Government of Western Australia
Department of Water

Water quality protection note 90
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Looking after all our water needs

Organic material - storage and recycling

Purpose

Recycling has strong community and industry support and there are obvious incentives, both financial and environmental, for establishing recycling facilities. Recycling organic materials saves landfill space and creates useful products including mulch, compost, soil conditioner and vermicast (worm castings).

Historically, there have been problems establishing organic material storage and recycling facilities because they are viewed as messy, noisy, smelly and uncontrolled. However, with good design and management techniques, these facilities can have little impact on the surrounding environment. The selection of highly controlled and enclosed processes increases reliability and reduces the risk of contamination to water resources.

The adverse effects on water quality from poorly managed facilities that store and/or recycle organic material include:

- Groundwater, surface water and soil can become contaminated, which is of concern for drinking water sources, as contaminants may include pathogenic micro-organisms.
- Dust and runoff can cause turbidity in surface water bodies.
- Excessive nutrient releases can promote algal blooms (eutrophication) and contribute to oxygen deficient water, leading to the death of fish and toxicity to water birds.
- Acidic conditions can be created which release contaminants such as toxic metals.
- The quality of the soil and water can be altered (such as pH and salinity changes).
- Water can become discoloured (from leached tannins).
- ‘Wicking’ can occur in wet areas where groundwater seeps up into compost heaps causing water-logging, disrupting aerobic decomposition and causing foul odours.
- Polluted soil can result in a contaminated site.

The Department of Water is responsible for managing and protecting the state’s water resources. We are also a lead agency for water conservation and reuse. This note offers:

- our views on the contamination risks to water resources posed by organic material recycling activities and facilities
- guidance on acceptable practices and statutory measures employed to protect the quality of our water resources
- a basis for the development of a multi-agency code or guideline for sustaining a healthy environment that consider the views of industry, government and the community.

This note advises on relevant environmental issues and makes recommendations on best practice. It is intended to inform industry operators, government officers, environmental consultants and community members on water quality protection aspects of this activity including initial planning, design, construction, operation and potential closure. Supporting information is provided in appendices. These include *Information on sensitive water resources, note limitations and updates*, *Relevant statutes and administering agencies* and *Key data we need to support project assessments.*

Scope

This note applies to all recycling and storage facilities for organic materials including:

- manure
- paper waste
- green waste (grass and garden refuse)
- straw
- forestry products
- wood processing waste
- soil blended with organic material
- dewatered (sewage) biosolids
- non-toxic organic sludges
- food industry waste
- brewery waste
- animal feed.

This may include components of facilities such as:

- soil supply outlets
- farms with large stockyards or feedlots
- abattoirs
- anaerobic digesters (biogas production)
- chip mills and other timber processing facilities
- waste transfer stations and general material recycling operations
- animal feedstock providers.

The types of operations covered by this note include:

- aerobic composting such as green wastes in windrows
- bulk storage of green matter
- chipping, grinding, mixing, screening and sieving of organic wastes
- mixing of raw organic materials
- blending, packaging and/or selling of materials including compost, green waste, soil, peat, manure, sawdust, sewage biosolids and humus.

The note does not apply to:

- raw sewage and septic tank waste
- anaerobic (oxygen deficient) digesters
- municipal waste (mixed refuse)
- liquid organics
- chemical fertilisers
- biomedical waste
- non-commercial scale operations
- landfills (see our Water quality protection note (WQPN) no. 111 – *Landfills for disposal of putrescibles materials* (see References and further reading, 4a for where to find our WQPNs).

It may however offer some useful guidance on potential risks to water resources and good practice for reducing these.

Advice and recommendations

Location

1 Organic material management sites should ideally be buffered by features (such as hills, bushland or agricultural area, or located in redundant quarries) to separate them from residential and public areas.

2 Facilities should be located on gently sloping land with grades between 1 in 10 and 1 in 200. Slopes greater than 1 in 10 are likely to cause excessive runoff and increase contaminated water entering the environment. Rocky and steep slopes should be avoided.

3 The soil type should be able to support this type of operation – it should permit some infiltration but not be waterlogged. For example, if the site has sandy soils, additional management measures will be needed to prevent rapid infiltration of contaminated water. A soil with loam or clay and a phosphorus buffering index greater than 140 is normally suitable. For operational areas and hardstand requirements, refer to *Table 1*.

