Planning Scheme Policy 14 - Waterways, Wetlands and Moreton Bay

14.1 Purpose

(1) The purpose of this policy is to -

(a) provide information about the technical requirements of development within or adjoining areas shown on the Waterways, Wetlands and Moreton Bay Overlay;

(b) describe the relationship of outcomes in the Habitat Protection Overlay, and Landscape and Stormwater Management Codes to outcomes of the Waterways, Wetlands and Moreton Bay Overlay.

14.2 Application

(1) The policy applies to -

(a) development that is subject to the Waterways, Wetlands and Moreton Bay Overlay including development affected by -
(i) major and minor waterways;
(ii) coastal drainage areas;
(iii) Moreton Bay foreshore buffer;
(iv) freshwater wetlands;
(v) natural drainage lines;
(vi) Tingalpa reservoir;

(b) applications that are likely to result in adverse impact on waterway and wetland values;

(c) development that is -
(i) impact assessable;
(ii) has identified ecological or environmental values that require long-term management.

14.3 Interpretation

(1) Part 9 - Schedule 3 - Dictionary defines terms used in the policy.

(2) Appendix 1 - Glossary also defines terms used in the policy.

14.4 Waterway Management Objectives

(1) The Waterways, Wetlands and Moreton Bay Overlay, relevant codes and this policy seek to achieve three waterway management objectives -

(a) <u>riparian zone ecology</u> - within buffer zones the primary objective is to work with vegetation to achieve a structurally and ecologically stable zone of riparian vegetation that -
(i) maintains and improves water quality;
(ii) maintains and improves waterway and bank stability;
(iii) maintains and improves fauna and flora habitat.

(b) <u>water quality</u> - the primary water quality objective to be achieved by application of the policy is ecologically and structurally stable waterways that contribute to the maintenance and improvement of water quality as measured by water quality objectives[1].

[1] *Riparian Land Management Technical Guidelines Volume Two: On-ground Management Tools and Techniques*, Land and Water Resources Research & Development Corporation, November 1999.

A secondary objective is stormwater run-off that maintains or enhances waterway environmental values and measurable water quality objectives.

(c) waterway processes - the structural stability of the bed and banks of waterways are maintained or enhanced through the application of treatments that maintain or improve waterway environmental values and that replicate unmodified flow patterns.

(2) It is recognised that these objectives should be pursued in balance with the needs of managing water flow, in particular during flood events.

14.5 Waterway Buffer Zone Areas - Ecology

14.5.1 Buffer Zone Area - Function and Composition

(1) The following information will assist in achieving riparian zone ecological objectives -

(a) a well-established riparian vegetation community serves several functions including maintaining waterway channel bank stability, removing nutrients and pollutants from stormwater run-off, providing habitat for fauna and flora, and suppression of weed growth.

(b) the buffer zones shown on the Waterways, Wetland and Moreton Bay Overlay Map and described in the code are based on required distances for -
- (i) filtration of a number of pollutants contained in stormwater overland flows;
- (ii) bank stability;
- (iii) diversity of flora species;
- (iv) protection of fish habitat areas;
- (v) provision of wildlife corridors;
- (vi) maintaining suitable in-stream water temperatures, for aquatic flora and fauna;
- (vii) shading;
- (viii) maintenance of scenic amenity and landscape features.

(c) the Waterways, Wetlands and Moreton Bay Overlay Code defines two components of the waterway or wetland buffer zone area, namely -
- (i) a core riparian area;
- (ii) an outer riparian area.

(d) the riparian vegetation structure should comprise the following elements -
- (i) canopy - through trees;
- (ii) understorey - including shrubs and trees;
- (iii) groundcover species - that may include native herb species;
- (iv) vines.

(e) the structure, density and spacing of vegetation on the waterway channel bank will vary from site to site.

(f) canopy trees have the most significant effect on the stability of waterway channel banks, due to -
- (i) their above ground size and weight;
- (ii) the below-ground extent of their root systems that binds the earthen bank of the channel and counteracts the effect of stream bank erosion.

(g) In the absence of some of these components, others, such as canopy trees, will have more significance in influencing the stability of the banks.

