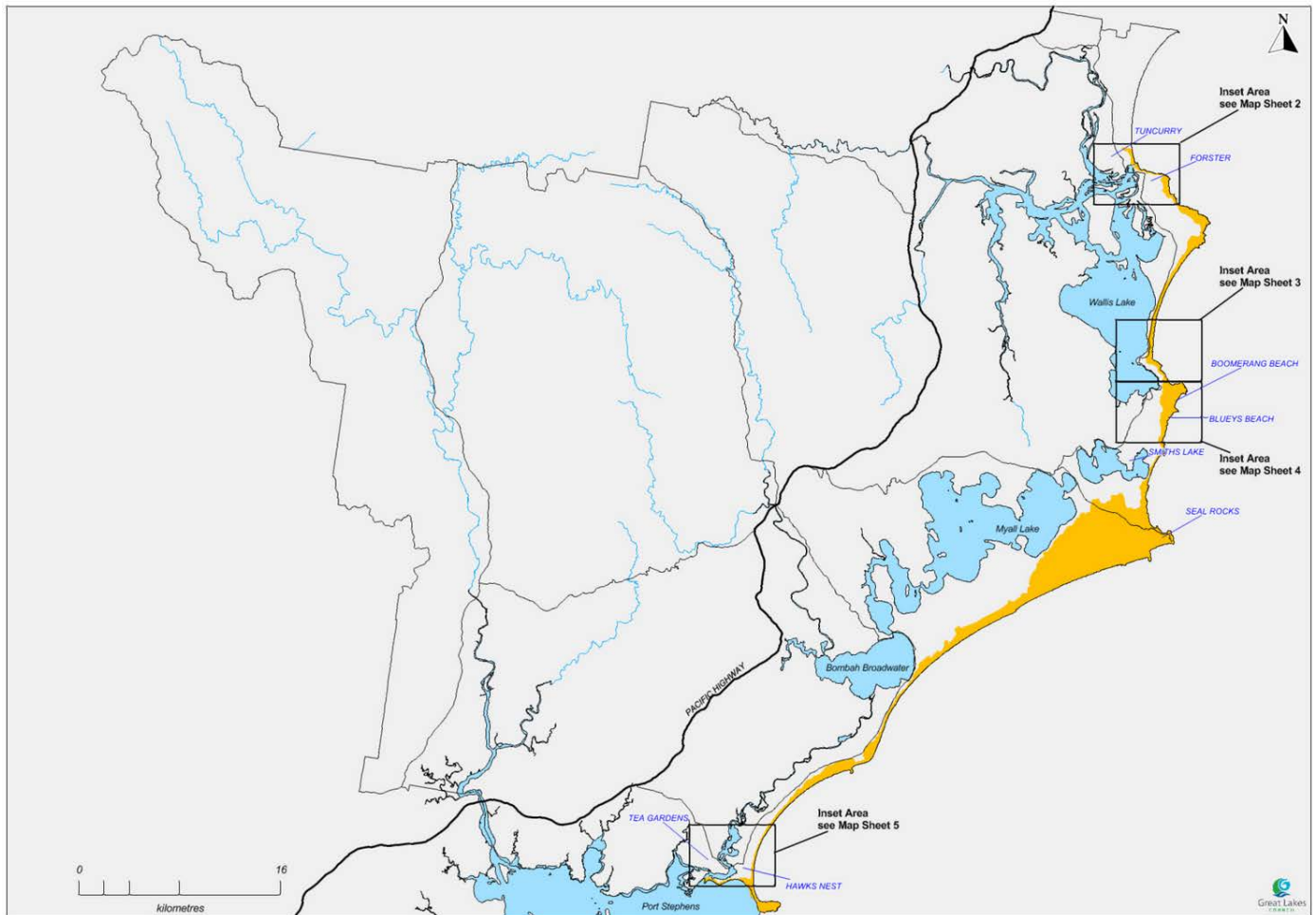
11.6 Appendices

11.6.1 Water Sensitive Design Catchment Areas

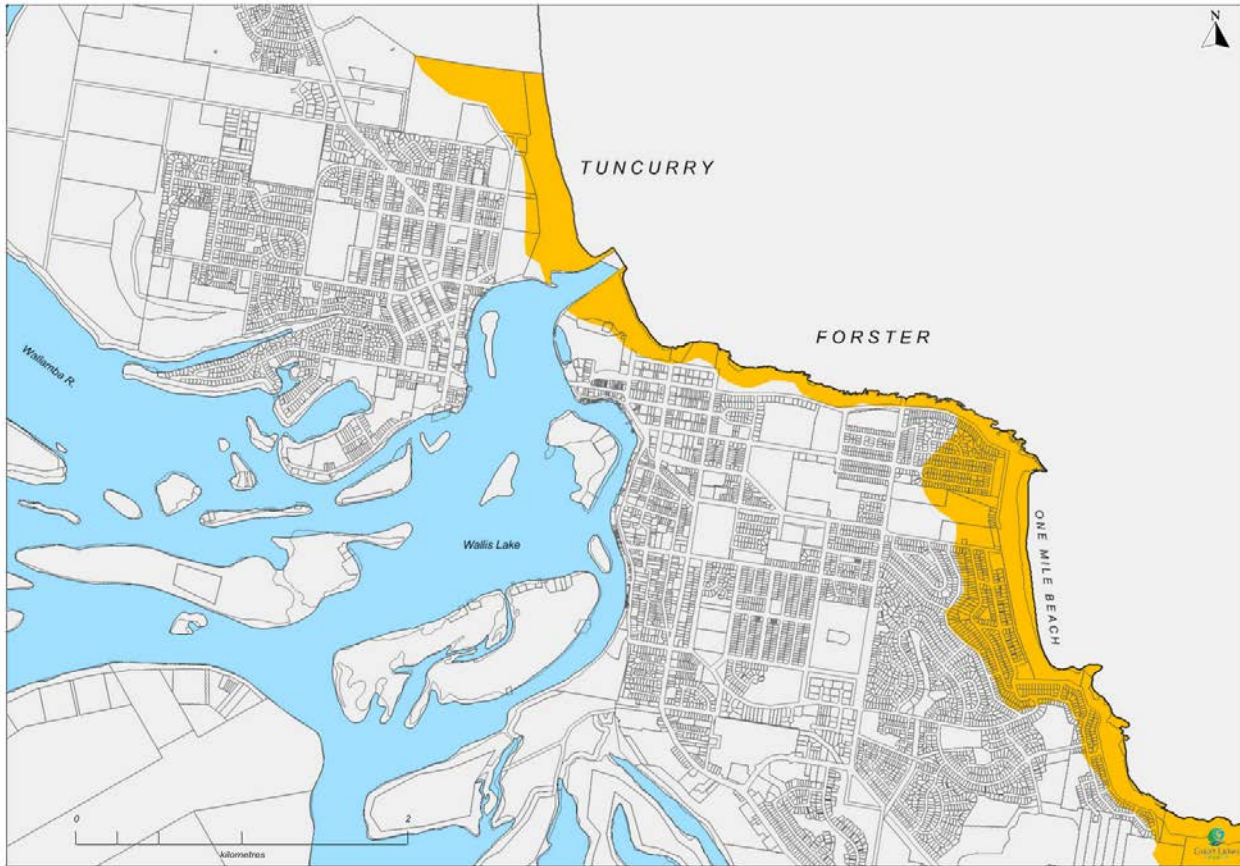
New development that occurs wholly within the Coastal Drainage area of the Water Sensitive Design Catchment Maps (refer to Water Sensitive Design Appendices) will be required to meet the Performance Target Reduction Loads the Stormwater Quality Targets table.

The Performance Target Reduction Loads for properties that are only partly affected by the Coastal Drainage Area in the Water Sensitive Design Catchment Maps (refer to Water Sensitive Design Appendices) will be determined in consultation with Council staff.