4 There should be a vertical separation distance of at least 2 m from the base of the infrastructure to the maximum groundwater level.

5 Facilities should be at least 100 m away from any private water supply bores, and preferably down-gradient (as per groundwater movement) of the bores.

6 If the facility requires a water supply from a bore or surface water extraction point, contact our nearest regional office (<www.water.wa.gov.au> select *Contact us*) about water licensing requirements.

7 Contact the Department of Environment and Conservation (DEC) for information on constraints on the clearing of native vegetation. Refer to the brochure *Protecting native vegetation – new laws for Western Australia* (see References and further reading, 3).

8 The direction of prevailing winds should be considered for odour and dust control. This information is available from the Bureau of Meteorology at <www.bom.gov.au> (see References and further reading, 1).

9 Adequate access to transport routes should be considered, as well as adequate space for vehicles to manoeuvre.

Near sensitive water resources

For information on what constitutes a sensitive water resource, see Appendix A.

Natural vegetation buffers can improve water quality by filtering contaminated water before it enters a surface water resource.

10 Native vegetation buffers should be established between the operations and any sensitive water resources. For advice on buffer selection, see our WQPN no. 6 – *Vegetated buffers to sensitive water resources*.

Within public drinking water source areas

11 We will oppose development or expansion of organic material storage and recycling facilities in priority 1 (P1) areas, priority 2 (P2) areas, wellhead protection zones (WHPZ) and reservoir protection zones (RPZ) as they are considered *incompatible.*

12 Organic material facilities are *compatible with conditions* in priority 3 (P3) areas, provided best management practices are used, as given in this note or in project-specific conditions set by regulatory agencies.

13 We recognise that in some cases, land-use activities were approved and established before priority areas were assigned. The operators of non-conforming activities should ensure that they progressively implement best management practices to minimise the risk to water resources.

Near waterways

14 Facilities should be located outside the 1 in 100 year flood level (see References and further reading, 1 and 5).

15 Facilities should not be established on land subject to seasonal flooding, in boggy areas, or in depressions where surface drainage collects.

16 An adequate separation distance should be maintained between the activity and waterways (including foreshore areas) to protect their values and water quality. (For more information see References and further reading, 4b).

Wetlands

17 Contact DEC about buffer requirements if your proposal is within 500 m of a wetland (see References and further reading, 3).

Relevant policies, standards and requirements

18 Any proposed new or expanded activities that may affect water resources should be referred to our nearest regional office for assessment. Appendix C provides the details you will need to give to us.

19 You may require a permit from us under the *Rights in Water and Irrigation Act 1914* to undertake any works that will alter the bed or banks of a waterway within a proclaimed area. Please contact our nearest regional office for information.

20 If your facility is in a is in a proclaimed waterway management area you may require written approval from us. Contact our local regional office.

21 You may require development approval from your local government authority. Please contact the relevant council for more information.

22 Australian standards should be used for organic material storage and recycling facilities (see References and further reading, 6):

- a Australian Standard (AS) 4454 (2003) for composts, soil conditioners and mulches
- b AS 3743 (2003) for potting mixes
- c AS 4419 (2003) soils for landscaping and garden use.

23 You need to apply for a licence from DEC if your operation is a prescribed premise under the Environmental Protection Regulations 1987:

- a solid waste facility of 1000 t or more per year
- b solid waste depot of 500 t or more per year
- c composting, manufacturing and/or soil blending facility of 1000 t or more per year.

24 Contact DEC if you intend to store and recycle liquid waste, as you need to apply for a licence under the Environmental Protection (Controlled Waste) Regulations 2004.

25 The sale, supply, storage and use of poultry manure is restricted in localities included in the Health (Poultry Manure) Regulations 2001. Check with your local government authority for more information.

26 It is an offence under the Environmental Protection (Unauthorised Discharge) Regulations 2004 to cause or allow animal waste, food waste and other scheduled items to be discharged to the environment. Contact DEC for more information.

27 If waste or wastewater (including treated) is to be discharged to the environment, you will need approval from DEC.

28 If wastewater is to be discharged to a sewer, you will need written permission from the water service provider (such as the Water Corporation).

29 Dumping of wastes is illegal. For more information contact the Keep Australia Beautiful Council of Western Australia. To report illegal dumping in Western Australia, phone their hotline on 1300 766 451.

30 Organic material facilities may require approvals from other agencies and regulators. Please check Appendix B for information on these before commencing construction.

