



POLICY SRT/D4 STORMWATER MANAGEMENT

BACKGROUND

Increasing population, decreasing rainfall and increasing community expectations regarding environmental issues have led to increasing recognition of the values associated with water resources. Water resource values can be ecological (e.g. supporting flora and fauna) and associated with human use (e.g. drinking water, recreation, agriculture and industry).

Stormwater is water that flows over ground surfaces, in natural streams and through constructed drainage systems as a direct result of rainfall over a catchment (DoW, 2004-2007). Stormwater can also include both surface run off and groundwater intercepted by drains. Stormwater can mobilise sediments, nutrients or contaminants in its flow path and must be managed to protect receiving water bodies. Urban, commercial or industrial development often leads to a significant increase in the area of impervious surfaces, which can result in more stormwater runoff and a greater risk of pollution. In the past, stormwater was perceived as a waste product with a cost, but it is now recognised as a resource with social, environmental and economic opportunities.

The Swan Canning river system receives a large proportion of the stormwater that drains from the Perth region, with a smaller proportion flowing out to the ocean. The quantity and quality of stormwater entering the Swan Canning river system influences its ecological health, community benefit and amenity. The Swan River Trust is committed to improving water quality and maintaining water flow in the river system.

The significance of these issues is also addressed at a state-wide level. *State Planning Policy 2.9 Water Resources* (WAPC, 2006) recognises that land use planning can assist in protecting, conserving, managing and enhancing the state's water resources. In addition, *State Planning Policy 2.10 Swan-Canning River System* (WAPC, 2006) acknowledges the iconic nature of the river and the need to protect and improve water quality through the use of water sensitive urban design.

OBJECTIVES

The objectives of this policy are to ensure that:

- land use changes and development improve water quality where possible and do not result in further water quality degradation of the Swan Canning river system;
- stormwater management systems are designed in a manner to enhance the environmental quality of the river; and
- river foreshores reserved for Parks and Recreation are protected as public resources that should be available for public access, recreation and conservation.

APPLYING THIS POLICY

This policy aims to provide a consistent basis for the Trust's decision making in relation to stormwater management. It applies to areas where the Trust has a role in assessing development applications or providing advice on proposed land use changes in accordance with the *Swan and Canning Rivers Management Act 2006*, the *Swan and Canning Rivers Management Regulations 2007*, and the Metropolitan Region Scheme. This includes

proposals in and around the Trust Development Control Area (DCA) as well as those that may not be near the DCA but that may affect waters in the Swan and Canning rivers through surface and/or groundwater connections. Plans of the Trust DCA and further information on the Trust's statutory planning role are available from the Trust's website at www.swanrivertrust.wa.gov.au

Proponents of development should have regard to this policy when planning land use changes or preparing applications for subdivision and development that are in and around the Trust DCA or that may affect waters in the Swan and Canning rivers.

The policy provides guidance to applicants, stakeholders and other decision making authorities on the Trust's position on matters relating to stormwater management. It recognises and refers to other relevant State government policies and provides additional guidance relevant to the Swan Canning river system.

POLICY STATEMENTS

SRT/D4.1 Better urban water management

The Swan River Trust has endorsed *Better Urban Water Management* (WAPC, 2008), which provides a framework for how water resources should be considered at each planning stage by identifying the actions and investigations required to support the particular planning decision being made. Regional, district and local land use planning proposals, as well as subdivision proposals should be prepared in accordance with *Better Urban Water Management*. *Better Urban Water Management* requires the preparation of an appropriate water management strategy or urban water management plan to inform and support a planning proposal or subdivision application. The water management strategy or plan must be submitted with the planning proposal or subdivision application.

Better Urban Water Management is designed for new greenfield and urban renewal projects, and is not intended to apply in brownfield or infill circumstances or to small scale subdivision or development proposals unless significant water management issues are present.

The Department of Water is responsible for endorsing water management plans and strategies prepared in accordance with the *Better Urban Water Management* framework. As part of this role, the Department of Water seeks advice from the Trust and local governments.