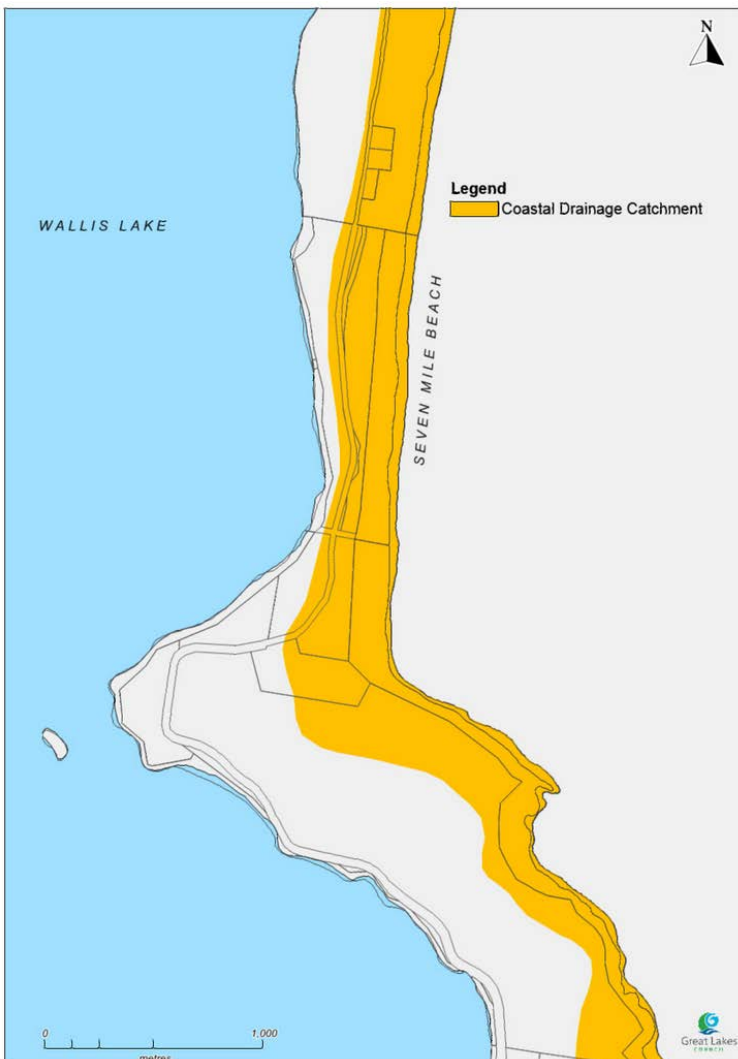
Overview of Water Sensitive Design Catchment Areas