Design and construction

31 The facilities should be designed and constructed to prevent escape of contaminants risking harm to water resources. Recommended designs are shown in *Table 1.*

32 Wastewater and stormwater streams should be kept separate through adequate surface grade changes, bunding, piping or other drainage systems.

33 Wastewater should be contained and directed to a wastewater storage and treatment system (see our WQPN no. 39 – *Ponds for stabilising organic matter*). The water can then be treated to an acceptable standard and, in order of preference:

- a used in the facility's operations (if for irrigation, see WQPN no. 22 – *Irrigation with nutrient rich wastewater* and WQPN no. 33 – *Nutrient and irrigation management plans*)
- b disposed of to sewer with the permission of the water service provider
- c discharged to the environment, with the approval of DEC.

34 Uncontaminated stormwater should be captured for fit-for-purpose use on-site or infiltrated into the ground.

35 The capacity of the wastewater management system and holding ponds should be designed to:

- a handle a 72 hour duration, 1 in 10 year ARI critical rainfall event without overflow (see References and further reading, 1 and 5)
- b have sufficient storage freeboard for a 90th percentile wet year and any wave action without overflowing.

36 Storage areas should be designed with sufficient capacity to ensure all material is properly contained and protected from dispersal by wind.

37 Agricultural drain coil wrapped in geo-fabric (within a contained granular soil bed) should be used to assist underdrainage of material stockpiles and compost windrows.

Table 1: Recommended designs according to rainfall and type of organic material

	Location of facility		
Type of organic material	**All rainfall conditions, near a sensitive water resource**	**Annual rainfall over 500mm, not near a sensitive water resource**	**Annual rainfall under 500mm, not near a sensitive water resource**
Dewatered (sewage) biosolids, manure	• fully enclosed weatherproof* facility	• weatherproof* cover • impermeable surface**	• impermeable surface** • weatherproof* cover (if over 300m^3 storage capacity)
Non-toxic organic sludges, food industry waste, brewer's waste, animal feed	• weatherproof* cover • impermeable surface**	• weatherproof* cover • low-permeability hardstand***	• low-permeability hardstand***
Paper, greenwaste, straw, forestry products, wood processing waste, blended soil	• weatherproof* cover • low-permeability hardstand***	• weatherproof* cover • low-permeability hardstand***	• low-permeability hardstand***

*Weatherproof cover should be achieved by (in order of preference):
1. permanent structure (such as shed)
2. temporary structure (such as vented tarpaulin with restraints to prevent wind movement).

**Impermeable surface - bituminous concrete with membrane underlay and perimeter containment bund, graded and maintained to provide efficient surface drainage and slope towards the contained water storage or treatment system.

***Low-permeability hardstand - bitumen, asphalt, reinforced concrete, compacted or rolled limestone of at least 200 mm thickness with perimeter containment bund, graded and maintained to provide efficient surface drainage and slope towards the contained water storage or treatment system.

Operation

38 The release of stormwater should not result in any harmful effects on the quality of the receiving water (such as turbidity or variable pH).

39 The generation of wastewater should be minimised. This can be achieved by:

a locating operational areas away from the spray zone of sprinklers

b using high-pressure, low-volume hoses for cleaning and wash down – this not only limits wastewater generation but minimises water use

c keeping uncontaminated stormwater separate from wastewater at all times.

Organic material storage

40 Storage time of stabilised material should be minimised, as this reduces the likelihood of water resource contamination.

41 Storage areas should be kept clean in between deliveries or loads.

42 Bulk organic materials (excluding biosolids, manures, sludge and industrial waste products) such as green waste or woodchips that are stored outside should be held on a low-permeability surface with wastewater run-off directed to the treatment system.

43 Weatherproof skips or storage areas with perimeter bunds should be installed and maintained to hold non–approved waste materials pending removal to licensed disposal facilities.

44 Finished products (if stored outdoors) should be packaged in sealed bags stored on pallets, or in weatherproof containers.

Composting process

Composting is an important part of many organic material storage and recycling facilities. It is carried out to reduce volumes and stabilise volatile organic materials. The benefits of composting are that it reduces waste and creates useful by-products. Composting may be carried out in turned piles or windrows or in a purpose-built aerated vessels. There are a number of factors to manage when composting to ensure the process happens effectively. These include control of pile temperature, access to adequate oxygen from the air, moisture content, carbon to nitrogen ratio, particle size and process duration. A correct balance of these ensures that the composting process occurs effectively, resulting in a reduced potential for water quality contamination.