14.5.2 Enhancement Activities in Buffer Zones

(1) When undertaking enhancement planting of riparian or foreshore vegetation in buffer zones, the recommended order of approaches is -

(a) *rehabilitation* including -
- (i) weed treatment and exclusion;
- (ii) regeneration of native species, incorporating exclusion fencing or tree protection;

(iii) monitoring of vegetation establishment and weed re-growth[2];

(b) *re-vegetation* including -
(i) selecting species appropriate to the site from the Vegetation Enhancement Strategy;
(ii) utilising information about specific vegetation communities as detailed in -
a. Planning Scheme Policy 4 - Ecological Impacts;
b. *Vegetation Enhancement Strategy* (RSC, 2004);
c. *Remnant Native Vegetation Mosaics of Lands within Redland Shire* (LAMR, 2001);
(iii) monitoring of vegetation establishment and weed re-growth;

(c) *stabilisation* including -
(i) identifying the location and agent of waterway channel bank instability;
(ii) document the methods, incorporating a mix of soft engineering and re-vegetation, proposed to stabilise the bank in accordance with best-practice guidelines[1]&[5];
(iii) document methods for minimising impact on existing vegetation through work involved in instituting bank stabilisation techniques.

Notes -

- Local examples of stable and mature riparian vegetation, within the same waterway system, can be used as a guide to age and composition of riparian vegetation communities associated with a waterway system, and may constitute a starting point for rehabilitation, revegetation or stabilisation efforts.
- Junctions of waterways, bends and meanders in larger waterways are ideal places to commence rehabilitation and revegetation efforts due to the higher concentration of nutrients and seeds that are collected in these areas and that will act as a primary source for natural regeneration.

(2) In the case of enhancement activities in the waterway buffer zone, supplementary or replacement planting may be required, as identified through growth establishment and monitoring techniques conducted on site during the approved maintenance period.

(3) Where intensive agriculture activities, involving stock, are undertaken on a property adjacent to a waterway buffer zone, a permanent fence and gate are constructed to prevent intermittent access and allow for managed stock access to the buffer zone.

(4) The management objectives for stock access to the waterway buffer zone should be identified in the Property Management Plan prepared under Specific Outcome S7. of Part 6 - Use Codes, Division 16 - Intensive Agriculture.

14.5.3 Enhancement of Existing Constructed Waterbodies

(1) For the purposes of the Waterways, Wetlands and Moreton Bay Overlay Code, constructed waterbodies, such as dams, may form a component of a minor waterway or natural drainage line.

(2) Where these waterbodies lies within a waterway buffer zone the dam is retained.

(3) In the instance of a waterbody forming a component of a natural drainage line, the local government's preference is for retention of the waterbody, however some circumstance may require the modification of the dam.

(4) An ecological assessment report is undertaken and provides details of the function, any modification and treatment of the waterbody for conservation and community purposes.

(5) The ecological assessment report should consider the following conditions that apply in order to establish a safe usage zone around the waterbody perimeter -

(a) where the waterbody will not have public access –

(i) a temporary fence is erected for the full perimeter of the waterbody;

[2] Monitoring Regeneration – Fact sheet, Greening Australia (web site: www.greeningaustralia.org.au)

(ii) where this waterbody was historically associated with an agricultural activity, then the minimum setback distance for the perimeter fence should be 2 metres from the high level water mark. The temporary fence should be maintained in place for a minimum period equal to 12 months or the agreed on-maintenance period.
(iii) the temporary fence erected around the waterbody, should include no more than 2 formalised access points to the waters edge, with a length of 3-5 metres, and with the balance of the waterbody perimeter being rehabilitated or revegetated for a minimum set back distance of 2 metres to discourage access to the edge of the water;
(iv) at the end of the agreed on-maintenance period the temporary fencing is replaced by permanent fauna-friendly fencing which is aligned as directed by the local government.

(b) For waterbodies that will have public access -
(i) a permanent fauna-friendly fence is to be erected around the perimeter of the waterbody;
(ii) the fence around the waterbody is to be erected with a minimum setback distance of 4 metres from the high level water mark;
(iii) informative signage is erected at public access points, not less than 50 metres from the perimeter of the waterbody, specifying activities within the waterbody that are not-permitted due to the sensitivity of the waterway environmental values.

(6) For permanent fencing, lockable access points are provided for maintenance purposes.

Note -

- Refer to Planning Scheme Policy 9 - Infrastructure Works - Chapter 5, regarding design standards for the paving and design of formalised access points to the waterbody.
- Buffer zone enhancement requirements identified in this policy also incorporate those enhancement outcomes detailed in -
  - Planning Scheme Policy 4 - Ecological Impacts;
  - Planning Scheme Policy 9 - Infrastructure Works, Chapter 11 - Landscaping.

14.6 Water Quality of Receiving Waters

(1) The following information will assist in achieving water quality objectives.

