

Development Control Policy 1.8

Canal estates and artificial waterway developments

May 2012

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1. Citation

This policy is Development Control Policy 1.8 Canal Estates and Artificial Waterway Developments, reviewed under Part 2 of the *Planning and Development Act 2005*.

2. Background

The Western Australian Planning Commission (WAPC) adopted a policy on this matter on 10 December 1991, which was the result of review of a previously endorsed Cabinet policy. Operation of the policy and experience of the development of canal estates were reviewed in 1998, and from 2007 to 2011. Emphasis has been on clarifying roles and responsibilities of State government agencies and affected stakeholders.

This policy supersedes Development Control Policy 1.8 Canal Estates and Other Artificial Waterway Developments (February 1999).

Related State planning legislation, policies, strategies, guidelines, planning bulletins and Australian standards are listed under Appendix 3 as they apply to various State government agencies and affected stakeholders.

3. Introduction

This policy sets out requirements of the WAPC for assessment of canal estate proposals. General principles and procedures to be considered by those proposing to undertake canal estate projects are set out in the associated guidelines.

This policy and guidelines applies to canal estate developments which propose to incorporate artificial waterways. The general principles of the policy and guidelines also apply to:

- marinas and harbours, whether as a result of construction of breakwaters into natural water bodies or by dredging inland harbours;

- developments incorporating artificial waterways or lakes designed for navigation as well as ornamental and recreational purposes; and
- private water frontage abutting or over waterways.

4. Objectives

Policy objectives are:

- establishing a consistent and coordinated approach to the assessment of proposals for canal estates and artificial waterways; and
- establishing ongoing management and maintenance responsibilities for canal estates and artificial waterways.

5. Preliminary consultation

Given the wide range of issues involved in proposals for canal estates and artificial waterways, it is in the proponents' interest to conduct a round of preliminary consultations with local government and other relevant agencies.

Proponents should have preliminary discussions with agencies such as Department of Planning, Department of Transport, Department of Environment and Conservation, Swan River Trust, Cockburn Sound Management Council, Office of the Environmental Protection Authority, Department of Water, Department of Health, Department of Regional Development and Lands, Department of Fisheries and the applicable local government prior to lodging a formal proposal that includes canal estates and/or artificial waterways.

Early consultation will be necessary to establish various government agency requirements to be addressed over the design stage of the project. Requirements include:

- the level of detail of relevant and adequate information to enable proposals to be considered;

- staging of requirements for engineering and planning design guidelines;
- approach for best practice water management;
- documentation to supplement rezoning of marinas and canal estates; and
- scoping content for a deed of agreement.

It is expected that proponents in this process will consult with all affected authorities and obtain general advice from those authorities on the level of detail required for the proposal to be assessed.

It will also be necessary to determine whether or not the local government is prepared to initiate an amendment to its local planning scheme to have the land appropriately zoned for the purpose proposed.

5.1 Information for preliminary consultation

This section identifies requirements in addition to those specific to each agency listed under section 5.2, and the information required for subdivision applications to the WAPC, development proposals under relevant local government town planning Scheme provisions and Scheme amendments.

Proponents are to provide sufficient information to enable informed discussions to take place between the proponent, local government and other relevant agencies. The following information is recommended.

- A costed 25-year maintenance plan that includes:
 - (1) costs of maintenance, dredging (including dredge spoil treatment-disposal and management), environmental monitoring and management (including contingency management strategies) to be implemented if environmental quality objectives are not met, and maritime structure maintenance;
 - (2) sources of funding; and
 - (3) obligations of the proponent, local governments, lot owners and other relevant State government agencies.
- A basic concept plan showing approximate shape of proposed waterways, mooring envelopes and connecting channels, and proposals for subdivision, land use and development (including preliminary building footprints, bulk and scale form).
- Preliminary hydrodynamic analysis demonstrating that flushing rates will be adequate to maintain acceptable water quality.
- Basic hydraulic, environmental, geotechnical and ecological studies showing perceived impact of development on the natural and physical features, and processes of the site and its environs including any public health implications.
- A map showing natural and proposed waterways and drainage lines.
- Relevant floodplain mapping showing the floodway and flood fringe.
- A map showing any low-lying seasonally inundated breeding areas for mosquitoes in close proximity to the proposal. Approval for mosquito control measures in areas managed by the Department of Environment and Conservation will be required from the Department.
- Preliminary analysis and mapping of native vegetation, flora and fauna, threatened flora and fauna records, threatened and priority ecological communities, classification and management category of any wetlands in Department of Environment and Conservation datasets and nationally and internationally listed wetlands'.
- Preliminary Health Impact Assessment to Department of Health requirements including and not limited to, potential for disturbance of acid sulphate soils, disturbing mineral deposits and radon gas formation.

- Any other information that may be reasonably requested by an agency or local government at this stage of the process.

5.2 Roles and information requirements of agencies (Refer to Appendix 3).

5.2.1 WAPC and Department of Planning

It is recommended that a copy of the concept plans and supporting documentation be provided to the WAPC and the matter be discussed with officers of the Department of Planning. These preliminary consultations will draw attention to any concerns relating to the project or any issues that need to be addressed in the formulation of a detailed proposal. The Department of Planning will provide a coordinating role by arranging joint meetings and discussions between affected parties when and where appropriate. The WAPC is responsible for amendment of region planning schemes, approval of local planning scheme amendments, endorsement of local structure plans and approval of subdivision. Appendix 1 shows the dual process where the Environmental Protection Authority is also involved with the statutory assessment process.

5.2.2 Department of Transport

Information required in this section should be sufficient for the Department of Transport to advise the proponent, as to whether fundamental objections to the proposal exist. Objections may arise or be the result of:

- impact on coastal processes, such as changes to the littoral drift regime at the entrance channel and their consequences for subsequent management;
- exposure to damage by tide and storm surge levels; and
- navigation problems.

If a proposal is acceptable in broad principle, the Department of Transport will be asked to comment on the objections above and those set out below to assist in more detailed design work:

- sea level rise (SLR) in accordance with State Planning Policy 2.6;
- artificial waterway design and stability (including walls, banks and revetments);
- entrance design and stability;
- siltation rates;
- navigation requirements;
- tide and storm surge levels;
- mooring design requirements; and
- other relevant matters as applicable to the proposal.

5.2.3 Department of Environment and Conservation

The Department of Environment and Conservation should be consulted at an early stage. This is necessary to ensure there are no overriding environmental constraints that could prohibit the proposed development from proceeding, and to assist the proponent identify environmental principles to be incorporated in development concept designs. The proponent should identify environmental issues and determine potential environmental impacts of the proposal.

Prior to the EPA setting the level of assessment on a scheme or proposal that relates to a canal estate or waterway development, the OEPA will generally request the DEC's advice.

The Department will usually require a description of environmental quality management framework (see section 8) for the canal estate or artificial waterway and adjacent natural waterways; environmental values to be protected; environmental quality objectives; levels of protection; frequency of monitoring and environmental quality criteria to be achieved;

- current and/or anticipated water quality (particularly nutrient and contaminant levels) and its management, involving natural or artificial flushing or water exchange;
 - coastal, estuarine or river environments and potential for impacts upon those environments;
 - native vegetation, flora and fauna habitat, including waterbird habitat protected by Commonwealth or International treaty agreements;
 - impacts from construction and operational activities on marine fauna, marine fauna habitats, benthic primary producer habitats and significance of species and habitats affected;
 - description of wetland classification and management category from Department datasets; identification of conservation category wetlands; wetlands of national and international importance including Ramsar-listed wetlands; description of likely impacts on wetland water regime; regional groundwater and surface water interactions with local groundwater; and assessment of system functions based on hydrological studies;
 - identification of any lands or waters gazetted and managed by the Department under the *Conservation and Land Management Act 1984* within footprint and proximity of the proposed development; a description of how the values of these areas will be affected; and consideration of consistency with the relevant area management plan(s);
 - prospective impact upon groundwater reserves and such other matters as saltwater intrusion and drawdown; impacts from drawdown and/or saltwater intrusion on groundwater dependent ecosystems and wetlands;
 - likely extent of and distribution of acid sulphate soils on the land; potential for acid regeneration; and capacity of the land to sustain proposed development, having regard to both excavation and land-based dredge disposal, and to include:
 - likely extent and severity of acid sulphate soils,
 - potential impacts on surface and groundwater quality and quantity,
 - potential impacts on ecosystems and biodiversity,
 - potential impacts on infrastructure, and
 - cumulative impacts;
 - likely extent of monosulfidic sediments accumulation in poorly flushed estuaries and waterways that may be disturbed by artificial waterway development;
 - maintenance dredging of acid sulphate soil sediments, their disposal and spoil management;
 - quality of dredge spoil, in particular for heavy metals and hydrocarbons (required for assessment of the impacts of both onshore and offshore disposal methods);
 - waste disposal with particular regard to disposal of wastewater (including vacuum or gravity sewage infrastructure proposed) and contaminated surface water run-off; and
 - land clearing of native vegetation (Including Indigenous aquatic and terrestrial vegetation) and potential impacts on biodiversity and potential loss of biodiversity.
- If the Department of Environment and Conservation is aware of a fundamental constraint to the proposal, it will advise the proponent of that constraint. In such circumstances, the proponent should not proceed unless action can be taken to overcome that constraint. The lack of identification of a fundamental constraint by the Department or any other agency during the early consultation phase does not necessarily mean that the project is cleared of significant issues, particularly when deficient information is provided or there are substantial proposal modifications.

Any development adversely impacting upon important conservation areas, including habitats for endangered species and species of high conservation significance, is unlikely to be supported.

5.2.3.1 Cockburn Sound Management Council

The Cockburn Sound Management Council is responsible for implementing the *State Environmental (Cockburn Sound) Policy 2005*, *Environmental Management Plan 2005* and associated environmental quality criteria, and will need to be consulted for proposals within Cockburn Sound and Owen Anchorage.

5.2.4 Swan River Trust

The Swan River Trust should be consulted where any proposed development is located within or abutting the Trust Development Control Area boundary or is likely to affect waters within this area. Approvals may be required under the *Swan and Canning Rivers Management Act 2006*.

5.2.5 Department of Water

The Department of Water is concerned primarily with the impact of artificial channels on natural receiving bodies and regulation under the *Rights in Water and Irrigation Act 1914* and *Waterways Conservation Act 1976* where these apply. Consultation with the Department at an early stage is encouraged to discuss impacts on natural waterways, licensing requirements and to assist the proponent identify principles to be incorporated in development concept designs.

The Department of Water will usually require a description of:

- impact on general flooding regime;
- exposure to flooding and flood damage;

- management of stormwater and drainage; and
- impact on natural waterways estuaries, groundwater aquifers and water quality.

The Departments of Water will need to be consulted regarding flood levels, dewatering, dredging, effluent disposal, provision of pollution control equipment, stormwater management, and licence for a bore or well and potential impacts of proposals on aquatic and riparian habitats. Approvals are required under provisions of the *Waterways Conservation Act 1976* and the *Rights in Water and Irrigation Act 1914*.

The above information should be provided to the Department of Water in the relevant water management report according to WAPC's '*Better Urban Water Management*' document (WAPC, 2008).

5.2.6 Environmental Protection Authority

The Environmental Protection Authority provides advice to the Minister for Environment regarding environmental protection in the State and for conducting environmental impact assessments for planning schemes and significant development proposals as required under the *Environmental Protection Act 1986*.

Section 38 of the *Environmental Protection Act 1986* requires the WAPC and any other decision-making authority to refer to the Environmental Protection Authority any proposal application that is likely, if implemented, to have a significant effect on the environment. This includes any canal estate or marina proposal that is environmentally significant and affects environmental values mentioned in this document.