45 The core temperature of composting piles should be maintained between 55 ^{o}C and 65 ^{o}C to kill pathogens.

46 The moisture level in the stockpile should be maintained between 40 to 65 per cent (generally, 50 to 60 per cent is optimal, depending on the material). For a quick field check, it should feel as moist as a wrung-out sponge. If the compost is too wet, there may be contaminated runoff and anaerobic decomposition may occur (this creates foul odours). If it is too dry, microbial activity will diminish and spontaneous combustion may occur (Queensland DPI&F 2005).

47 The carbon to nitrogen ratio (C:N) should be maintained between 20:1 and 40:1 at the start of decomposition. If the ratio is less than this, odours maybe generated and odour control equipment may be required. The final product C:N should be between 10:1 and 20:1 (EPA South Australia 2007).

Composting stockpiles and windrows

Properly constructed stockpiles have little potential to contaminate water resources.

48 Stockpiles should be set up on a hardstand or similar area (see the *Design and construction* above) with drainage into the wastewater treatment system.

49 Fresh heaps should be set up on a porous base layer with high water absorbency such as coarse sand, dry woodchips or straw (on top of the hardstand).

50 Materials with a high water demand (such as sawdust) should be blended into the stockpile to minimise runoff.

51 Material should be added to the stockpile in thin, even layers less than 50 cm thick. After the addition of each layer, the stockpile should be compacted, especially if the stack is higher than 1.8 m.

52 If outdoors, the stockpile should be shaped and periodically graded to stop water from gathering in ponds on the pile surface.

53 Windrows (stacking raw material in long piles) should be constructed parallel to the slope of the ground to avoid water gathering on the upside of the piles.

Dust control

54 Maintain correct moisture levels in stockpiles, and store finished products correctly to reduce dust generated from wind or turning of the organic materials.

55 Use soil amendment or water for dust control on internal roads.

56 Maintain vegetation cover and plant trees as windbreaks to minimise the generation of dust and provide a visual screen.

Good housekeeping

57 Any spillage of material should be cleaned up immediately (see contingency planning section below for more information).

58 Hydrocarbons (fuels and oils) and chemicals should be stored and used appropriately as recommended in our WQPN nos. 56, 58, 60 to 62 and 64 - 'tanks' series.

59 Pests such as flies and rodents should be controlled. Pesticides should be used in accordance with WQPN no. 37 – *Pesticides, management and use near sensitive waters.*

Management, monitoring and reporting

60 Employees should be well trained and suitably equipped to manage site incidents. They need to understand the risks the operation may pose to water quality.

61 Strategically placed signs or symbols should remind employees and visitors of the risks to water resources posed by contaminants released to the local environment.

62 Odours should be avoided by maintaining correct composting techniques (see *Composting process* above) or installation of bio-filters on building vents. For more information on odour management, contact DEC.

63 Incoming organic material should be assessed, tested and documented on arrival to assist in making the correct decisions about what materials to accept, and how and when to process them, based on water quality considerations.

64 All working areas should be regularly inspected and maintained to ensure contaminated water is not escaping.

65 Water quality monitoring may be required by regulars for outdoor operations. Monitoring programs should be determined on a case-by-case basis based on the value of local water resources, probable contaminant travel pathways, the types of materials stored on site and the water quality risks they pose. Parameters that may need to be monitored include metals, pesticides, pathogens, nutrients, suspended solids, pH, electrical conductivity and biochemical oxygen demand, for:

- groundwater quality monitoring up-gradient and down-gradient of the site (in terms of groundwater movement)
- surface water quality monitoring if the facility could affect surface water resources.

66 If any wastewater is discharged to the environment, it should be monitored and tested to ensure it is of appropriate quality before discharge. This may require approval from DEC. For more information, see References and further reading, 2.

67 Additional water quality monitoring may be required following any incidents (see the section on contingency planning, incidents and emergencies).

68 All water quality samples should be tested by a laboratory registered with the National Association of Testing Authorities (www.nata.com.au).

Contingency planning, incidents and emergencies

69 A contingency plan should be available on site to address foreseeable emergency situations such as accidents, fires, chemical spills and vandalism that could have an effect on water resources. Facility operators should consult with the appropriate fire authority on layout and services required. Foam that excludes oxygen may be needed when fire fighting due to the nature of the organic matter.