14.6.1 Waterway Environmental Values and Water Quality Objectives

(1) All run-off to receiving waters should enhance and protect the water quality of receiving waters, being waterways, wetlands and Moreton Bay.

(2) The objective of enhancing and protecting water quality of receiving waters is achieved through *environmental values* and the application of *water quality objectives* to stormwater run-off.

(3) Waterway Environmental Values and Water Quality Objectives for fresh and marine waters are defined and scheduled under *Queensland Environmental Protection (Water) Policy, 1997*.

(4) By way of definition -

(a) *environmental values* are characteristics of waterways that the community considers are important to protect;

(b) *water quality objectives* are quantifiable measures of indicators, that can be physical, chemical or biological, that when consistently measured over time, will protect waterway environmental values. The measurable indicators of runoff are against water quality objectives to determine approval for discharge.

(5) Environmental values and water quality objectives for individual waterways in a Local Government area are determined in conjunction with catchment-specific waterway management plans (WMPs).

(6) To date waterway management plans have been produced and adopted for the following waterways -

(a) Tingalpa Creek, including all tributaries and headwater streams in Redland City;

(b) Eprapah Creek;

(c) Hilliards Creek.

(7) The environmental values and water quality objectives for these waterways and all other water catchments in the local government area are contained in Part 9, Schedule 11 - Water Quality Objectives.

(8) The main pollutants associated with stormwater run-off and their impact on waterways are[3] identified in Table 1.

Table 1 - Pollutants, Impacts and Water Quality Objectives

Pollutant	Impacts	Associated Water Quality Objectives
Nutrients (nitrogen, phosphorous)	Eutrophication, excessive nuisance plant growth	Total Nitrogen, Total Phosphorous
Sediment	Altered biological characteristics, altered hydraulic capability, turbidity, altered temperature regime	Turbidity, Suspended Sediment, Secchi Depth
Litter / gross pollutants	Depressed visual character, smothering of flora and fauna, potentially injurious to fauna	Litter / gross pollutants
Human or animal waste	Human health risk	Faecal coliforms
Oils and petroleum hydrocarbons	Mortality and sub-lethal effects on individual aquatic fauna, smothering of flora; mortality and sub-lethal effects on aquatic ecosystems; accumulation in sediments.	No visible or otherwise noticeable films or colouration on the water surface or through the water column.

(9) It is acknowledge that that some developments will be constrained in their ability meet discharge water quality objectives, due to either the nature of the site, including available area for stormwater treatment measures.

(10) These constraints may result in difficulty meeting water quality objectives for all key contaminants.

(11) In this circumstance, the assessment process will determine whether or not the development should be approved on water quality grounds.

(12) In some instances the local government may have undertaken water quality monitoring in waterways within or adjacent to the site. Contact the local government to verify if this information is available.

(13) The *Draft Queensland Water Quality Guidelines*[4] (QWQG) are numerical concentration levels or statements for indicators that protect a single or multiple environmental values.

(14) The QWQG include measures for range of indicators not included in Part 9, Schedule 11 - Water Quality Objectives of this planning scheme.

14.6.2 Management of Stormwater Run-off from Development to Receiving Waters

(1) To fulfil the requirements of the Stormwater Management Code and Planning Scheme Policy 11 - Infrastructure Works Policy, Chapter 6 - Stormwater Management, for conceptual design of stormwater treatment systems, it is recommended that applicants apply the *Guidelines for Pollutant Export Modelling in Brisbane Version 7 - Draft* (BCC 2003).

[3] This list is not exclusive and other pollutants associated with current or historic land use may be present in stormwater run-off.
[4] EPA, 2005. *Draft Queensland Water Quality Guidelines*, Queensland Environmental Protection Agency, Brisbane, Queensland.

Note -

- The local government has adopted these guidelines with the permission of Brisbane City Council.
- It is noted that Brisbane City Council's planning framework for water quality management as detailed in Chapter 1 of the Guidelines differs to that of Redland City Council. However the intent of this framework is similar to that of RSC and may be read as a guide.
- All information contained in Chapters 2-7 of the *Guidelines for Pollutant Export Modelling* is relevant to Redland City. However, all references to Brisbane City Council Water Quality Objectives must be substituted to refer to Redland City Council Water Quality Objectives.

14.6.3 Design Standards for Water Sensitive Urban Design (WSUD) Infrastructure

(1) For the purpose of water sensitive urban design technical guidelines refer to *draft Water Sensitive Urban Design Guidelines: Stormwater*, (BCC, 2003)

Note -

- The local government is preparing similar guidelines which are due for completion in 2006.
- The BCC guidelines are adopted as an interim measure.
- The BCC guidelines are applicable to requirements contained in both the Landscape Code and Stormwater Management Code for development on Southern Moreton Bay Islands.