If a proposal for a canal estate is referred to the Authority, it is required to make a decision on whether or not to assess the proposal, and if so, the level of assessment. If it decides to formally assess a proposal, it will do so

using levels of assessment and assessment procedures set out in the *Environmental Impact Assessment Administrative Procedures 2010*.

The *Planning and Development Act 2005* and the *Environmental Protection Act 1986* require that all planning schemes (including scheme amendments) be referred by the responsible authority to the Environmental Protection Authority for a decision on whether or not the scheme should be formally assessed. This would include any schemes which contemplate a canal estate or artificial waterway as a future land use. Allowing environmental issues to be considered 'upfront' during the scheme formulation process ensures that environmental factors are given proper consideration by the Authority and the responsible authority before subdivision and development occur.

5.2.7 Office of the Environmental Protection Authority

The Office of the Environmental Protection Authority was established on 27 November 2009 to support the Environmental Protection Authority in conducting environmental impact assessments and developing policies to protect the environment. The Office also monitors compliance with ministerial conditions related to approvals.

The Office should be consulted as early as possible during the planning stages to identify the most suitable mechanism and process by which a canal estate or artificial waterway development may be best considered by the Authority under the *Environmental Protection Act 1986*.

5.2.8 Department of Health

The Department of Health is to be consulted in the process, as it considers land use activities and evaluates risks to humans in the new community. Examples of risks include the possible location of residential canal housing in close proximity to mosquito-breeding areas that can lead to high risk of disease infection such as Ross River Virus. Proposals located within areas designated to have a high to

medium Mosquito risk shall require a Mosquito management plan.

Water quality is of concern in respect to pollution through illegal disposal of raw sewage within waterways and subsequent contamination. It will ensure that potential public health risks caused by the development are properly identified, assessed and managed to ensure its relevant objectives are satisfied.

5.2.9 Department of Fisheries

The Department of Fisheries has responsibility for fish habitat, aquatic environment protection, fisheries management, fish health and the prevention of marine pest incursions. In line with these responsibilities, it provides advice on development projects which have potential to impact these sectors, which include coastal developments such as canal estates.

5.2.10 Local government

The local government should be requested to advise whether the proposal meets general planning and engineering criteria, and the circumstances under which it would be prepared to proceed with an amendment to its town planning scheme (ie. land rezoning) when formally requested to do so.

Long-term maintenance of public areas such as waterways, connecting channels, breakwaters, and artificial waterway walls and embankments where these abut land set aside for use by the public at large, will normally be the responsibility of local government. Local government will need to be satisfied regarding economic viability of the proposal and the local government's financial capacity to meet ongoing water and canal wall-monitoring and maintenance costs. Proponents shall provide projected short and long-term costs related to capital works and maintenance for local government assessment.

The proponent will normally be responsible for maintenance of the entire project for the initial period (normally five years), apart from those responsibilities assumed by

purchasers of lots within the canal estate. Additional responsibilities may include the payment of specified area rates to provide the local government with additional financial contributions to undertake long term maintenance of the canal estate or artificial waterway development.

Local government may liaise with State government agencies in regard to obtaining information that the local government considers relevant when deciding whether to proceed with a scheme amendment and subsequent approvals.

5.2.11 Other agencies

In addition to prior consultations, it will, in particular circumstances, be appropriate to confer with other authorities, for example, the Department of Indigenous Affairs may require an Aboriginal heritage survey in accordance with the *Aboriginal Heritage Act 1972*. The Department of Mines and Petroleum shall be consulted to ascertain whether the proposal is located within a designated mineral field in accordance with the *Mining Act 1978* and *Land Administration Act 1997*. In cases of likely environmental impacts of national significance, for example, proposals in close proximity to Ramsar wetlands, consultation is required with the Commonwealth Department of Sustainability, Environment, Water, Population and Communities under the *Environment Protection and Biodiversity Conservation Act 1999*. The Heritage Council of Western Australia should also be consulted in regard to proposals, or in close proximity to places listed on the State Register of Heritage Places. Also, consultation is recommended with infrastructure servicing authorities, such as Western Power for electrical provision and infrastructure upgrading and Water Corporation for sewerage and reticulated water servicing and infrastructure upgrading.

6. Approvals

6.1 General

The general procedure for approval, including environmental assessment, to develop a canal estate or other artificial waterway is shown in a flow diagram at Appendix 1.

Zoning

The site area of the proposal shall be zoned for urban land use under a region planning scheme where a region scheme applies to the subject land. An amendment to the local planning scheme to rezone the subject land to an appropriate zone including applicable provisions following the gazettal of any region planning scheme amendment is required. A local planning scheme amendment proposal requires a scheme amendment report to be prepared, which includes a concept plan of the development and any other details required by the local government in support of the proponents request to rezone the subject land.

A prerequisite to rezoning will be the requirement for the proponent to enter into a draft deed of agreement with the local government concerning future waterways management. The deed will need to state the waterways manager and be endorsed by all affected parties prior to the amendment being finalised. The deed shall be flexible to accommodate provision for any matters determined by the WAPC arising from subsequent planning stages, such as structure plan subdivision/survey strata and development assessment processes.

Information supplied shall accord with the key stages shown the flow chart in Appendix 1. All parties are expected to apply reasonable judgment related to the characteristics of the particular proposal to ensure that the level of information is provided at the appropriate stage of the planning process.

Local Structure Plan

A Local Structure Plan may be required to be prepared and approved by the local government and the WAPC as a prerequisite to subdivision and/or development. The requirement to prepare a local structure plan will be identified during the local scheme amendment process.

Subdivision

Approvals to subdivide land and to commence and carry out development will be considered (refer section 157 and 170 of the *Planning and Development Act 2005*) following finalisation of the region and local planning scheme amendments and a local structure plan.

Environmental Approvals

If a region and/or local scheme amendment has been formally assessed by the EPA then a Ministerial Statement is issued under the *Environmental Protection Act 1986*. Further environmental approvals are likely to be required at subsequent planning stages, particularly at the local structure plan stage.

6.2 Region planning scheme

The WAPC may amend a region planning scheme in one of two ways:

- (1) as a substantial or “major” amendment; or
- (2) as a non-substantial or “minor” amendment.

Canal estate developments will be dealt with as major amendments due to their complex and technical nature. A proposal deemed to be a minor variation to an existing canal development may, in the opinion of the WAPC, be considered a minor amendment. The *Planning and Development Act 2005* provides opportunity for the simultaneous amendment of a local planning scheme where a region scheme is amended.

The process for amending a region planning scheme is set out in part 4 of the *Planning and Development Act 2005*.

6.3 Local planning scheme

The following represent principal matters which may be covered by a local planning scheme and accompanying local structure plan, outline development or subdivision guide plans (draft model scheme text provisions for the Canal Zone are shown in Appendix 2):

- information describing the existing environment (social, physical and biological) of the development area and environs and the potential environmental impacts of the proposed development, as well as contingency management strategies for mitigation potential environmental impacts. Information should be sufficiently detailed to assist the Environmental Protection Authority to determine whether the amendment warrants formal environmental assessment;
- a submission showing all of the matters believed by the proponent to be the basis upon which a deed of agreement can be entered into with the local government (or alternative waterways manager). State government agencies may also be parties to the deed of agreement at their discretion;
- building densities (based upon net developable area of dry lot);
- layout of subdivision and/or development scale/form for land within the canal estate;
- layout of mooring envelopes within artificial waterways;
- location of lot boundaries in relation to retaining walls;
- artificial waterways, connecting channels and the water body to which connection is to be made;
- land to be ceded to the Crown as such as waterways, foreshore reserves and public open space;
- siting of buildings with particular reference to flood levels and to artificial waterway banks;
- ramps and hoists;

- pump-out facilities for non-residential vessel moorings;
- a local water management strategy in accordance with the WAPC's *'Better Urban Water Management'* (WAPC, 2008) framework to support the scheme amendment and/or structure plan and demonstrate that water can be managed appropriately onsite;
- particulars of any proposed sea bed lease and Torrens title within the project area; and
- other matters covered by Schedule 7 of the *Planning and Development Act 2005* which the local government deems appropriate.

Initiation of a local planning scheme is set out in Part 5 of the *Planning and Development Act 2005*. The process for a local scheme amendment is set out in the *Town Planning Regulations 1967*.

6.4 Environmental assessment process

Following resolution of the WAPC to amend a region scheme and/or the local government to amend its local planning scheme, sections 38 and 81 of the *Planning and Development Act 2005* require referral of the amendment to the Environmental Protection Authority.

Upon receipt of sufficient information, the Authority will determine whether the amendment warrants formal environmental assessment, and if so, at what level (under section 48A of the *Environmental Protection Act 1986*), or whether it is incapable of being environmentally acceptable. If an amendment warrants formal assessment, the Authority will issue instructions regarding scope and content to be addressed by the responsible authority preparing the environmental review. The environmental review must be advertised with the amendment during the public submission period.

At the end of the public submission period, the responsible authority is required to inform the Authority of its views and response to the

environmental issues raised in the submissions. The EPA then prepares an assessment report to the Minister for the Environment, making recommendations as it sees fit. The report is publicly released and copies are forwarded to the responsible authority, any decision-making authorities, the minister responsible and any other minister concerned.

The contents of the report, including recommended conditions, are subject to third party appeal to the Minister for the Environment. If appeal rights are exercised, the amendment cannot be implemented while the appeal is pending. The Minister for the Environment consults with the Minister for Planning prior to setting any environmental conditions to be incorporated in the amendment.

Alternatively, a development proposal may be referred under section 38 of the *Environmental Protection Act 1986* for a decision on whether to assess the proposal. Generally, a development proposal would only be referred under this section 38:

- a corresponding scheme or rezoning has not been assessed under section 48A;
- it does not comply with requirements and conditions of the assessed scheme;
- it is of a prescribed class which causes pollution;
- it raises environmental factors not addressed in the scheme assessment; or
- the Environmental Protection Authority did not have sufficient scientific or technical information at the time it assessed the scheme to assess all environmental factors raised by the proposed development.

If the Authority decides to formally assess a proposal, it will do so using the levels of assessment and assessment procedures set out in the *Environmental Impact Assessment Administrative Procedures 2010*. Canal estate developments are likely to require formal assessment by the Authority.

The *Waterways Conservation Act 1976* makes provision for conservation and management of certain waters and of associated land and environment. The Act applies to declared waterways (currently the Peel-Harvey Estuary, Wilson Inlet and Albany Harbour).

Furthermore, provisions of the Act regarding regulatory licensing apply only to certain activities such as dredging, disposal and reclamation activities within the management area. Approvals under the Act should not occur before or interfere with the Authority's consideration of a proposal. Should it decide to formally assess, approvals under the Act will follow the Minister for Environment's approval and conditions, and be consistent with such an approval and conditions. The Minister for Water and the Department of Water are to be consulted on any proposal within a declared waterways management authority area.

6.5 Subdivision

The proponent should not lodge subdivision or applications for planning approval prior to the Minister granting final approval to a scheme amendment, and until a structure plan for the subject land (if required under the scheme amendment)) have been endorsed by the local government and the WAPC.

Conditions of subdivision will normally address:

- construction of artificial waterways;
- filling of land;
- construction of artificial waterway banks, retaining walls and artificial waterway and navigation structures;
- maintenance plans for dredging, disposal and acid sulphate soils;
- management plans for environmental matters such as acid sulphate soil management, and control of nutrients, pesticides algal accumulation and insects;
- environmental management plans for impacted wetlands and buffers, flora and fauna;
- emergency, public or resident access along canal waterways;

- public open space and other reserves; and
- such other matters as the WAPC may determine in consultation with local government and State government agencies.

These conditions should accord with requirements of the appropriate authority nominated in the approval processes set out in this policy.

6.6 Other approvals

If the project is in a declared waterways management area, the proponent is required to obtain a dredging licence from the relevant agency prior to any dredging or reclamation being carried out, in accordance with the *Waterways Conservation Act 1976*.