SRT/D4.2 Land use change

Urban, commercial or industrial development can change the water cycle. Proposed land use changes should be managed to minimise sediment transport and to prevent the mobilisation of nutrients or contaminants from the site to the river. Land use changes should not result in further water quality degradation but should, if possible, improve the situation.

SRT/D4.3 Water sensitive urban design

Stormwater management systems shall be designed to enhance the environmental quality of the river through the use of water sensitive urban design. The *Stormwater Management Manual for Western Australia* (DoW, 2004-07) and the *Decision Process for Stormwater Management in WA* (DoW, 2009) provide guidance on this matter, including details of structural and non-structural best management practices for Western Australia.

Natural flow regimes are generally preferred over artificial systems. The Trust will encourage retention of existing tributaries or surface water flows and will oppose replacement with pipe systems unless it can be demonstrated that habitat values and water quality will be maintained or improved.

SRT/D4.4 Stormwater quantity

Post-development annual discharge volume and peak flow should be maintained relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments in accordance with the *Decision Process for Stormwater Management in WA* (DoW, 2009).

The effective imperviousness of the development should be minimised (DoW, 2009). In particular, stormwater runoff from constructed impervious surfaces generated by 1 year, 1 hour average recurrence interval (ARI) events should be retained or detained on site, as high in the catchment and as close to the source as possible. The design for larger events should address minor (up to 5 year ARI events) and major (greater than 5 year ARI events) system conveyance. Effective management of stormwater quantity can lead to improvements in water quality. Proponents of development should rationalise proposed stormwater quantity management measures in terms of water quality objectives and identify how environmental flows to the river will be maintained.

SRT/D4.5 Stormwater quality

Stormwater management systems should include a water quality treatment train designed to meet the water quality management objectives of the catchment. The treatment train should include a combination of structural and non-structural controls. Multiple best management practices may be needed to meet the water quality management objectives and ensure further water quality degradation in the river does not occur as a result of the development.

Water quality objectives for local catchments may be defined by an approved water quality improvement plan, regional water plan, drainage and water management plan, district or local water management strategy or urban water management plan prepared in accordance with *Better Urban Water Management* (WAPC, 2008).

In the absence of defined water quality objectives for a catchment, stormwater to be discharged to the Swan Canning river system, its tributaries or drains should not exceed the trigger values applying to typical slightly–moderately disturbed systems (for lowland rivers in south-west Australia) cited in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000) and the long-term nutrient targets in the *Healthy Rivers Action Plan* (SRT, 2008). The long-term Healthy Rivers targets are representative of the background nutrient levels in the river, so applying these targets will ensure that river water quality is not degraded.

Requirements to demonstrate compliance with the water quality objectives will depend on the scale and nature of the proposed development. Large scale developments are likely to require pre- and post-development monitoring to establish water quality and determine the effectiveness of the proposed treatment train. The Trust may require a contingency plan outlining the actions to be taken if monitoring indicates that the water quality objectives are not being achieved. For smaller scale developments, it may only be necessary to demonstrate that the most suitable best management practices are being implemented.

SRT/D4.6 Contaminated sites and elevated nutrient levels

The Swan Canning catchment contains areas where soil and groundwater are contaminated by historic land use practices. Proponents must demonstrate that land use changes or development will not result in the mobilisation of nutrients or other contaminants from the soil or groundwater to the river system as a result of the chosen stormwater management practices.

Infiltration of stormwater to the groundwater system will not be supported in these areas if there is a risk that nutrients or other contaminants will be mobilised from the site to the river. Adequate site investigations must be undertaken before development commences to determine the appropriate water quality management measures for the site and to establish

whether previous land use practices have resulted in soil, groundwater or surface water contamination.

Sites that are suspected to be contaminated or are found to be contaminated should be reported to the Department of Environment and Conservation in accordance with the requirements of the *Contaminated Sites Act 2003*. Subsequent remediation of the site may be required prior to land use changes or development being considered.