14.6.4 Methods for Stormwater Monitoring

(1) Water quality monitoring of stormwater outflows through infrastructure is a recommended method of measuring compliance with water quality objectives.

(2) In addition to other requirements of the stormwater management plan, it is recommended that a water quality monitoring program be implemented during the operational works phase and on-maintenance stages.

(3) The water quality monitoring program should include -

(a) water quality indicators such as total nitrogen, total phosphorous, suspended solids / turbidity, and dissolved oxygen;

(b) one or more test site(s) within the development area or at the legally identified discharge point(s) for stormwater and, if adjacent to a waterway, one site within the receiving waters nearest to the discharge zone;

(c) frequency of sampling - monthly during the agreed on-maintenance period;

(d) documentation / recording - written copies of water quality records for each sampling event that is maintained by the party responsible for stormwater management.

14.7 Waterway Channel Processes

(1) The information presented in this section will assist in achieving objectives for waterway channel processes.

14.7.1 Background

(1) Waterways, excluding wetlands, are dynamic features of the landscape that are continuously moving, spatially and temporally, within broad floodplain corridors under the influence of run-off from the surrounding catchment and in response to the geomorphological characteristics of the catchment and artificial changes such as straightening of bends, creation of barriers to flow and high-energy stormwater inputs among others.

(2) Erosion processes within the waterway channel occur under natural conditions as a result of the interaction of water flows and the physical bed and banks of the waterway.

(3) Natural erosion processes often have negative impacts when infrastructure is created within the floodplain corridor or when erosion and sedimentation processes disturb ecosystem processes.

(4) Waterways in urban areas often demonstrate instability through active erosion of the bed and banks of waterway channels as a result of highly modified catchment run-off conditions, altered flooding and flow regime and location of infrastructure within or crossing waterway channels.

(5) Identifying erosion processes is a fundamental precursor to successful rehabilitation or revegetation of riparian buffer zones.

(6) The following section describes different types of bank erosion.

14.7.2 Types of Bank Erosion

(1) There are several forms of erosive process in waterway channels that result in erosion and unstable bed and banks of waterways.

(2) The most common forms of waterway bank erosion and a brief description of their appearance, include[5] -

(a) sub-aerial erosion - the major types of sub-aerial erosion are related to vegetation and climatic conditions, including - .
  (i) wind thrown trees - where trees are knocked over and their root balls detach from the bank, results in sediment delivery to the waterway and erosion of the bank in the space where the root ball was located;
  (ii) weather conditions that lead to the wetting and prolonged drying of bank soil often make the soil more erodible. Vegetation coverage and shading reduce the exposure and drying of banks and reduce cracking of soil through the action of plant roots;
  (iii) erosion of soil on waterway banks through the action of rain splash is exacerbated by the absence of vegetation, mulch and leaf litter coverage. A well-vegetated waterway bank significantly reduces erosion by this means;
  (iv) the action of flood water triggers erosion through the mechanism of slaking. This form of erosion is more common where the bank is rapidly immersed by water and where there is poor root reinforcement;
  (v) the action of trampling of banks by introduced hard hoofed animals reduce plant coverage and increases exposure leading to bank erosion by other agents.

(b) scour - vegetation on the waterway bank plays a significant role in reducing scour erosion that is largely associated with moderate to high velocity flows and flooding, where banks are temporarily submerged. Dense coverage by grasses and smaller shrubs and stands of trees can reduce the effects of scouring. Excessive scouring is associated with significant silt and sediment deposition in waterway channels and on flood plains.

(c) mass failure - this form of erosion is generally the most visible as it consists of whole blocks of material that slide or topple into the channel. Gravity is the primary causative agent in mass failure, acting on the slope, soil properties and vegetation of the bank.

(3) The types of erosion vary depending on the waterway reach type -

(a) in upland creeks, being natural drainage lines, first-order streams and some minor streams, sub-aerial erosion is often the dominant category of erosion;

(b) in mid-basin streams being second-order, third and fourth-order streams, minor and major waterways, sub-aerial erosion in combination with scour is often the dominant category of erosion;

(c) in lowland streams, being fourth and fifth order streams with steeply sloping banks, mass failure is often the dominant erosion category, particularly where there has been a history of human or stock access and consequent removal of vegetation.