Under the *Rights in Water and Irrigation Act 1914*, the taking of water for activities (e.g. dewatering, dust suppression, irrigation of public open space) within a proclaimed area must be undertaken in accordance with a valid water licence. Another licence will be required to construct or alter any wells from which groundwater will be taken. A permit will be required to interfere with bed and banks or to take water from a watercourse. Applications for licences and/or permits are made to the Department of Water.

The Department's policy requires that proponents applying to draw large amounts of water must prepare an operating strategy or management plan demonstrating how effects to the aquifer, surrounding environment and other users will be managed. Water quality monitoring is usually required and water is often treated before being released back to the aquifer or waterway. Groundwater modelling is sometimes required for large projects.

Where a natural watercourse or collection of water is being modified to allow development in a proclaimed area, a bed and banks permit will be required.

A Notice of No Objection may be required from the Commissioner for Soil and Land Conservation. Preparation of a nutrient and irrigation management plan, a dredging and dredge spoil disposal management plan and a conservation and foreshore management plan will also normally be required.

Where native vegetation on-site is proposed to be cleared (including marine), it will be necessary to obtain a native vegetation clearing permit, unless the clearing is exempt under schedule 6 of the *Environmental Protection Act 1986* or exempt under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Approvals are required under the *Wildlife Conservation Act 1950* for the taking of native flora and fauna.

Developments that occur within marine parks or reserves may require approval under the *Conservation and Land Management Act 1984*.

The Commonwealth Department of Sustainability, Environment, Water, Population and Communities advise on the need for referral of a proposal under the *Environment Protection and Biodiversity Conservation Act 1999*.

Government agencies should be consulted that have applicable legislation, and policies and procedures that need to be followed are listed in Appendix 3.

6.7 Deed of agreement

The purpose of the deed of agreement between the local government and the proponent is to agree to:

- undertake development within a defined period;
- provide a feasibility assessment of the proposal (Refer to section 5.1);
- identification of the local government as the waterways manager and any other party to the agreement;
- transfer of the 'waterway' area at no cost to the Crown for subsequent vesting;
- construct, including a development contribution plan in accordance with State Planning Policy 3.6, monitor and maintain specific artificial waterway and channel works;
- monitor and manage water quality to specified requirements;
- identify funding sources for construction and maintenance work referred to above, which may include a development contribution plan where necessary, and which will require amendment to the local planning scheme for implementation;
- remain a party to the agreement until at least five years after the date of practical completion of the project; should there be a recurring problem, this period may be extended yearly with WAPC approval;
- apply the deed of agreement to each stage of a development involving artificial waterways;
- provide a sustainable maintenance program including obligations for water quality and sediment monitoring programmes, monitoring water depths (ie. hydro graphic surveys), dredging, monitoring erosion or accretion of shorelines associated with the waterways;
- provide maintenance bonds;
- provide waterways headwork contributions;
- make arrangements regarding source of revenue for ongoing maintenance; and
- provide a bank guarantee against default of the above commitments and to cover any defects which may become evident during the period of the developer's obligation.
- establish the environmental values, environmental quality objectives, levels of ecological protection and environmental quality criteria for the artificial and adjacent natural waterways or water bodies and which define the objectives for management; and

- describe contingency management strategies that will be implemented if the environmental quality objectives are not met.

Determine the extent to which local laws, vessel mooring management plan and cyclone contingency plans may be required in consultation with relevant State government agencies, including Department of Transport, Department of Planning and State Emergency Service.

Funding sources of revenue may include fees paid for use of public facilities such as boat launching ramps, marine pen fees and commercial leases, lump sum payments made by the developer, and rating revenue via general, special area or differential rating methods.

A costed 25 year maintenance plan/feasibility assessment to be finalized by the completion of the State government planning process.

The deed of agreement may not be required to address all environmental issues, as these will be the subject of development under the *Environmental Protection Act 1986*.

The level of detail of items listed in section 6.7 can be addressed in consultation with local government and State government agencies. There should be flexibility for inclusion of any other relevant matters that apply to the particular proposal.

7. Guidelines for the design of boat harbours, marinas and canal estates

These guidelines should be applied to the rezoning, local structure plan and subdivision application process as required. Responsible agencies should be consulted to clarify the nature, extent and timing of particular requirements. Canal estates, boat harbours and marinas have some features which do not exist in conventional subdivisions.

Guidance for the design of boat harbours and marinas can be found in *AS 3962 2001: Guidelines for the Design of Marinas*. However, these guidelines are not wholly applicable to canal estates, and do not include particular local requirements. Western Australian design standards are currently based upon a 1 in 100 Annual Exceedence Probability (1% AEP) event. Proponents of canal/marinas are encouraged to voluntarily adopt standards above 1% AEP and that the design standard be, via legal instrument, stated on lot/strata titles.

The following supplementary guidelines have been prepared.

7.1 Dimensions of artificial waterways

To define navigable widths and depths for artificial waterways, lateral loads on mooring structures and dimensions of mooring areas, a 'design vessel' (the largest vessel expected to use the waterway) should be selected to guide the design of the artificial waterway.

Table 1 lists recommended sizes for a design vessel. These sizes are based on draughts appropriate to yachts, and beams appropriate to power boats.

Table 1: Design vessel sizes

Boat length (metres)	Beam (metres)	Draught (metres)
6	2.8	1.4 (0.8)*
8	3.4	1.5 (0.9)*
10	4.0	1.8 (1.0)*
12	4.4	2.0 (1.0)*
15	5.0	2.5 (1.2)*
18	5.4	2.7 (1.4)*
20	5.7	2.9 (1.5)*

*It is possible that some inland canal estates may cater for small power boats only. If this is the case, these reduced draughts may be acceptable. (Source: *AS 3962 2001*, Australian Standards)

The depth of clear fairway and mooring areas below Chart Datum shall be:

- not less than 1.0 metres;
- not greater than the associated natural water body;
- not less than the maximum draught of the design vessel plus:
 - half the predicted wave height;
 - 0.3 metres for soft bed or 0.5 metres for a rock bed;
 - allowance for siltation that matches the proposed maintenance dredging regime.
- The width of the navigation fairway shall be no less than 15 metres. In a Canal Zone the width shall be:
 - measured from boundaries of mooring envelopes and (in the case of sloping walls) from the navigation depth contour, whichever is appropriate;
 - twice the length of design vessel between the limits of the mooring envelopes;
 - increased if more than 20 residential moorings are upstream of any channel cross section.

The width across water between property boundaries in a Canal Zone should not be less than 30 metres.

Mooring areas in a Canal Zone should be identified in an overall mooring arrangement plan that depicts the design vessel for each lot, all mooring areas, navigation clearances, and signage. Mooring areas should comply with the following requirements:

- mooring envelope shall be shown in the artificial waterway at each property boundary, of sufficient size to contain all jetties, mooring piles and the design boat;
- for single residential lots, lot width and mooring location shall be such that the moored vessel is entirely in the water area bounded by the extension of the property boundaries; and

- beam to moorings only are permitted in main navigation channels.

The length and cross-section of any artificial waterway shall relate hydraulically so that non-scouring currents exist at the entrance and in the artificial waterways (note that this will be dependent on soil type and bank construction).

The Department of water provides technical advice (e.g. local government authorities, developers and Department of Planning) to incorporate into the approval process.

These currents are to be conservatively assessed against any annual event, and may be limiting only at the 1 in 100 Annual Exceedence Probability (1% AEP) event.

7.2 Canal walls and breakwaters

For all artificial waterways, all land retaining structures and breakwaters shall:

- be designed to resist damaging erosion by wind, current and wave action for a 1 in 100 Annual Exceedence Probability (1% AEP) event.
- be geotechnical stable under expected range of active loads including earth loads, earthquake, hydrodynamic loads, building, traffic and construction surcharges;
- minimise maintenance requirements as far as practicable; and
- take account of predicted climate change sea level rise under State Coastal Planning Policy 2.6.

7.3 Layout for navigation safety

It can be assumed that a vessel speed of five knots or less will be required within the artificial waterways system. While power boats may be in the majority, use of canoes, rowing dinghies and small sail boats must be expected.

For all artificial waterways:

- navigation safety requirements should comply with the maritime safety regulations of the Department of Transport;
- the artificial waterway system should contain clearly defined main waterways, and branches and cross-intersections should be avoided;
- junctions of artificial waterways should provide clear sight distances;
- navigation beacon piles shall be placed to identify the presence of any hazard to navigation for the design vessel and shall be marked with day marks and lights or reflective, coloured night marks in accordance with Department of Transport requirements;
- bridge clearances appropriate to the needs of the design vessel for height and width should be provided in accordance with Department of Transport requirements;
- lighting in the area should not be a hazard to safe navigation through excessive glare or inappropriate colour; and
- a sign shall be erected at the entrance(s) to the artificial waterways advising that the artificial waterway is designed for a vessel of given maximum length and draught (the design vessel dimensions), and that vessels of greater length and draught may encounter navigation difficulties.

7.4 Moorings, jetties and launching ramps

In the Canal Zone:

- all moorings, jetties and launching ramps must be contained within the mooring envelope, and no intrusion into the navigation channel will be permitted;
- mooring envelopes, jetty envelopes and launching ramps should be identified on the structure plan;
- car parking areas, to the satisfaction of the local government, shall be provided for all jetties, ramps, and moorings not directly

associated with the canal estate lot in a suitable location adjacent or close to those facilities (AS 3962 2001: Guidelines for Design of Marinas — provides guidance on car parking requirements); and

- when a large number of similar structures is expected (eg. boat ramps and jetties), a policy relating to such structures (including standard designs for structures) shall be prepared by the developer, in consultation with and to the satisfaction of, both the local government and the waterways manager. Consideration of implementing *ISO 140001 Environmental Management Systems* is recommended.

For all artificial waterways:

- jetties, ramps and moorings may not be constructed except with a jetty license from the Department of Transport, and approval of the waterways manager and the local government where applicable;
- as waste disposal from vessels could result in pollution of artificial waterways, sewage pump-out facilities, refuse and waste oil receptacles may be required by the waterways manager for each project incorporating artificial waterways;
- to reduce pollution of artificial waterways, separate drainage systems fitted with pollutant traps may be required at boat ramps to limit runoff via the ramp;
- areas for activities with potential to pollute waterways (such as the draining of bilges) may be required to be constructed adjacent to boat ramps and should include appropriate drainage management systems. Consideration should be given to installing signage or other measures to discourage boat users from undertaking bilge draining, wash down or other polluting activities on ramps; and
- jetties and moorings shall not be attached to retaining walls unless the retaining wall has been designed for that purpose.

7.5 Property frontage to waterways

Within the Canal Zone:

- individual property owners with a water frontage will be responsible for stability and integrity of that water frontage;
- a safe pedestrian public right of carriageway easement (Refer to Section 195/196 *Land Administration Act 1997*) shall be provided along the edge of the waterway and located within lot titles, and no obstructions such as fencing shall impede public and emergency access along the waterway. Emergency access is preferably achieved via provision of public open space and /or location of roads. The provision of 8-metre wide public access ways must be avoided and are not supported, unless no other physical design solution is available;
- all buildings or load bearing structures should be set back at least six metres (or such other distance as set out in the local planning scheme) from any waterway wall to ensure no additional loads are placed on the waterway wall and to accommodate sight lines from adjoining properties;
- where a boundary abuts a waterway, the setback requirements shall be measured from the outer or artificial waterway side at the top of the waterway wall;
- where a lot adjoins a canal or artificial waterway, the boundary of such lot should not extend beyond any retaining or revetment wall of the canal or artificial waterway; and
- in determining minimum lot frontages of a property adjoining a canal or artificial waterway, including the further subdivision of the property, desirable dimensions of a jetty envelope should be considered. The Department of Transport will provide guidance in this regard; and for all artificial waterways, all buildings or load bearing structures should be sufficiently set back from any waterway wall in order to ensure no additional loads are placed on the waterway wall.