Constraints on the land such as elevated nutrient levels in groundwater must be considered when stormwater management systems are being designed, regardless of the site's classification under the *Contaminated Sites Act 2003*.

SRT/D4.7 Acid sulfate soils

The design and construction of stormwater management systems can have the potential to disturb acid sulfate soils and must be managed carefully to avoid environmental harm. To assist with the identification, investigation and management of acid sulfate soils, risk maps, fact sheets and guidance materials are available from the Department of Environment and Conservation's website.

SRT/D4.8 Controlled groundwater levels and subsoil drains

Through its role in approving urban water management plans under *Better Urban Water Management* (WAPC, 2008), the Department of Water is responsible for determining the levels at which groundwater drainage can be set and is currently preparing guidelines on determining those levels.

Controlled groundwater levels (CGLs) and subsoil drains may reduce the potential for water quality improvement of stormwater through infiltration and increased subsurface residence time. Subsoil drains must not mobilise contaminated or nutrient-rich groundwater from the site to the river.

If CGLs and subsoil drains are proposed to change groundwater levels, the implications for water quality treatment must be addressed. The Trust will require treatment of water discharging from subsoil drains to surface water systems. This approach is consistent with *Better Urban Water Management* (WAPC, 2008).

SRT/D4.9 Maintenance

The Trust will require details of ongoing maintenance requirements for the proposed stormwater management system to be provided with proposals for subdivision or development if they have not already been addressed through an approved urban water management plan. Roles, responsibilities and funding arrangements should also be included.

SRT/D4.10 Stormwater management for small-scale developments

For small-scale developments such as single residential developments, survey strata subdivisions or some small subdivisions, the Trust will require stormwater drainage to be contained on site or, if the local government consents, connected to the local drainage system. Development applications shall include basic details of the site drainage design. Connection to the local government drainage system is likely to require the approval of the local government through the building licence process.

If the applicant can demonstrate to the Trust's satisfaction that it is not practicable to contain stormwater drainage on site or connect to the local government drainage system, the Trust may allow a controlled overflow to the river. This option will only be considered where stormwater runoff from constructed impervious surfaces generated up to the 1 year, 1 hour average recurrence interval (ARI) event has been retained or detained on site, and the development abuts the River Reserve and surface water naturally flows towards the river. Overflow into the river shall be by overland flow paths across vegetated surfaces. The outfall

shall be located on or near the property boundary and shall be designed to minimise visual intrusion on the foreshore and to control erosion.

For new car parks or road networks in or adjacent to the Trust's development control area, stormwater run-off generated up to the 1 year, 1 hour ARI event must be retained or detained on site and will not be permitted to enter the river untreated.

SRT/D4.11 Stormwater management within the Trust Development Control Area

This section provides guidance in relation to proposals to use the foreshore for the management of stormwater from new or existing urban developments.

State Planning Policy 2.10: Swan Canning River System (WAPC, 2006), *State Planning Policy 2.9: Water Resources (WAPC, 2007)* and *Better Urban Water Management (WAPC, 2008)* provide clear policy direction requiring water quality in receiving water bodies to be protected from impacts of land use change, and ensuring water resource management is considered at each stage of the planning process. As such, sufficient land should be provided in the development site for retention, storage and treatment of stormwater.

Development in the Trust Development Control Area, including installation of stormwater management infrastructure, requires approval under Part 5 of the *Swan and Canning Rivers Management Act 2006*.