70 Staff should be trained and assigned roles in conducting effective emergency response procedures. Emergency contact details should be readily available to all staff.

71 Absorbent materials such as sand or inert adsorbent litter (attapulgite or 'kitty litter') should be kept on site to absorb any chemical spilt onto floors. Spills should initially be cleaned up using absorbents prior to any wash down. Contaminated litter should be placed in a skip for disposal at an approved location.

72 Any spill or contamination should be immediately reported to DEC (phone 1300 784 782). If the spill is within a public drinking water source area, advise the Water Corporation immediately (phone 1800 652 897, all hours).

73 Detailed information should be recorded and kept about all incidents, including:

- date and time of incident
- description, quantity and location of the escaped chemicals
- action taken to remedy the problem on discovery
- water quality monitoring results (if required by regulators).

Project closure and site restoration

74 On vacating the site, the operator is responsible for the removal of any contamination or waste, and for the restoration and revegetation of the site as appropriate for the next land use. Contact DEC for more information about contaminated sites.

Appendix A – Information on sensitive water resources, note limitations and updates

Sensitive water resources

Water resources sustain ecosystems, aquatic recreation and aesthetic values and provide drinking, industry and irrigation supplies. Along with breathable air, uncontaminated water is essential for viable communities. Natural water resources must remain within defined quality limits to retain their ecological, social and economic values. Therefore they require appropriate protection measures to minimise contamination.

Information on water quality parameters and processes to maintain water values are published in the Australian Government's national water quality management strategy papers. These papers are available online at <www.environment.gov.au> select *water> water policy and programs> water quality.*

The Department of Water strives to improve community awareness of catchment protection measures (for both surface water and groundwater), as part of a multi-barrier protection approach to sustain acceptable water resource quality. Human activity and many land uses pose a risk to water quality if contaminants are washed or leached into sensitive water resources in significant quantities. Sensitive waters include estuaries, natural waterways, wetlands and unconfined groundwater. Sensitive waters support one or more of the environmental values described below.

Public drinking water sources

Overview

Public drinking water source area (PDWSA) is the collective name given to any area proclaimed to manage and protect a community drinking water scheme source. PDWSAs include underground water pollution control areas, water reserves and catchment areas administered by the Department of Water under Western Australian statute provisions of the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947*. For online information on the location of PDWSAs, see <www.water.wa.gov.au> select *tools and data> maps and atlases> geographic data atlas*, then open *environment> public drinking water source areas.*

Priority areas within PDWSAs (priority 1 (P1), priority 2 (P2) and priority 3 (P3)) have been defined to guide land planning, rezoning and development approval processes. Priority areas are assigned based on the current local planning scheme zoning, land tenure, the water source's strategic value and its vulnerability to harm. Each priority area is managed using a specific risk–based strategy to provide for effective water resource protection. P1, P2 and P3 areas are assigned in drinking water source protection plans or land use and water management strategies. The department develops these documents in consultation with other government agencies, landowners, industry and the community.

P1 areas are defined to ensure that there is no degradation of the water source induced by human activity. These areas are declared over land where the provision of the high quality drinking water for public use is the prime beneficial land value. P1 areas typically cover land controlled by a state agency. These areas are managed in accordance with the principle of *risk avoidance* and so most land development and human activity is normally opposed.

P2 areas are defined to ensure that there is *no increased risk of pollution* to the water source, once a source protection plan has been published. These areas are declared over land where low intensity development (such as rural use) already exists. Protection of public water supply sources is a high priority in these areas. These areas are managed in accordance with the principle of *risk minimisation*, and so the intensity of development is restricted (with management conditions) and activities with a low contamination risk are accepted.

P3 areas are defined to *manage the risk of pollution* to the water source. These areas are declared over land where public water supply sources must coexist with other land uses such as residential, commercial and/or light industrial development. Protection of these areas is achieved through management measures defined via environmental guidance (such as these protection notes) or via site-specific development conditions that limit the contamination risk to water resources from the land use or activity. If, however, the water source becomes significantly contaminated, then water supplied from P3 sources may need to be treated more intensively or an alternative water source found.

Protection zones are also defined close to the point where drinking water is harvested or stored. These zones are known as *wellhead protection zones* (WHPZs) and *reservoir protection zones* (RPZs). Additional constraints apply to activities within these zones to safeguard a defined area surrounding these sources most vulnerable to contamination.