7.6 Flood mitigation

For all artificial waterways:

- impact of the proposed development (including proposed fences or barriers) on flood flow should be evaluated, and in areas where they detrimentally impact the flooding regime, proposals should not be permitted;
- flood flows from upstream catchments should not discharge directly to proposed developments (eg. via natural or constructed channels or through constructed spillway structures) unless the watercourse is specifically designed to manage the flow of floodwaters through the proposed development. Mooring envelopes are generally not permitted within watercourses acting as flow paths during major flows; and
- the proponent should consult with the Department of Water regarding proposed or existing regional flood studies.

7.7 Soil stability

For all canals and artificial waterways:

- the local government may require a geotechnical report from an appropriately qualified consulting engineer to determine whether any requirements apply to buildings prior to the issue of development approval or a building license; and
- soil batters to be armoured to protect against a 1 in 100 Annual Exceedence Probability (1% AEP) event prior to the issue of a building licence for a dwelling.

7.8 Cyclonic areas

Developments in cyclonic areas shall be designed for:

- extreme wind loads (*AS 1170.2 2002: Structural design actions – wind actions*) on all marine structures;
- extreme water levels associated with cyclonic storm surge for all maritime structures; and

- soil batters in cyclonic locations; along waterway frontage to property lots may require armour for a 1 in 100 Annual Exceedence Probability (1% AEP) event prior to clearance of titles.

A cyclone contingency plan is required for each development for ongoing operation. Examples are available from the Department of Transport. In cyclonic areas, the boat mooring management plan is to include a cyclone contingency plan.

7.9 Coastal and estuarine or river impacts

Natural supply of littoral sand is a resource shared by all Western Australians. Interruption and trapping of sand and/or macro algae/seagrass wrack is discouraged. Any potential for this needs to be modelled and quantified, and the artificial waterway or canal estate designed to minimise impacts on the longshore movement of sand and seagrass wrack.

Should the artificial waterway canal estate change the natural supply of sand or trap macro algae seagrass wrack along the coast, the waterways manager shall be responsible for funding and carrying out artificial sand by passing of the interrupted supply, managing any seagrass wrack accumulation and managing any associated amenity, environmental and public health impacts.

Potential impacts on estuarine and river systems shall be examined and appropriate mitigation measures addressed by approved monitoring and management plans.

7.10 Maintenance dredging

Proponents shall minimise the need for maintenance dredging in their designs, particularly in the connecting channel. The volume, cost, nature of the maintenance dredging material and disposal options shall be

clearly identified prior to the finalization of the local scheme amendment.

The proponent shall also clearly identify any environmental impacts associated with maintenance dredging prior to project approval. This shall include changes to water quality, risks to marine fauna and impacts on benthic habitats. The proponent shall also prepare a maintenance dredging monitoring and management plan (Including cumulative impact of repeated dredging) that includes environmental values to be protected, environmental quality objectives, levels of protection and environmental quality criteria to be achieved and contingency management strategies for ensuring these objectives are met.

The waterways manager shall fund maintenance dredging. This funding or source of revenue may include rating revenue via general, special area or differential rating methods.

7.11 Water circulation

The canal design must have the following basic design principles:

- consideration will only be given to designs with good circulation, and which maximise tidal flushing, mixing by wind action and vertical mixing (eg. ideally flushing within three days);
- the water body bathymetry should not have holes or sills and shall be designed so that the water body is shallower than the adjacent natural water body, generally increasing in depth towards the entrance;
- water depths shall be the minimum possible for safe navigation, allowing for siltation; and
- design of canals shall minimise build up of organic material.

Design shall allow for maintenance access. The proponent shall outline upfront the environmental quality management framework

for operation of the canal estate, including environmental values, environmental quality objectives, levels of protection and environmental quality criteria to be met to maintain acceptable water and sediment quality. These criteria are to be established in consultation with:

- the Environmental Protection Authority or the Office of the Environmental Protection Authority;
- the Department of Environment and Conservation (Cockburn Sound Management Council); and
- Swan River Trust

whichever is relevant.

A monitoring and management program developed to demonstrate that the project can be managed to comply with these criteria prior to approval of canal or marina developments.

7.12 Public open space

Public open space should be provided in canal estates (and similar developments) in accordance with the WAPC *Liveable Neighbourhoods* policy and *Policy No. DC 2.3 Public Open Space in Residential Areas*. Waterwise design principles shall be applied to the design and management of public open space.

This requires the normal 10 per cent public open space contribution for residential subdivision and additional foreshore reserves for land abutting any natural watercourse.

The 10 per cent public open space contribution should provide:

- active and passive recreation areas;
- the wider community with opportunity to take advantage of views and aspects created by the waterway;
- suitable locations for emergency and maintenance access;

- protection of additional areas to maintain significant biodiversity values; and
- information to assist assessment processes during early consultation and formal approval processes.
- canal developments should consider public access to launching facilities for non motorised recreation craft (kyaks etc) in the provision of waterside parklands.

Public open space calculations normally exclude major roads, schools, commercial and major drainage areas, and, in a canal estate, the area of artificial waterways and the foreshore reserve should also be excluded from the area of land used to determine the 10 per cent public open space contribution.

Consideration should be given to location of some public open space away from artificial waterways, because casual or formal sporting activities and playgrounds for small children are not normally compatible with waterside sites.

Small multipurpose reserves (generally a minimum of 1000m²) which can combine a recreational function with areas for management and maintenance of the waterways can be included in the 10 per cent contribution. It is not intended that these reserves should contain features which attract large numbers of people, such as a public boat launching ramp.

The foreshore reserve shall ensure public access to the natural waterway unless conservation requires otherwise. Access shall not be confined to canal estate residents and shall be provided from the nearest public road with adequate car parking facilities. A safe public access way shall be provided along the edge of the waterway and located within lot titles, and no obstructions such as fencing shall impede public and emergency access along the waterway. Emergency access may be achieved via public open space, location of adjoining roads, or if absolutely necessary, 8-metre wide access ways.

Pedestrian cycle access shall form a continuous link within the canal estate and shall link with existing or proposed paths on adjoining land. The design of canals should not interrupt or interfere with convenient pedestrian and cycle links, and where this is unavoidable, convenient alternative links or pedestrian bridges should be provided.

Recreation in foreshore reserves should be passive and water-oriented. The reserve should exist for the benefit of the natural waterway and its users, rather than for land-based activities which can be located elsewhere.

The foreshore reserve should:

- measure 30–150 metres in width or greater, having regard to environmental, topographical, access and flood control considerations, purpose of reserve and coastal processes;
- avoid development within a designated floodway;
- limit development within the flood fringe and plan for the effects of climate change; and
- be clearly delineated, by the proponent in consultation with local government, Department of Water, Department of Environment and Conservation (Cockburn Sound Management Council), Swan River Trust and any other applicable public authority, whichever is relevant, for subsequent vesting under Section 152 of the *Planning and Development Act 2005*.

8. Guidelines for water quality management

8.1 Environmental quality management framework

The Environmental Protection Authority or the Office of the Environmental Protection Authority, Department of Environment and Conservation (Cockburn Sound Management Council), Swan River Trust, Department of Water and local government, whichever is relevant, should be consulted during

the project planning phase to establish an appropriate environmental quality management framework for the canal estate or artificial waterway and any adjacent natural waterway or water body. The main purpose for applying this framework is to ensure that environmental quality in the artificial waterway is managed such that environmental quality and ecological integrity in the adjacent natural waterway, water body or groundwater is not compromised.

The framework should be based on the recommended approaches in National Water Quality Management Strategy Report 4 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* and State Water Quality Management Strategy Report 6 *Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Water Quality Monitoring and Reporting (Guidelines Nos. 4 and 7: National Water Quality Management Strategy)*.

The basis of the environmental quality management framework is the environmental values, environmental quality objectives and levels of protection that should be defined for the canal estate or artificial waterway and adjacent natural waterway or water body. These represent the community's desires and aspirations for the waterway and form the primary management aims. Advice can be sought from:

- the Department of Environment and Conservation (Cockburn Sound Management Council);
- Swan River Trust;
- the Department of Water;
- Environmental Protection Authority or the Office of the Environmental Protection Authority; and
- the Department of Health

on primary management aims, whichever is relevant. Environmental values that would generally need to be protected include 'ecosystem health', 'fishing' (safe for consumption) and 'recreation and aesthetics'.

The proponent should submit the final primary management aims to the EPA for review and endorsement. The EPA has been tasked with the role of reviewing and endorsing primary management aims through the State Water Quality Management Strategy (No.6).'

To achieve primary management aims, a suitable set of environmental quality criteria that represent an acceptable level of quality for the water, sediment and/or biota should be established for the most relevant indicators. The indicators should then be the focus of an environmental monitoring program, and criteria should become the benchmarks for measuring environmental performance and triggering implementation of contingency management plans if they are not met.

For some indicators, it may be necessary to derive appropriate environmental quality criteria using data collected from a suitable reference site that represents the desirable level of quality to be achieved in the canal estate or artificial waterway. In these situations, a reference site water quality monitoring program shall be created prior to the assessment of the project and run for at least one year prior to development of works.

8.1.1 Water and sediment quality indicators

Indicators regarded as being significant for assessing water and sediment quality include but are not limited to:

- suspended solids
- pH and total acidity
- density stratification
- dissolved oxygen
- bacteriological counts
- chlorophyll 'a'
- sulfidic and monosulfidic materials
- phytoplankton
- alkalinity
- nutrients
- sediment organic carbon accumulation

- toxic contaminants, particularly hydrocarbons and metals;
- toxic algae; and
- other factors, such as salinity, acid sulphate soil management or biota may be significant in some instances.

The set of water, sediment or biological indicators measured for any particular canal estate or artificial waterway will depend on the threatening activities and processes at that location and the risks they pose to the waterway.

Water and sediment quality samples and measurements shall be collected in accordance with approved standard operating procedures and relevant standards (eg. *AS/NZS5667.1 1998: Water quality-sampling-Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*; *AS/NZS 5667.4 1998: Water quality-sampling-guidance from lakes, natural and man-made*; *AS/NZS5667.9 1998: Water Quality-Sampling Guidance on sampling from marine Waters*; and *AS/NZS5667.12 1998: Water Quality-Sampling Guidance on sampling of Bottom Sediments*).

8.1.2 Establishing the quality of the adjacent natural waterway, water body or source groundwater

The Department of Water, Department of Environment and Conservation (Cockburn Sound Management Council), Swan River Trust, Environmental Protection Authority or the Office of the Environmental Protection Authority, the Department of Health and local government, whichever is relevant, must be consulted during the project planning phase to establish whether the source water in the adjacent waterway, water body or groundwater is of sufficient quality to be able to support a canal estate or other artificial waterway.

This will require water quality assessment of the proposal, accounting for both temporal and spatial variation in water quality. Historical

water and sediment quality data may be available from the Department of Water's WIN database or the Waterways manager of the artificial waterway. Nevertheless, background water quality data should be collected prior to assessment of the project and should cover at least one full season or preferably one year.

Additional data may also be required if the period sampled does not represent typical conditions. A background water quality monitoring program should therefore be developed prior to approval of the project. If both background and reference site monitoring programs (see 8.1.1) are required, it may be possible to combine them into a single monitoring program.

If quality of the adjacent waterway is not appropriate, a canal estate proposal for that location is probably inappropriate.

8.1.3 Compliance with environmental quality objectives for artificial waterways

The proponent shall demonstrate that the environmental quality objectives established for the artificial waterway (both ecological and social) will be met to the satisfaction of:

- the Department of Environment and Conservation (Cockburn Sound Management Council);
- Swan River Trust;
- the Department of Water;
- Environmental Protection Authority or the Office of the Environmental Protection Authority;
- the Department of Health; and
- the Department of Fisheries

whichever is relevant.