The Trust will only support applications for the use of land in the Trust Development Control Area for stormwater management from new or existing residential, commercial or industrial developments if:

- the proposal will improve the ecological value of the foreshore reserve and the waterway and will result in a demonstrable community benefit;
- the subject site is in close proximity to the urban development that is the source of the stormwater;
- the reasons that stormwater cannot be managed on the development site are provided and the need to locate the stormwater management system in the Trust Development Control Area is justified to the Trust's satisfaction;
- every practicable attempt has been made to manage the 1 year, 1 hour ARI events as high in the catchment and as close to the source as possible;
- the proposal includes a demonstrable commitment to improve the quality of water entering the river system from the development site and the surrounding catchment;
- the use of the foreshore reserve for stormwater management has been rationalised in an urban water management plan prepared in accordance with *Better Urban Water Management*;
- the use of the Parks and Recreation reservation for stormwater management is consistent with the purpose of the reserve as a regionally significant public resource that should be available for public access, recreation and conservation;
- the owner of the land (or the agency responsible for the care, control and management of the land) supports the application; and
- the long-term management of the stormwater management system is addressed and evidence of an agreement with the land manager is provided with the application.

Water sensitive urban design and environmental protection

Stormwater management systems proposed in the Trust Development Control Area must be designed to enhance the environmental quality of the river through the use of water sensitive urban design and shall utilise best management practices. The rehabilitation and enhancement of natural flow regimes is preferred rather than construction of artificial systems. Living streams, vegetated swales and bioretention basins will be favoured rather than 'hard engineering' solutions. Traditional pipe and pit conveyance systems and compensating basins will not be supported in the Trust Development Control Area.

Community benefit

The Trust is more likely to support applications for stormwater management in the foreshore reserve where the proponent demonstrates that time and resources will be invested in rehabilitation, restoration and revegetation of the foreshore reserve. Public access to the river should also be maintained and enhanced, and should reflect the nature of foreshore reserves as regionally significant public resources.

Natural and visual landscape

The design of the stormwater management system shall maintain or improve the visual landscape character of the river and protect the natural ecosystem of the river. Landscaping associated with the system shall utilise local native plant species. The selection and use of materials should be based on materials and hues naturally occurring or predominantly used in the locality. In particular, rock selected for use in spalling or features shall reflect the natural geology of the area. The use of limestone for rock spalling and features will only be supported in areas where limestone or white sandy soils occur naturally.

Approvals

Better Urban Water Management indicates that infrastructure and land requirements for stormwater management should be identified at the local planning stage in a local water management strategy. Accordingly, where there is a need to utilise the foreshore for stormwater management this should be identified in a local water management strategy. Subdivision should be supported by an urban water management plan providing detailed information on the size and location of stormwater management systems and rationalising the use of the foreshore reserve for stormwater management.

Urban water management plans are approved by the WAPC as a component of a subdivision application, on the advice of the DoW. The DoW seeks input from the Swan River Trust, local governments and other relevant agencies before providing advice and recommended subdivision conditions to the WAPC. Detailed guidance on developing urban water management plans is provided in *Urban Water Management Plans: guidelines for preparing plans and for complying with subdivision conditions* (DoW, 2008).

It should be noted that the approval of a subdivision application (including the accompanying urban water management plan) by the WAPC, on advice from the Department of Water, does not constitute approval for construction of stormwater infrastructure in the Trust Development Control Area. Separate approval of the stormwater infrastructure is required under Part 5 of the *Swan and Canning Rivers Management Act 2006*. Where it is proposed to use foreshore areas for stormwater management, it is recommended that proponents use the urban water management plan process to gain consensus on the stormwater management design prior to lodging a Part 5 development application.

The foreshore often contains areas that are recognised as environmentally sensitive, or of landscape or heritage significance. This may include conservation category wetlands, Bush Forever, floodplain or heritage sites. The proponent should identify such factors early in the planning process and liaise with the relevant agencies. The Trust will not support constructed stormwater infrastructure in conservation category wetlands and their buffers without the

written authorisation of the Department of Environment and Conservation; or in the floodway of the river without the written authorisation of the Department of Water.

All applications for development of stormwater management systems in the Trust Development Control Area should include details on the staging of works and demonstrate how the proposed foreshore works are to progress in conjunction with the development that is the source of the stormwater.