WHPZs are assigned within the immediate surrounds of water production wells. Specific land use restrictions apply in these zones as groundwater moves rapidly towards wells due to aquifer depressurisation by pumping. Any contamination leaching from the ground surface in a WHPZ could rapidly migrate into scheme water supplies (before effective remedial action can occur). In sedimentary basins, WHPZs are usually circular, with a 500 m radius in P1 areas, 300 m in P2 and P3 areas. These zones do not extend outside PDWSA boundaries.

RPZs are defined over and around public water supply dams or pipe-head reservoirs. Special access and land use restrictions apply in RPZs. The aim is to restrict the likelihood of contaminants being deposited or washing into water sources following rainfall. RPZs within state-controlled land cover an area of up to two kilometres measured from the reservoir top water level and include the inundated area when the reservoir is full.

For additional explanatory information on PDWSAs, see our Water quality protection notes (WQPNs) no. 25 – *Land use compatibility in public drinking water source areas* and 36 – *Protecting public drinking water source areas* (available online at www.water.wa.gov.au).

Established activities within PDWSAs

Many land use activities were approved and established before publication of a source protection plan or strategy. The operators of these land use activities should ensure that modern environmental facilities and practices are progressively implemented so the water resources contamination risk is minimised (within practical and economic constraints).

New or expanded activities in PDWSAs

Any development proposals that could affect a drinking water source should be referred with detailed supporting information to the department's regional office for assessment and a written response.

The development proposal may be approved (with or without conditions); additional information may be sought prior to making a decision; or the proposal rejected due to a policy conflict or inadequate protective measures to safeguard the water source. To facilitate approval, operators should demonstrate that under all operating conditions the materials and processes used on-site do not pose a significant water contamination risk.

Buffers to water supply sources

Native vegetation buffers should separate compatible land use areas from the full supply level of reservoirs and their primary feeder streams or production bores used as a source of drinking water. Advice on suitable buffer form and dimensions is provided in WQPN no. 6 – *Vegetated buffers to sensitive water resources*.

Within clearing control catchments

Special controls on vegetation clearing for salinity management are provided under part IIA of the *Country Areas Water Supply Act 1947*.

These controls apply in the Wellington Dam, Harris River Dam, Mundaring Weir and Denmark River catchment areas and the Kent River and Warren River Water Reserves.

Details on clearing controls may be obtained from our local regional office, see online information at <www.water.wa.gov.au>, and select *Contact us*.

Private water supply sources

These sources vulnerable to contamination include:

- human or stock (animal) drinking water sources
- commercial or industrial water sources (requiring specific qualities that support activities such as aquaculture, cooling, food or mineral processing or crop irrigation)
- urban or municipal irrigation sources (where water quality may affect vegetation performance or people's health or wellbeing).

Underground ecosystems

Important underground ecological functions that may be at contamination risk include groundwater and cave dwelling animals and microorganisms (generally within soils with open pore spaces such as sand, gravel and limestone).

Waterway ecological and social values

Waterways considered to have high social and conservation significance are described in the Western Australian Environmental Protection Authority's Guidance statement 33 *Environmental guidance for planning and development*, section B5.2.2. This statement is available online at <www.epa.wa.gov.au> select *EIA* > *guidance statements.*

The *Waterways Conservation Act 1976* defines Western Australian waterways subject to specific regulatory controls managed by the Department of Water. These waterways are the Avon River, Peel-Harvey Inlet, Leschenault Inlet, Wilson Inlet and Albany waterways management areas.

This department also manages waterways under Section 9 of the *Water Agencies (Powers) Act 1984* and the *Rights in Water and Irrigation Act 1914*.

For online information, see <www.water.wa.gov.au> select *managing our water*. Apart from aquatic ecosystems and water sources, waterways provide social values including aesthetic appeal, drainage pathways and recreational opportunities such as watercraft use, fishing, tourism, swimming and related aquatic activities. Engineered drains and constructed water features are normally not assigned ecological values because their function and operational factors override their ecological value.

The Swan-Canning river system is managed to provide for ecological and social values by the Swan River Trust under the *Swan and Canning Rivers Management Act 2006*. For online information, see <www.swanrivertrust.wa.gov.au> or phone the trust on 9278 0900.