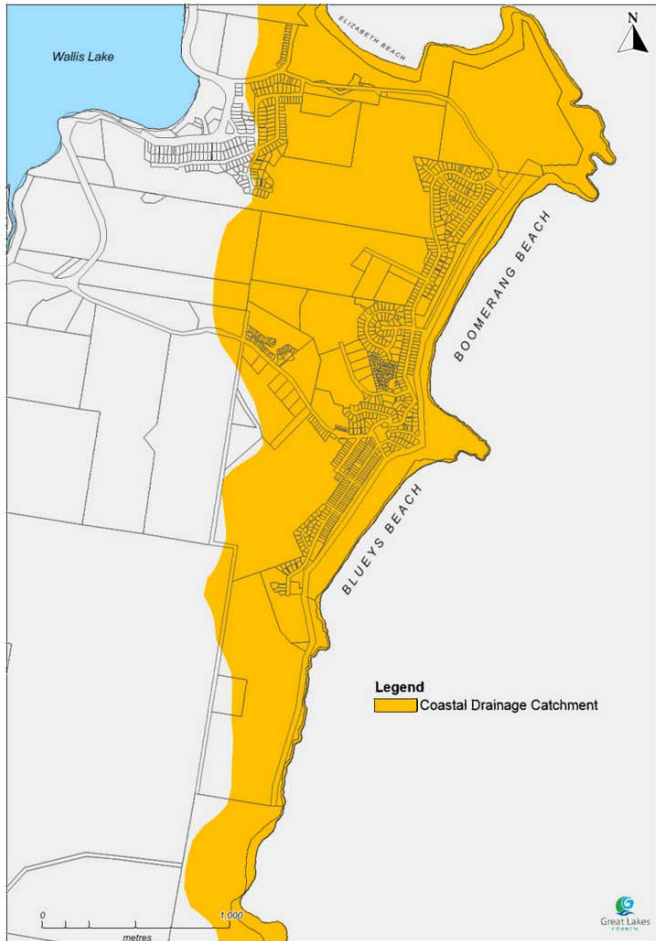
Map Sheet 2 - Tuncurry & Forster Area



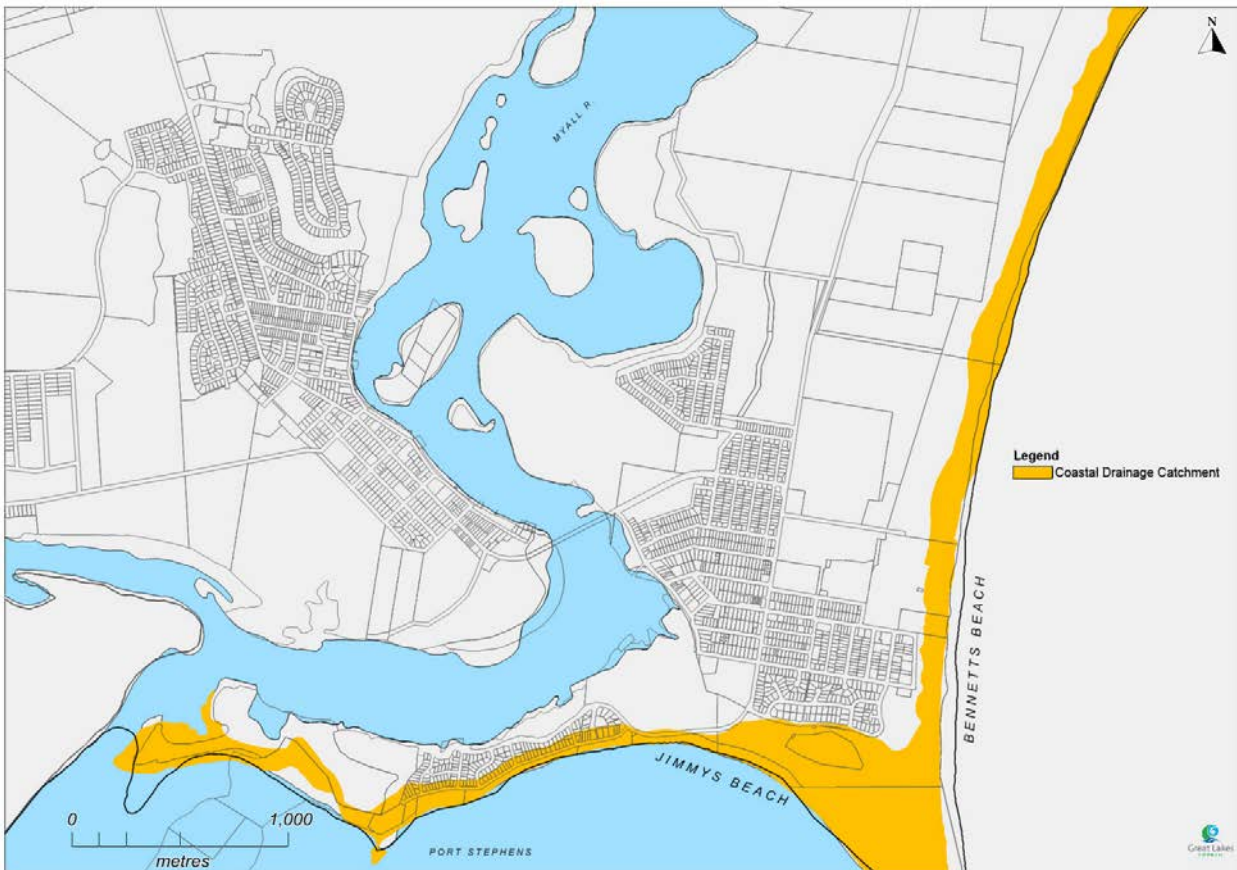
Map Sheet 3 - Seven Mile Beach



Map Sheet 4 - Pacific Palms Area



Map Sheet 5 - Hawks Nest Area



11.6.2 Guidance on Assessing Soil Texture

In applying the water quality requirements of this section, applicants will be required to determine the soil texture of their property. A simple field based technique can be used to determine soil texture shown in the table below.

Field soil texture classes

Texture Class	Coherence	Bolus Characteristics	Ribbon Length	Other Remarks
Sand	Nil to slight	Sandy to touch	Cannot be moulded	Single sand grains adhere to fingers
Sandy Loam	Slight	Sandy to touch	15 to 25mm	Medium and grains (dominant size) readily visible
Sandy Clay	Strong	Plastic to touch; fine to medium sand seen, felt or heard in a clayey matrix	50 to 75mm	
Clay	Strong	Plastic and smooth to touch, handles like plasticine	75mm and greater	Moulded into rods without fracture; moderate shearing resistance

Adapted from: Soil Conservation Commission of NSW, (1991), Soils Their Properties and Management, Sydney University Press in Association with Oxford University Press, Melbourne, Vic, (page 151).

11.6.3 Bushland Hydrology

Urban developments that drain to areas of natural bushland can cause significant erosion if the flows from those developments are not properly managed. The erosion hazard associated with such discharges is a function primarily of soil erodibility, slope and flow velocities. Stormwater systems proposed for developments adjacent to urban bushland areas should be designed to prevent or minimise the establishment of new discharge points and stormwater flow paths. Urban development proposals which drain to areas of natural bushland should also incorporate WSUD and stormwater treatment elements aimed at preventing or minimising erosion at or downstream of the discharge point. No specific targets have been set at this stage as the configuration of the outlets and the soil types requiring management vary considerably across the region.

Frequency of soil wetting within (i.e. discharge into) bushland areas has been identified as an additional significant hydrologic parameter relating to the provision of environmental conditions contributing to weed growth in areas of natural bushland. Stormwater treatment measures likely to minimise the discharge of weed propagules into bushland areas (through filtration provided by bioretention measures, for example) are therefore encouraged.