Compliance with environmental quality objectives during construction and post-construction would be determined through results of the environmental monitoring and management program. Monitoring and

reporting shall be to the satisfaction of the entities listed above and local government.

Hydrodynamic and water quality modelling of the artificial waterway is required prior to construction. The modelling scope should be endorsed by:

- the Department of Environment and Conservation (Cockburn Sound Management Council);
- Swan River Trust;
- the Department of Water;
- Environmental Protection Authority or the Office of the Environmental Protection Authority; and
- the Department of Health

whichever is relevant.

Hydrodynamic modelling shall account for spatial and temporal variation in flushing (e-folding) times throughout the waterway. Typical and worst-case scenarios shall be modelled. Seasonal variations in key variables such as winds, tides and groundwater inflows should be considered and the associated meteorologic and oceanographic conditions for model runs should be included.

Guidance on modelling should be sought from State agencies named in this section.

8.1.4 Compliance with environmental quality objectives for water and sediment quality in adjacent natural waterway or water body

The proponent shall demonstrate that environmental quality objectives (both ecological and social) established for an adjacent natural waterway and water body will be met to the satisfaction of:

- the Department of Environment and Conservation (Cockburn Sound Management Council);
- Swan River Trust;

- the Department of Water;
- Environmental Protection Authority or the Office of the Environmental Protection Authority; and
- the Department of Health

whichever is relevant.

Prior to assessment of the canal development or artificial waterway, the proponent shall model the zone of influence, zone of effect and zone of loss in the natural waterway or water body that could potentially result from construction of the artificial waterway development or from the on-going operation of the waterway post-construction. Environmental Assessment Guidelines (EAG) for the loss of benthic habitat (EAG No.3) and dredging (EAG No.7) can be obtained from the Office of the Environmental Protection Authority. It is important that construction and operation phases are considered separately. Compliance with environmental quality objectives established for the natural waterway would be determined through results of the environmental monitoring program conducted during the construction and post-construction phases. Monitoring and reporting shall be to the satisfaction of the entities listed above and local government.

Compliance with environmental quality objectives established for the natural waterway or water body would be determined through results of the environmental monitoring program conducted during the construction and post-construction phases. Monitoring and reporting shall be to the satisfaction of the entities listed above and local government.

8.1.5 General aesthetic guidelines

Proponents shall demonstrate how the development has been designed and how it will be managed, to ensure that the waterway will be:

- free from materials that settle to form putrescent or otherwise objectionable sludge deposits;

- free from floating debris, oil, grease, scum, foam and other floating materials in amounts sufficient to be unsightly or otherwise objectionable; and
- free from materials that will produce colour, odour, turbidity, or other conditions to such a degree as to be unsightly or otherwise objectionable.

8.1.6 Maintenance of artificial waterway water quality by natural process

Maintenance of artificial waterway water quality should be largely dependent on natural processes, thus minimising the need for active management. The monitoring and management program developed by the proponent is to include a reporting framework and contingency management plan for managing the impacts of development should water quality criteria or standards for the waterway not be met. The program should be developed before any approval is issued to enable relevant agencies to review and endorse plans prior to approval.

8.1.7 Stormwater runoff and drainage

Stormwater runoff or drainage to artificial waterways, particularly from vegetated or vehicle use areas, is a potential source of nutrient or contaminant input to artificial waterways and adjacent source waters. Developments must include appropriate design features and management strategies to minimise any inputs to an artificial waterway, which may adversely affect water quality. The *Stormwater Management Manual for Western Australia* and the WAPC's *Planning Bulletin No. 92 Urban Water Management* provide guidelines for the treatment of stormwater. Stormwater management will need to be addressed in water management documents produced in accordance with *Better Urban Water Management* (WAPC 2008).

8.1.8 Industrial and residential waste

No industrial or residential waste or effluent of any nature (including air conditioner bleed-off) can be discharged directly or indirectly into artificial waterways. A waste management

plan shall be developed to include measures to reduce waste, monitor waste, educate users of appropriate waste disposal measures and provide corrective actions should waste management measures prove ineffective.

8.1.9 Vessel sullage

There shall not be any discharge of boat sullage to the artificial waterway or the natural waterway. The developer shall outline how vessel sullage will be managed for vessels using the waterways. The Department of Health and Water Corporation will need to be consulted and satisfied in regard to the adequacy of the pump out facilities and connection to the utility service.

8.1.10 Impact on fauna and flora

The proponent should demonstrate that the development will not impact the passage of fauna (including cetaceans, migratory bird species and fish) in the natural waterway to the satisfaction of:

- the Department of Environment and Conservation (Cockburn Sound Management Council);
- Swan River Trust;
- Environmental Protection Authority or the Office of the Environmental Protection Authority; and
- the Department of Fisheries

whichever is relevant.

Where risks to fauna are posed, the proponent will need to demonstrate avoidance, minimisation, mitigation and management measures to the satisfaction of the entities listed above. An assessment will need to be undertaken in regard to the impacts upon major benthic primary producers from dredging and increased turbidity.

8.2 Artificial waterway flushing

The proposal shall detail how the artificial waterway design has followed best practice design principles, including the following aspects:

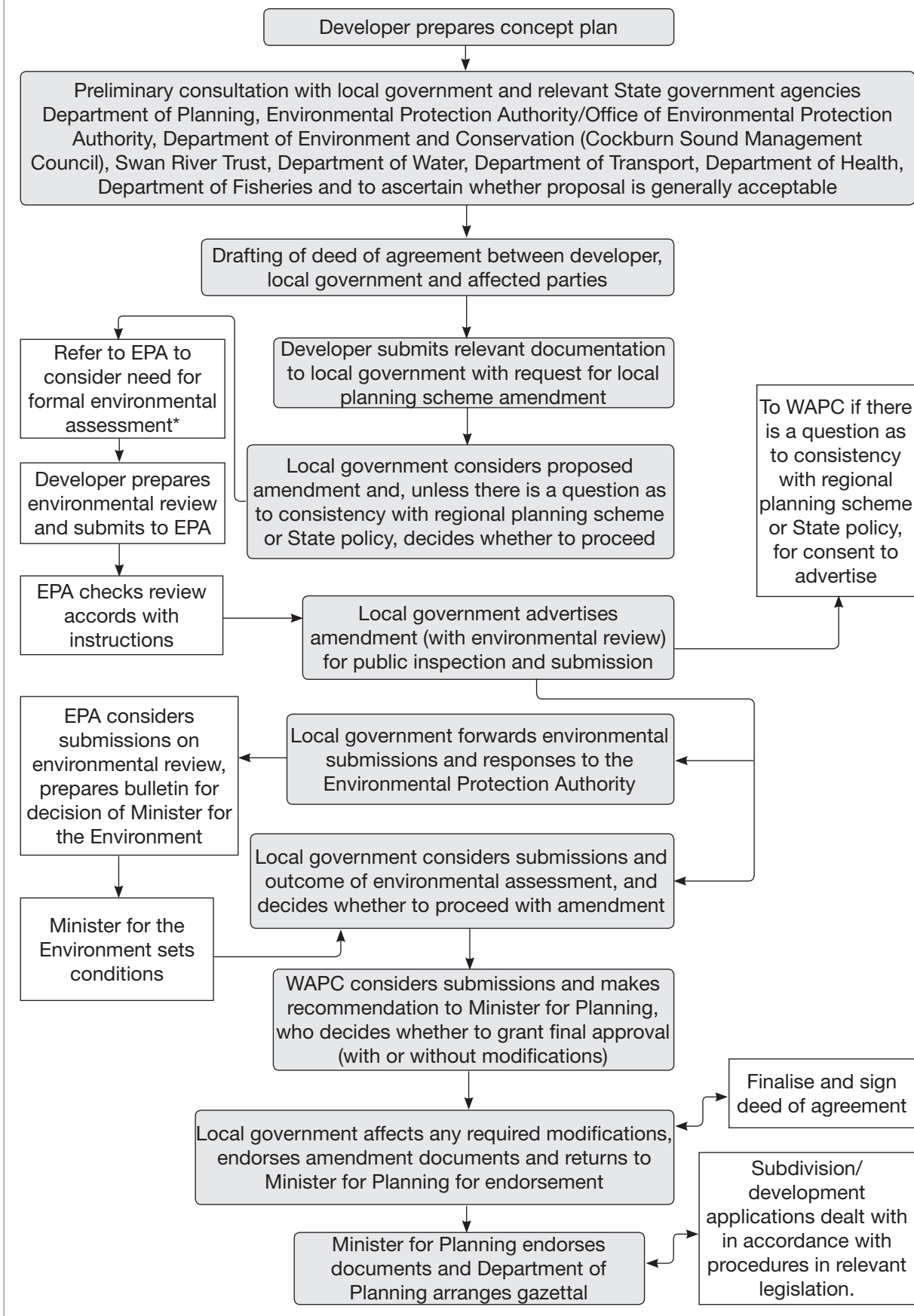
- the design shall maximise natural mixing so that flushing is largely dependent on natural processes;
- the waterway should not rely on mechanical means such as pumping to maintain water quality.

Aspects that should be explored to maximise water quality include, but should not be limited to:

- depths and layouts that maximise efficiency of tidal mixing;
- depths and layouts that minimise occurrence of vertical stratification;
- depths and layouts that avoid the creation of poorly flushed pockets;
- use of dominant wind directions to promote mixing;
- where wind-mixing is important, ensuring that wind shadowing by future buildings in the development will not compromise performance; and
- design to minimise ingress of wrack and algae from an adjacent water body.

Appendix 1

Summary of procedures for assessment of canal estates and artificial waterway developments



Appendix 2

Canal zone in a local planning scheme

1. General

Given the different construction of scheme texts and the variety of proposals falling within the definition of a canal estate, it is clearly not possible to provide an exhaustive set of recommendations appropriate to all schemes and proposals. It will therefore be necessary to examine the relevance of each provision and customise any local planning scheme amendment to suit each scheme and circumstance.

2. Scheme amendment documents

Where an amendment involves a local planning scheme where there is no current reference to a Canal Zone, there will be a need to initiate changes to the scheme in accordance with the process set down in the *Town Planning Regulations 1967* and *Planning and Development Act 2005*.

3. Scheme text provisions

3.1 Definitions:

In most local planning schemes with no current provisions for the Canal Zone, the list of definitions and interpretations is likely to be inadequate for adequate control. Desirably, any scheme amendment should incorporate definitions set out in Appendix 4.

3.2 List of zones and zoning table:

Appropriate amendments to the scheme text will need to be made to include the zone classification – ‘Canal Zone’.

Where zoning is amended to include Canal Zone, appropriate symbols will need to show whether particular land uses are permitted within the zone, together with those uses which may be permitted at local government discretion.

3.3 General provisions:

The following typical clauses may be used as appropriate, in addition to other more specific provisions as may be required in each case:

‘Clause No. # Development in Canal Zones

3.3.1 The local government’s intention in controlling development within the Canal Zone is to:

- encourage a high standard of development within the zone;
- promote and safeguard health, safety, convenience, environmental quality and the general welfare and amenity of the locality; and
- promote a high standard of maintenance of artificial waterways and other waterways (through cooperation with the Waterway Manager and the Department of Transport).

3.3.2 Land comprised of artificial waterways in a canal estate developed within a Canal Zone is land for the purpose of this Scheme and, notwithstanding any other provision of this Scheme text, any development in, on, under, over or abutting any such waterways requires the local government’s prior approval in accordance with the procedures set out in this Scheme.

3.3.3 Any development proposed between the boundary of an artificial waterway and the setback distance for any buildings on the land as prescribed by this and other provisions of this Scheme, requires prior approval of local government in consultation within the Department of Transport in accordance with the procedures set out in this Scheme.