This statement also applies to foreshore land that is proposed to be, or has been, ceded free of cost to the Crown as a result of subdivision and is to be included in the Trust Development Control Area. Element 4 of Liveable Neighbourhoods (WAPC, 2009) sets out WAPC's intentions with respect to ceding of foreshore reserves. Such land may, or may not be, reserved for Parks and Recreation. Development of stormwater management systems on such land is likely to be subject to approval under Clause 30A of the Metropolitan Region Scheme.

SRT/D4.12 Advice from other agencies

As part of its consideration of any application, the Trust may seek advice from agencies or organisations which it considers have a legitimate interest in the application. In relation to stormwater management, the following agencies may be consulted:

- relevant local governments;
- Department of Water;
- Department of Planning;
- Water Corporation;
- Department of Environment and Conservation; and
- Department of Indigenous Affairs.

RELATED POLICIES AND GUIDELINES

- Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra (ANZECC & ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy No 4*
- Department of Environment and Conservation (2001-2007) *Contaminated Sites Management Series Guidelines*
- Department of Water (2004-2007) *Stormwater Management Manual for Western Australia*
- Department of Water (2008) *Interim: Developing a local water management strategy*
- Department of Water (2008) *Urban Water Management Plans: Guidelines for preparing plans and for complying with subdivision conditions*
- Department of Water (2009) *Decision Process for Stormwater Management in WA*
- Department of Water (in prep) *Guidelines for Assessing the Need for and Setting Controlled Groundwater Levels*
- Swan River Trust (2008) *Healthy Rivers Action Plan*
- Swan River Trust (2011) *SRT/D20: Nutrient Offset Policy for the Swan Canning Catchment*
- Swan River Trust (2012) *Draft River Protection Strategy for the Swan Canning River Park*

- Western Australian Planning Commission (2006) *State Planning Policy 2.10 Swan-Canning River System*
- Western Australian Planning Commission (2006) *State Planning Policy 2.9 Water Resources*
- Western Australian Planning Commission (2008) *Better Urban Water Management*
- Western Australian Planning Commission (2009) *Liveable Neighbourhoods*

TERMINOLOGY

Community benefit: The enjoyment and comfort brought about by the provision of opportunities and facilities for a range of activities. Community benefit incorporates community use of the Riverpark, including aesthetics and provision of public facilities, as well as maintaining public access and safety (SRT, 2012).

Controlled groundwater level: The modified groundwater level (measured in metres Australian height datum) at which the Department of Water will permit drainage inverts to be set (DoW, 2009).

Ecological value: In relation to proposals to manage stormwater in the Trust Development Control Area, factors of ecological value that should be improved include water quality, biodiversity, habitat and condition of the foreshore, flora and fauna.

Ecological water requirements: The water regimes needed to maintain the ecological values of water dependent ecosystems.

Groundwater: Water beneath the ground surface that fills pores and cracks between materials such as sand, soil, rock or gravel.

Impervious surfaces: Surfaces that are mainly artificial structures such as rooftops, roads, pathways, driveways and car parks that are covered by impenetrable materials such as tiles, bitumen, concrete, brick, stone. Soils compacted by urban development can also be highly impervious. Impervious surfaces eliminate rainfall infiltration and natural groundwater recharge and increase surface water runoff.

Stormwater: Water flowing over ground surfaces and in drains and natural streams as a result of rainfall over a catchment (DoW, 2007-2009). Stormwater can also include rainfall surface run off, groundwater intercepted by drains and any material (soluble or insoluble) mobilised in its path of flow.

Surface water: Water that is on the earth's surface, such as in lakes, streams, rivers, oceans and storm water drains.

Water sensitive urban design: The philosophy of achieving better water resource management outcomes in an urban context by using an integrated approach to planning an incorporating total water cycle management objectives into the planning process. The key elements of this design include protection from flooding; management of water quantity and quality to achieve ecological objectives; and water conservation, efficiency and re-use (WAPC, 2008).

ADOPTION AND REVIEW DATES

| Draft Adoption Date | Final Adoption Date | Review Date |
|---------------------|---------------------|----------------|
| 16 November 2009 | 14 August 2012 | 14 August 2017 |