[5] *Riparian Land Management Technical Guidelines*, Volume One, Chapters 6 and 7, Land & Water Resources Research & Development Corporation, November 1999.

14.7.3 Contributing to Waterway Stability

(1) Addressing waterway, bed and bank, instability should be undertaken using a continuum of approaches with a first preference on application of ecological engineering, or natural channel design, methods.[6]

(2) Further intervention, or hard engineering, at the least preferred end of the continuum, is appropriate only where soft engineering methods are not able to contain the hydraulic pressures placed on the waterway, or where damage to infrastructure is threatened by hydraulic process.

(3) Where remedial action or intervention is required in the waterway channel to address active erosion, this should be based on identification and assessment of the agents of erosion, such as high velocity, flows, bank height or structure, obstacles to flow, removal of bank vegetation, altered flow regime.

(4) Applying ecological engineering, or natural channel design, methods will contribute to the maintenance or achievement of waterway environmental values as presented in this policy.

Note -

It is recommended that an applicant proposing to undertake in-stream treatments to address waterway instability, liaise with the local government to ensure that proposals are compatible with implementation of Waterway Management Plans and waterway rehabilitation plans.

14.8 Restoring In-Stream Habitat

(1) Restoration of waterway in-stream habitats with rocks, woody debris and aquatic plants is encouraged.

(2) The composition and arrangement of these should be considered on a site by site basis to minimise impacts on erosion and potential for flooding and damage to downstream infrastructure.

(3) The placement of in-stream habitat materials is undertaken with consideration to existing hydraulic characteristics such as channel capacity and stream flow velocities.

(4) The principles associated with restoring in-stream habitats in waterways are contained in *Riparian Land Management Technical Guidelines, Volume One* (Land and Water Resources Research and Development Corporation, 1999).

14.9 Specific Requirements for Wetlands - Freshwater and Coastal and Tidal Affected Areas

(1) Due to the differing hydraulic characteristics of wetlands specific attention should be applied to stormwater run-off and weed control impacts.

(2) Re-vegetation in buffer zones of tidal areas should be guided by the 'tidal influence points' shown on the Waterways, Wetlands and Moreton Bay Overlay.

(3) These points are approximate only and reference to surrounding vegetation, upstream and downstream of the site, will determine the type of species used in re-vegetation activities.

14.10 Management of Weeds in Receiving Waters and Buffer Zone Areas

(1) Aquatic weeds, declared and environmental, under the *Land Protection (Pest and Stock Route Management) Act, 2002* are a concern where infestations, through transmission, result in infestations in waterways elsewhere in the local government area.

[6] Natural Channel Design Guidelines, Brisbane City Council, November 2003.

(2) Weed species identified in the Vegetation Enhancement Strategy are eradicated from within the buffer zone areas of waterways, wetlands and Moreton Bay foreshore areas.

(3) The eradication of weed species is carried out in accordance with the requirements of Planning Scheme Policy 9 - Infrastructure Works, Chapter 11 - Landscaping.

14.11 Infrastructure in Buffer Zone Areas

(1) Where infrastructure is constructed within the buffer zone areas, its location and construction does not compromise the stability, or contribute to instability, of waterway banks.

(2) Stormwater quality treatment infrastructure is located outside the core buffer zone area;

(3) The management of stormwater where discharged in the buffer zone area is carried out in accordance with requirements of the -
   (a) Stormwater Management Code;
   (b) Planning Scheme Policy 9 - Infrastructure Works, Chapter 6 - Stormwater Management.

References

Land & Water Resources Research & Development Corporation, 1999, *Riparian Land Management Technical Guidelines, Volume One*, Land & Water Resources Research & Development Corporation.

EPA, 2005, *Draft Queensland Water Quality Guidelines*, Queensland Environmental Protection Agency, Brisbane, Queensland.

Brisbane City Council, 2005, *draft Water Sensitive Urban Design Guidelines: Stormwater*, Brisbane City Council.

Brisbane City Council, 2003, *Natural Channel Design Guidelines*, Brisbane City Council.

14.12 Appendix 1- Glossary

The following additional administrative terms have been used in this policy.

Coastal Drainage Area - This term applies to waterways on the Southern Moreton Bay Islands and North Stradbroke Island. Applies to permanent flowing creeks and streams, standing waterbodies and wetlands as well overland flow paths.

Marine Vegetation - For the purpose of this policy, has the definition contained in Section 8 of the *Fisheries Act, 1994*.

Dam - For the purpose of this policy, has the definition contained in Schedule 4 of the *Water Act, 2000*.

this page purposely
left blank