3.3.4 Where development as described in clauses 3.3.2 and 3.3.3 above is proposed on land, the local government shall require the developer to provide certification by a consulting engineer that the development is safe under all conditions. Local government

- shall take into account any comments in making its determination.
- 3.3.5 All artificial waterway retaining walls along an artificial waterway frontage shall be kept in a structurally sound condition and shall not be altered, extended or removed without prior written approval of local government. The owner or vested manager of land adjoining the artificial waterway shall be responsible for stability of the interface between water of the artificial waterway and that land, and shall maintain this interface to the satisfaction of local government. Alternate management arrangements may be considered where applicable legislation exists, for example the *Swan and Canning Rivers Management Act 2006*.
- 3.3.6 All dwellings shall be set back a minimum of 6 metres from an artificial waterway frontage measured from the outer side of the top of the waterway wall and 6 metres from a road frontage.
- 3.3.7 No retaining wall or fencing shall be erected along the artificial waterway frontage or within 1 metre of the top of an artificial waterway wall or artificial waterway frontage whichever is the greater setback as determined by the local government.
- 3.3.8 No retaining wall situated greater than 1 metre in height but less than 7.5 metres from an artificial waterway frontage shall exceed 1 metre above the stabilised surface level.
- 3.3.9 No retaining wall situated more than 7.5 metres but less than 9 metres from an artificial waterway frontage shall exceed 1.5 metres above the stabilised surface level,
- 3.3.10 No fence situated within 7.5 metres of an artificial waterway frontage shall exceed 1 metre above the original stabilised surface.
- 3.3.11 No fence situated more than 7.5 metres from an artificial waterway frontage shall exceed 2 metres above the original stabilised surface.
- 3.3.12 General provisions may be varied where the local government adopts design guidelines for the alternative urban form within the canal estate.

Appendix 3

Agency/proponent responsibilities and relevant legislation for canal estates and artificial waterway developments.

Western Australian Planning Commission (WAPC)/Department of Planning

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Agency branch	Current role/responsibility in canal management
Regional Planning and Strategy Division	
• Perth and Peel Planning and Strategy Division	→ Statutory referrals, structure plans, scheme amendments, development and subdivision applications.
• Strategy Policy and Projects Division	→ Policy coordination and development. → Strategic projects.

Legislation

- *Planning and Development Act 2005* provides a system for land use planning and development in the State and for related purposes:
 - direct relevance to canal estates
 - outlines the processes of approval, etc.
- *Town Planning Regulations 1967*:
 - Scheme amendment procedures
 - model scheme text provisions.

Policies

- *Draft Coastal Zone Management Policy for Western Australia (2001)*:
 - the State policy aimed to achieve a balance between the conservation and development of the Western Australian coast.
- *State Planning Policy (SPP) No. 1 – State Planning Framework Policy (Variation 2)*:
 - A central framework which provides a context for decision-making on land use and development in Western Australia, taking into account issues associated with the environment, community, economy and infrastructure.
- *SPP 2.0 – Environment and Natural Resources Policy 2000*:
 - defines the principles and considerations that represent good and responsible planning;
 - in terms of environment and natural resource issues within the framework of the State Planning Strategy.
- *SPP 2.6 – State Coastal Planning Policy (Amended 2006)*:
 - deals with issues relating to public interest, coastal foreshore reserve (and appropriate setbacks), coastal strategies and management plans, environment, development and settlement.
- *SPP 2.8 – Bushland Policy for the Perth Metropolitan Region*:
 - This policy applies if the canal development is proposed on Bush Forever areas.

- *SPP 2.9 – Water Resources Policy:*
 - directly related to policy SPP2 and provides clarification and additional guidance to planning decision-makers for consideration of water resources in land use planning;
 - this policy is important when canal development is proposed on land containing wetlands, waterways or estuaries;
 - objectives of the policy are to:
 1. protect, conserve and enhance water resources identified as having significant economic, social, cultural and/or environmental values;
 2. assist in ensuring the availability of suitable water resources to maintain essential requirements for human and all other biological life with attention to maintaining or improving the quality and quantity of water resources; and
 3. promote and assist in the management and sustainable use of water resources.
- *SPP 3.4 Natural Hazards and Disasters (2006):*
 - this policy applies to the planning and development of land that may be affected by natural disasters and hazards (such as floods, cyclones, storm surge, severe storms, landslide, bush fires and earthquakes). SPP. 3.6 Development Contributions for Infrastructure:
- *SPP 3.6 – Development Contributions for Infrastructure*
 - This policy sets out the principles and considerations that apply to development contributions for the provision of infrastructure in new and established urban areas.
- *Development Control (DC) Policy No. 2.2 – Residential subdivision.*
- *Development Control (DC) Policy No. 2.3 – Public open space in residential areas.*
- *Development Control (DC) Policy No. 6.1 – Country Coastal Planning Policy (1989):*
 - this policy is designed to provide uniform approach to land use planning, development and subdivision of coastal areas of the State outside the Perth metropolitan region. The policy is intended to assist local government, developers and planning consultants and to deal primarily with new development and subdivision.
- *Liveable Neighbourhoods (October 2007):*
 - an operational policy to be followed in the design and approval of urban development. It applies to structure planning and subdivision for greenfield sites and for redevelopment of large brownfield and urban infill sites.

Bulletins

- *Planning Bulletin 64 – Acid Sulfate Soils (2009):*
 - supersedes Planning Bulletin 64 Acid Sulfate Soils (November 2003);
 - outlines the range of matters which need to be addressed at various stages of the planning process to ensure that subdivision and development of land containing acid sulphate soils is planned and managed to avoid potential adverse impacts on the natural and built environment.
- *Planning Bulletin 92 – Urban Water Management (2009):*
 - provides guidance on urban water management matters to be taken into account by the WAPC, local governments and applicants in considering planning proposals and applications for new development such as residential, rural-residential and commercial;
 - ensures planning decision-making, where water issues are a consideration, is informed via relevant and appropriate information;
 - supersedes Planning Bulletin 61.

Strategies

- *State Water Quality Management Strategy for Western Australia* (2001):
 - State framework for implementation of the National Water Quality Management Strategy (1994);
 - prime objective of the national strategy is “to achieve sustainable use of the nation’s water resources by protecting and enhancing their quality while maintaining economic and social development.”
- *Busselton Wetlands Conservation Strategy*:
 - provides a framework to guide sustainable land use and wise management of the biodiversity and environmental values of the Busselton wetlands area;
 - applies if development is proposed in the Busselton wetlands area.
- *Coastal and Lakeland’s Planning Strategy Dawesville – Binningup*:
 - provides a detailed resource information base and policy guidelines to assist in management of pressures for development and changes in land use activities within catchments to the Yalgorup Lakes and along the coastal strip;
 - applies if development proposed within the catchments to the Yalgorup Lakes and along the coastal strip.
- *Visual Landscape Planning in Western Australia – A manual for evaluation, assessment, siting and design* (2008):
 - applies when deciding on a suitable site for a canal development;
 - developed to help public and private sector planners address visual landscape in the planning process;
 - explains fundamental planning tools of visual landscape evaluation and visual impact assessment;
 - provides guidelines for siting and design in relation to a range of landscape types and land uses.

Department of Transport

www.transport.wa.gov.au

Agency branch	Current role/responsibility in canal management
Coastal Infrastructure	<ul style="list-style-type: none">→ Facility design and development.→ Assessment and clearance of marina and canal proposals.→ Breakwater construction, dredging, moorings, jetties, boat harbours, boat ramps – planning and maintenance→ Licensing of maritime structures (jetties).
Marine Safety	<ul style="list-style-type: none">→ Moorings, navigation, placement and repair of navigational aids.→ Emergency contact for incident and complaint.

Legislation

- *Jetties Act 1926*
- *Marine and Harbours Act 1981*
- *WA Marine Act 1982.*

Standards

AS 4997 2005: Guidelines for the Design of Maritime Structures, Standards Australia;
AS 3962 2001: Guidelines for Design of Marinas, Standards Australia;
AS 1170.2 2002: Structural design actions-wind actions, Standards Australia;
AS 4678 2002: Earth-retaining structures, Standards Australia;
Strategic Plan for Maritime Facilities, Department of Transport, 1996.

Department of Environment and Conservation

www.dec.wa.gov.au

Agency branch	Current role/responsibility in canal management
<ul style="list-style-type: none"> Department of Environment and Conservation Regions are generally the first point of contact for initial advice in relation to biodiversity conservation, Department-managed areas and environmental regulation pursuant to Part V <i>Environmental Protection Act 1986</i>. The management of lands and waters under the <i>Conservation and Land Management Act 1984</i>. Contaminated Sites Branch for site contamination and acid sulfate soil. Native Vegetation Conservation Branch for clearing permits. Climate Change Unit 	<p>The Department may provide advice to government agencies and proponents in relation to its key functions. Matters on which it may provide advice include:</p> <ul style="list-style-type: none"> acid sulfate soil and contaminated sites; biodiversity conservation; Department-managed areas and facilities; emissions and impacts on Department's environmental regulation function; climate change. <p>Its roles include the regulation of:</p> <ul style="list-style-type: none"> clearing of native vegetation; taking of native flora and fauna; prescribed premises; pollution and environmental harm; contaminated sites.

Legislation

- Conservation and Land Management Act 1984*:
 - applies to land or waters comprising national parks, conservation parks, nature reserves, marine nature reserves, marine parks and marine management areas;
 - does not apply to land defined as 'excluded waters' (includes State coastal waters).
- Environmental Protection Act 1986*:
 - regulates pollution and environmental harm;
 - regulates clearing of native vegetation.

(Where native vegetation on-site is proposed to be cleared, it will be necessary to obtain a vegetation clearing permit, unless the clearing is exempt under Schedule 6 of the *Environmental Protection Act 1986* or exempt under the *Environmental Protection (clearing of Native Vegetation) Regulations 2004*).
- Wildlife Conservation Act 1950*:
 - regulates the taking of native flora and fauna.
- Contaminated Sites Act 2003*:
 - regulates contaminated sites.

Policies

Conservation Commission of Western Australia Policy Statement 1 July 2006 Mosquito Control:

- *Wetlands Conservation Policy For Western Australia* (Government of Western Australia 1997):
 - applies to wetlands covered by the Ramsar definition;
 - aims to protect Western Australian wetlands – preventing further loss or degradation;
 - established a Wetlands Coordinating Committee.
- *Conservation of Endangered and Specially Protected Fauna in the Wild – CALM Policy Statement 33*:
 - policy applies if the canal estate was proposed to be located in an area that is known to be home to endangered or specially protected fauna.
- *Conservation of Threatened Flora in the Wild – CALM Policy Statement 9*:
 - as above – ie. policy only applies if the canal estate was proposed to be located in an area known to contain threatened flora.
- *Guidelines Checklist for Preparing a wetland Management Plan* (Dec 2008):
 - used by developers and their consultants when required to prepare a wetland management plan to the satisfaction of Department of Environment and Conservation as a condition of development approval, subdivision or scheme amendment approvals.
- *Protecting our Wetlands in Western Australia 2007*:
 - outlines importance of wetlands, existing protection mechanisms for wetlands in Western Australia and Department of Environment and Conservation incentive programs to help manage and protect wetlands.
- *Mooring Policy 59*:
 - applies if the proposed canal estate includes proposed moorings in marine conservation reserves;
 - the has been developed to:
 - maintain ecological and social values of marine conservation reserves by minimising impacts of uncontrolled mooring and anchoring activities;
 - enhance user safety, access and equity in relation to moorings in marine conservation reserves, and
 - provide a framework to accommodate present and future mooring usage patterns in marine conservation reserves.
- *Setting Priorities for Conservation of WA's Threatened Flora and Fauna – CALM Policy Statement 50*.
- *Acid Sulfate Soil Guidelines*:
 - Treatment and management of soils and water in acid sulfate soil landscapes (July 2011);
 - identification and investigation of acid sulfate soils and acidic landscapes (May 2009); and
 - direct relevance to canal estates.

**Department of Environment and Conservation
(Cockburn Sound Management Council)**

<http://csmc.environment.wa.gov.au>

Agency branch	Current role/responsibility in canal management
Cockburn Sound Management Council	<p>Assessment and advice to Minister for Environment and Environmental Protection Authority for marina and canal proposals. Breakwater construction, dredging within <i>State Environmental (Cockburn Sound) Policy 2005</i> boundary areas.</p> <p>Cockburn Sound Management Council may provide advice to government agencies and proponents in relation to its key functions. Matters on which it may provide advice include:</p> <ul style="list-style-type: none"> • water quality and seagrass health; • monitoring and management of pollution and environmental harm; • contaminants in water and sediments; • Council-managed areas; • biodiversity conservation; • emissions and impacts on Council's environmental management function; • acid sulfate soil and contaminated sites; • climate change. <p>Assessment and advice to Minister for Environment and Environmental Protection Authority for marina and canal proposals. Breakwater construction, dredging within <i>State Environmental (Cockburn Sound) Policy 2005</i> boundary areas.</p> <p>Cockburn Sound Management Council may provide advice to government agencies and proponents in relation to its key functions. Matters on which it may provide advice include:</p> <ul style="list-style-type: none"> • water quality and seagrass health; • monitoring and management of pollution and environmental harm; • contaminants in water and sediments; • Council-managed areas; • biodiversity conservation; • emissions and impacts on Council's environmental management function; • acid sulfate soil and contaminated sites; • climate change.

Standards

Public authorities with management responsibilities in the State Environmental Policy area will, within their area of jurisdiction –

1. make decisions and actions consistent with the objectives of the policy;
2. develop best management practices for the control of drainage, sewage, ballast water and disposal of wastewater and discharge of wastes and nutrients, whether point or diffuse source, and directly or indirectly discharged into the policy area;
3. incorporate into their work programs means of achieving the environmental quality objectives outlined in clause 7 of the policy, for activities which include but are not limited to diffuse sources of emissions and to licensed premises discharging wastes or nutrients, directly or indirectly, into the policy area;
4. establish monitoring programs and inventories as appropriate, using the *Manual of Standard Operating Procedures for Environmental Monitoring* against the *Cockburn Sound Environmental Quality Criteria (2003–2004)*, *Environmental Protection Authority 2005* (as amended and published from time to time by the Environmental Protection Authority following public consultation); and
5. report the results annually of monitoring programs to the Cockburn Sound Management Council.

Policies

- *State Environmental (Cockburn Sound) Policy 2005*:
 1. establishes the basis on which Cockburn Sound and the environment of adjacent land is to be protected;
 2. purposes of this policy are –
 - i. to declare, protect and maintain the environmental values of Cockburn Sound;
 - ii. to abate pollutants and restrict activities that diminish environmental values of Cockburn Sound;
 - iii. to establish a program to protect and enhance environmental quality to support environmental values of Cockburn Sound;
 - iv. to give effect to environmental quality objectives and environmental quality criteria for Cockburn Sound; and
 - v. to give effect to the Environmental Management Plan for Cockburn Sound;
 - vi. report to Minister for Environment and Parliament annually on the implementation of the State Environmental Policy and the State of Environment of Cockburn Sound and its surrounds.

Agency branch	Current role/responsibility in canal management
	<p>'The Trust has overall planning, protection and management responsibility for the Swan and Canning River system. The Trust provides advice, makes recommendations to and comes under the jurisdiction of the Minister for Environment. In accordance with the <i>Swan and Canning Rivers Management Act 2006</i>, the Trust is the 'owner' of the river reserve on behalf of the Crown, and therefore would need to agree to an application being made within the river reserve.</p> <p>Proposals located within or abutting the Trust Development Control Area Boundary or proposals likely to affect the waters within the Trust Development control Area Boundary shall be referred to the Trust at preliminary consultation and formal approval stage. Proposals for canal estate or artificial waterway development wholly within the Trust Development Control Area will require Trust approval under Part 5 of the <i>Swan and Canning Rivers Management Act 2006</i>'.</p> <p>The Trust to provide planning and technical advice to local government, WAPC/Department of Planning on issues such as risk of pollution, erosion, and any other issue affecting the development and health of the Swan or Canning River system including its tributaries.</p> <p>This advice is incorporated into the approval process to determine whether a development application is required and whether it be approved with appropriate conditions or not.</p>

Legislation

- *Swan and Canning Rivers Management Act 2006*:
 - Applies to development proposed in/adjoining Swan or Canning Rivers.
 - Objectives of this Act are to:
 1. provide for restoration and protection of the development control area and the River park;
 2. provide for management of activities that affect ecological and community benefits and amenity of the development control area and the River park;
 3. provide for the needs of future generations in relation to ecological and community benefits and amenity of the development control area and the River park;
 4. recognise interests of the Noongar community and other people in the community with an association with the development control area or the River park and to provide for their participation in management of those areas and management of activities affecting the ecological and community benefits and amenity of those areas;
 5. promote and facilitate good management of the catchment area to meet objectives referred to in paragraphs (a) to (d).
 - *Swan and Canning Rivers (Consequential and Transitional Provisions) Act 2006*
 - *Swan and Canning Rivers Management Regulations 2007*
 - *Swan and Canning Rivers (Transitional) Regulations 2007*.

Strategy

River Protection Strategy for the Swan and Canning Rivers

Policy

- SPP 2.10 – Swan and Canning River System:
 - relevant to development proposed within, abutting or affecting waters in the Swan Canning River system.

The following policies are available on the Trust's website under 'Planning and Licensing'.

SRT/EA – Conservation, environmental and landscape protection

SRT/DE1 – Dredging

SRT/DE15 – Yacht Clubs / Marinas

SRT DE7 – River Retaining Walls

SRT/D3 – Development Setback Requirements

SRT/E5 – Heritage

SRT/EA2 – Foreshore reserves

SRT/DE24 – Slipping facilities

SRT/D21 – Jetty Structures

SRT D2 – Access Pathway and Cycle Access

SRT DE9 – Commercial Development – General

SRT/DE6 – Dewatering.

Guidelines

Healthy Rivers Action Plan 2008

Legislation

- *Environmental Protection Act 1986* (Parts 2,3 & 4):
 - section 25;
 - reporting of pollution and environmental harm;
 - reporting of the clearing of native vegetation;
 - advise Minister for Environment and Environmental Protection Authority;
 - report on and implement environmental policies;
 - assess, report and advise on environmental impact assessments.

Department of Water

www.water.wa.gov.au

Current role/responsibility in canal management

Department of Water:

- has statutory responsibility for maritime proposals in declared waterway (eg. Albany Harbour and Vasse);
- is responsible for issuing approval and licences in declared waterways;
- is responsible for issuing licences to extract ground and surface water and permits to interfere with bed and banks under the *Rights in Water and Irrigation Act 1914*;
- provides floodplain management advice and recommends guidelines for development on floodplains with the object of minimising flood risk and damage;
- provides technical advice to local government, proponents, and Department of Planning to incorporate into the approval process.

Legislation

- *Waterways Conservation Act 1976*:
 - provision for conservation and management of certain waters and the associated land and environment, to repeal the *Swan River Conservation Act 1958*, and for incidental and other purposes (Refer Part 2, Section 10);
Part 2 (Section 10) of the Act specifically mentions artificial canal systems.
- *Land Drainage Act 1925*:
 - provides for drainage of land, use of drains and drainage water and constitution of drainage districts and other relative purposes.
- *Water Agencies (Powers) Act 1984*:
 - to give the Minister functions and powers, and the Water Corporation powers to make other provisions in respect of their functions, to establish the Water Resources Ministerial Body and the Water Resources Council, and for related and other purposes.
- *Rights in Water and Irrigation Act 1914*:
 - relates to rights in water resources, to make provision for regulation, management, use and protection of water resources, to provide for irrigation schemes and for related purposes.
This Act only applies to proclaimed surface and groundwater areas.

Standards

- AS/NZS 5667.1 1998: Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples, Standards Australia.
- AS/NZS 5667.4 1998: Water quality – Sampling – guidance on sampling from lakes, natural and man-made, Standards Australia.
- AS/NZS 5667.6 1998: Water quality – Sampling – Guidance on sampling of rivers and streams, Standards Australia.

Policies

'Documents

1. Stormwater management manual for Western Australia (Department of Water 2004-2007)
Provides consistent advice on storm water management options for both new developments and redevelopments in various built environments across Western Australia.
2. Foreshore policy No.1:identifying the foreshore area (Water and Rivers Commission,2002)
This policy position forms the basis by which all future foreshore and riparian land management policy is developed.
3. Wetland,waterway and estuary agreement, Department of Water)
Clarifies agency roles, responsibilities and interactions regarding the provision of advice on planning and development referrals for various wetland, estuary, waterway, floodplain and catchment management issues.
4. Water quality protection guidelines (Department of Water)
These guidelines are prepared cooperatively with other government agencies, industry and community groups. They discuss water quality issues and promote the use of best environmental practice while taking into account environmental, social and economic considerations
5. Better Urban Water Management
Provides a framework for appropriately considering water resources at each stage of the state planning process.
6. Water Facts 14 Floodplain management (Water and Rivers Commission,2000)
No text.
7. River Restoration manual (Department of Water)
A series of guidelines on the nature, rehabilitation and long-term management of waterways in Western Australia.
8. Fact Sheet: Supplementary information for permit applications to interfere with bed or banks of watercourses (Department of Water).
No text.
9. Operational policy 5.08-Use of operating strategies in the water licensing process (Department of Water, June 2011)
No text.
10. Water quality Protection Notes (Department of Water)
 - Wetland Buffers (2000)
 - Wetlands as Water bird Habitats (2000)
 - Herbicide Use in Wetlands (2001)These notes guide land use activities that may affect the quality of water resources.

Current role/responsibility in canal management

Decision-making authorities for canal estates and artificial waterways have an obligation under Section 38 of the *Environmental Protection Act 1986* to refer proposals to the Environmental Protection Authority where they are likely, if implemented, to have a significant effect on the environment. Decision-making authorities include agencies such as the Department of Water, Department of Transport and the WAPC.

The Planning and Development Act and the Environmental Protection Act requires that all planning schemes (including scheme amendments) be:

- referred by the responsible authority to the Authority for a decision on whether or not the scheme and amendments should be formally assessed. This would include any schemes which contemplate a canal estate or artificial waterway as a future land use. Allowing environmental issues to be considered ‘upfront’ during the scheme formulation process ensures that environmental factors are given proper consideration by the Authority and the responsible authority before subdivision and development occur.

Should the Authority decide to assess a proposal or scheme there is opportunity for relevant decision-making authorities and other government agencies such as Department of Environment and Conservation and Department of Water to provide advice to the Authority during the assessment process on the environmental issues. This would occur during the Authority’s consideration of the proponent’s environmental scoping document and the advertising of the proponent’s environmental review document (eg. Public Environmental Review or Environmental Review and Management Program).

The above information will be made available as part of the Authority’s advice to the Minister for Environment on whether the proposal or scheme should proceed and, if so, under what conditions. Government will make the final decision as to whether a proposal or scheme should proceed and under what conditions. The State Water Quality Management Strategy (No.6), which was endorsed by Cabinet in 2004, also tasks the EPA with the role of reviewing and endorsing the primary management objectives (environmental values, environmental quality objectives, levels of ecological protection and environmental quality criteria) proposed for waters under the State’s jurisdiction and which provide a framework for protecting and maintaining the quality of the State’s marine and fresh waters.

Legislation

- *Environmental Protection Act 1986*:
 - direct relevance;
 - provides for prevention, control and abatement of pollution and environmental harm, for conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing;
 - Part IV establishes provisions for the Environmental Protection Authority to carry out environmental impact assessment in Western Australia.

Policies

- *Environmental Protection Peel Inlet – Harvey Estuary Policy (1992)*:
 - sets out environmental quality objectives for the Estuary, which if achieved, will rehabilitate the Estuary and protect the Estuary from further degradation; and
 - outlines the means by which the environmental quality objectives for the Estuary are to be achieved and maintained.

Environmental Protection Authority, Office of the Environmental Protection Authority

- *Perth's Coastal Waters Environmental Values and Objectives (February 2000)*:
 - developed by the Environmental Protection Authority as an environmental management framework aimed at protecting the coastal waters of Western Australia from effects of pollution;
 - framework is being applied to Perth's coastal waters in consultation with the community and stakeholders;
 - a three-month public involvement and consultation program has been undertaken to help the Authority identify environmental values of these waters, develop a set of environmental quality objectives (ie. management goals) to protect environmental values, and provide an indication of where the objectives should apply within Perth's coastal waters.
- *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*.

Guidance Statements

- *Guidance Statement No. 33*:
 - resource for local government, State Government agencies, consultants, proponents and the public;
 - mainly describes processes the Environmental Protection Authority may apply for under the *Environmental Protection Act 1986* to land use planning and development in Western Australia, in particular the environmental impact assessment process applied to schemes; and to provide information and advice on a range of environmental issues and their protection and management.
- *Guidance Statement No 40 – Management of Mosquitoes by Land Developers (June 2000)*
 - provides information which the Environmental Protection Authority will consider when assessing proposals where mosquito management is a relevant environmental factor in assessment;
 - mosquitoes are important factor in canal estate development;
 - takes into account the factor of mosquitoes, where mosquitoes present a health risk or severe nuisance to residents, and protection of the environment as defined by the *Environmental Protection Act 1986 (WA)* with a focus on minimising environmental impacts associated with methods for mosquito management.
- *Environmental Assessment Guideline No. 3 – Protection of Benthic Primary Producer Habitat in Western Australia's Marine Environment (December 2009)*:
 - recognises the fundamental importance of benthic primary producer habitats to the integrity of marine ecological communities;
 - defines benthic primary producer habitats as seabed communities within which algae, seagrass, mangroves, corals or mixtures of these groups are prominent components;
 - establishes the framework that the Environmental Protection Authority will use for considering the consequences of removing areas of benthic primary producer habitat.
- *Environmental Assessment Guideline No. 7 – Marine Dredging Proposals – Draft, (December 2010)*:
 - guides proponents to improve clarity, consistency and certainty with respect to environmental impact assessment and management of marine dredging proposals.

Strategies

- *State Water Quality Management Strategy No.6*
 - Sets out the process and responsibilities for implementation of National Water Quality Management Strategy Guidelines No.'s 4 and 7 to State waters.

Department of Health

www.public.health.wa.gov.au

Current role/responsibility in canal management

The Department of Health is involved with:

- mosquito-control;
- water quality;
- environmental health;
- disease control and management.

Legislation

- *Health Act 1911.*

Documents:

- *National Health and Medical Research (NHMRC) Guidelines for Managing Risk in Recreational Waters* (2006).
- *Chironomid Midge and Mosquito Risk Assessment Guide for Constructed Water Bodies* (2007).

Policies:

- *Wastewater Overflow Response Procedures*, Draft Department of Health, Nov 2010.
- *Harmful Algal Bloom Response Plan for Recreational Waters*, Draft Department of Health Nov 2009.

Department of Fisheries

www.fish.wa.gov.au

Current role/responsibility in canal management

The Department of Fisheries is involved with:

- water quality and the effect on the health of aquatic animals;
- fish diseases and human health;
- marine biotoxins, algae and human health; and
- marine pests.

Legislation

- *Fish Resources Management Act 1994.*
- *Fish Resources Management Regulations 1995.*
- *Fisheries Act 1905.*

Local government authorities (various)

Agency branch	Current role/responsibility in canal management
<ul style="list-style-type: none"> Town Planning Environmental Health Services Branches Engineering. 	<p>Local governments are involved with:</p> <ul style="list-style-type: none"> assessment of scheme amendments, subdivision and development proposals; formulation of local laws and vessel mooring management plan and cyclone contingency plan; post-canal construction management/defects liability period; provision of community facilities and infrastructure; dredging and maintenance of waterway depth; maintenance of breakwaters; monitoring and management of water quality; collection and removal of weed or waste; repair and replacement of pumps and equipment required for water exchange and flushing; water quality monitoring for microbes (ie. bacteria, viruses, protozoa, etc.) and chemical monitoring (ie. nutrients, heavy metals, etc.); environmental pollution control; mosquito control; foreshore management; and environmental audits.

Legislation

- Local Government Act 1995*:
 - outlines responsibilities of local government authorities.
- Town Planning Schemes.

Policy

- Relevant local government policies.

Federal legislation

Current role/responsibility in canal management

Environment assessment and approval process:

- a person must not take an action that has, will have or is likely to have a significant impact on any of the matters of environmental significance without approval from the Australian Government Minister for Sustainability, Environment, Water, Population and Communities;
- an action is a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things;
- decide if a proposed action needs to be referred:
 - is the proposed action likely to have a significant impact on a matter of national environmental significance?
 - is the proposed action likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land)?
- If No, approval is not required from the Minister.
- If Yes, person proposing to take the action makes a referral to the Minister.

Legislation

- *Environment Protection and Biodiversity Conservation Act 1999*:
 - the Australian Government's central piece of environmental legislation;
 - provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the Act as 'matters of national environmental significance'.

Objectives of the Act are to:

- provide for protection of the environment, especially matters of national environmental significance;
- conserve Australian biodiversity;
- provide a streamlined national environmental assessment and approvals process;
- enhance protection and management of important natural and cultural places;
- control international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife;
- promote ecologically sustainable development through conservation and ecologically sustainable use of natural resources.

Actions that have, or are likely to have, significant impact on a matter of national environmental significance require approval from the federal Minister for the Environment, Heritage and the Arts. The Minister will decide whether assessment and approval is required under the Act. There are seven matters of national environmental significance that are protected under the Act:

1. World Heritage properties;
2. National Heritage sites;
3. wetlands of international importance;
4. listed threatened species and ecological communities;
5. migratory species protected under international agreements;
6. Commonwealth marine areas; and
7. nuclear actions (including uranium mines).

Federal legislation

Other matters protected:

- the environment, where actions proposed is on, or will affect, Commonwealth land and the environment;
- the environment, where Commonwealth agencies are proposing to take an action;
- actions include projects, developments, activities, or alteration of these things;
- the Australian and New Zealand Environment Conservation Council provides national guidelines for water quality standards.

Other legislation

Relevant legislation/policy and documents

Civil works includes: a road, railway, tramway, aircraft runway, canal, waterway, harbour, port or marina.

- *Public Works Act 1902*:
 - ‘Public work and work’ includes canals (Part I).

Australian Standards

Relevant legislation/policy and documents

- *AS 3962 2001*: Guidelines for design of marinas, Standards Australia:
 - Guides design of marinas in Australia. Sets guidelines for use by designers, manufacturers and operators of marinas for recreational and commercial vessels up to 50 metres in length – including fixed berth and floating pontoon marina systems, single pontoons and floating wave attenuators. Guidance is also given for on-shore facilities such as dry boat storage, boatlifts, boat ramps and parking facilities.
- *AS 4997 2005*: Guidelines for the design of maritime structures, Standards Australia;
- *AS 1170.2 2002*: Structural design actions – wind actions, Standards Australia;
- *AS 4678 2002*: Earth-retaining structures, Standards Australia;
- *AS/NZS 5667.1 1998*: Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples, Standards Australia;
- *AS/NZS 5667.4 1998*: Water quality – Sampling – Guidance on sampling from lakes, natural and man-made, Standards Australia;
- *AS/NZS 5667.6 1998*: Water quality – Sampling – Guidance on sampling from lakes, natural and man-made, Standards Australia.

Proponents

Agency branch

All applicable agencies as required

Current role/responsibility in canal management

Proponents:

- liaise with government agency and satisfy upfront project information requirements (eg. climate change and coastal process assessment);
- 5-year maintenance period with potential for annual extension;
- defects liability period negotiable with local government and agencies as applicable; and
- develop to Australian Standards.

Relevant legislation/policy and documents

- Refer to Appendix 3.

Appendix 4

Definitions

Artificial Waterway means any artificial channel, lake, harbour or embayment for use or intended for use by vessels for navigation purposes and which may also be used for ornamental and recreational purposes. The term includes any access channel or connecting channel, any addition to or alteration of any waterway within the meaning of this definition and any system of waterways within the meaning of this definition provided in any development of land. The term also includes any other waterway designed for other purposes such as drainage, but which is capable of use as a waterway as herein defined.

Artificial Waterway Structures means any structures on, in or over the artificial waterway, and includes jetties, launching ramps, bridges, moorings and water control structures.

Boat Harbour means an area of protected navigable waters where boats can shelter and where boat-to-shore (and vice versa) transfers of people or goods can be made. Includes the associated land, breakwaters and dredged waterways.

Canal Estate means a development or subdivision that adjoins or directly influences an existing or proposed artificial waterway. For planning purposes, any development where the titles to the subdivided lots extend into, abut or are proximate to an artificial waterway shall be deemed to be part of a canal estate unless the WAPC determines otherwise.

Canal Zone means a zone (as created within an operative town planning scheme) within which an artificial waterway or canal estate is permitted. Individual areas of land included within a canal zone are subject to specific provisions of that town planning scheme which may restrict development to certain types or classes.

Chart Datum means a permanently established surface from which soundings or tide heights are established, and are the theoretical level of water in any tidal area during the lowest possible astronomical tide as defined in the Australian National Tide Tables.

Connecting Channel means any channel in navigable water associated with the construction of an artificial waterway and connected or intended to be connected to the artificial waterway, and retaining wall or other works associated with such channels. The term includes any addition or alteration to any such channel, retaining wall or other works.

Design life means the period over which a structure or a structural element remains fit for use for its intended purpose with appropriate maintenance.

Development has the same meaning given the term in the *Planning and Development Act 2005*.

Floodplain means the extent of flooding in a 1 to 100-year flood event for a particular watercourse, which includes the floodway and flood fringe areas.

Floodway means the area of land that would be affected by river flooding in a 1 to 100-year flood event for a particular watercourse, where development and land uses should be limited to those which would not affect the flow of floodwaters.

Flood fringe means the area of land that would be affected by river flooding in a 1 to 100-year flood event, where development would normally be permitted subject to a specified minimum habitable floor level above the relevant 1 in 100-year flood level to provide adequate flood protection.

Foreshore Reserve means a reserve established for the management and protection of the foreshore of a natural waterway.

Marina means a discrete set of facilities operating under one management body within a boat harbour which provides safe permanent moorings and other boat related services for a group of small craft. There may be more than one marina operating within a single boat harbour.

Natural water body means the water body adjacent to a proposed canal estate that will be used to provide the source water for natural flushing.

Navigation Aids means aids such as lights, leads, buoys and beacons installed to guide the safe navigation of vessels.

Navigable Waters for the purpose of this policy means rivers, lakes, inlets and other waters on which any vessel or any type of marine craft can be navigated.

Waterway Banks means all natural or constructed boundaries to the waters, extending from the waterway bed to the upper level of the flood and wave affected waterway shore. This upper level shall be defined with respect to a 1: 100-year flood event.

Waterway Bed means land below the water of the artificial waterway.

Waterway Management Authority means the authority responsible for managing a natural waterway. Where the waterway is water defined under the *Waterways Conservation Act 1976* or the *Swan and Canning Rivers Management Act 2006*, it is the agency specified in that legislation.

Waterways manager means the agency (normally local government) responsible for the management, monitoring and maintenance works within the boundaries of the water bodies of an artificial waterway and its entrance channel.