Wetland ecology

Many important wetlands have been given a conservation status under the Ramsar agreement (described online at <www.ramsar.org>), Japan and Australia migratory bird agreement (JAMBA), China and Australia migratory bird agreement (CAMBA); and Republic of Korea and Australia migratory bird agreement (ROKAMBA), federal government policy (such as the *directory of important wetlands*) and state environmental protection policies. Conservation wetland data to guide land planning and development activities is provided via the following publications:

- Scheduled wetlands are defined by the Australian government in the *Directory of important wetlands in Australia,* available online at <www.environment.gov.au> select *water> water topics> wetlands.*
- Wetlands with defined high conservation significance described in the Environmental Protection Authority (WA) guidance statement 33 *Environmental guidance for planning and development (section B4.2.2).* This statement is available online at <www.epa.wa.gov.au> select *Environmental impact assessment> guidance statements.*

The Department of Environment and Conservation is the custodian of State wetland datasets, and is responsible for maintaining and updating relevant information. These datasets are available online at <www.dec.wa.gov.au> search *maps wetlands*, or select *management and protection> wetlands> wetlands data*. Guidance on viewing the wetlands is provided online at *water> wetlands> data*; or by phoning the department's nature conservation division on 9334 0333.

Wetlands identified for conservation value or for resource enhancement include:

- *Geomorphic wetlands of the Swan Coastal Plain dataset*
- *South coast significant wetlands dataset*
- *Geomorphic wetlands Augusta to Walpole* dataset. This dataset awaits detailed evaluation.

Wetlands that are highly disturbed by land use, or have been landscaped to provide a social amenity or drainage control function in urban settings, may not be assigned conservation values, unless they are actively managed to maintain these values.

Note limitations and updates

Many WA aquifers, waterways and wetlands await detailed scientific evaluation, data on their quality is sparse and their values remain unclassified. Unless demonstrated otherwise, any natural waters that are slightly disturbed by human activity are considered

to have sensitive environmental values. Community support for these water values, the setting of practical management objectives, sustainable protection provision and effective implementation are vital to protecting or restoring water resources for both current needs and those of future generations.

This note provides a general guide on environmental issues, and offers solutions based on data searches, professional judgement and precedents. Recommendations made in this note do not override any statutory obligation or government policy statement. Alternative practical environmental solutions suited to local conditions may be considered.

The note recommendations shall not be used as the department's policy position on a specific matter, unless confirmed in writing. Regulatory agencies should not use recommendations made in this note in place of site-specific development conditions based on a project's assessed environmental risks. Any regulatory conditions should consider the values of the local environment, the safeguards in place and take a precautionary approach.

Where a conflict arises between this note's recommendations and any proposed activity that may affect a sensitive water resource, this note may be used to assist negotiations with stakeholders. The negotiated outcome should not result in a greater water quality contamination risk than would apply if the recommended protection measures were used.

This note will be updated as new information is received, industry/activity standards change and resources permit. The currently approved version is available online at <www.water.wa.gov.au> select *publications> find a publication> series browse> water quality protection notes.*

Appendix B - Statutory approvals

This list contains some of the statutory approvals relevant to this note.

What's regulated?	**Western Australian statute**	**Regulatory office**
Development approval	*Planning and Development Act 2005*	Western Australian Planning Commission Department of Planning www.planning.wa.gov.au Local government
Wetlands, drinking water catchments and estuaries	*Environmental Protection Act 1986,* Part III Environmental protection policies	Minister for the Environment advised by the Environmental Protection Authority www.epa.wa.gov.au
Impact of significant development proposals on the values and ecology of land or natural waters	*Environmental Protection Act 1986,* Part IV Environmental impact assessment	
Prescribed premises that could pollute	*Environmental Protection Act 1986,* Part V Environmental regulation	Department of Environment and Conservation www.dec.wa.gov.au
Land and waters that have been contaminated by human activity	*Contaminated Sites Act 2003* and associated regulations 2006	

What's regulated?	Western Australian statute	Regulatory office
Discharge of specified contaminants prohibited	Environmental Protection (unauthorised discharges) Regulations 2004	
Illegal dumping of wastes	*Litter Act 1979*	Keep Australia Beautiful www.kabc.wa.gov.au
Taking of surface water, groundwater or waterway disturbance	*Rights in Water and Irrigation Act 1914*	Department of Water – regional office www.water.wa.gov.au
Discharge of waters to managed waterways	*Waterways Conservation Act 1976*	
Protecting public drinking water source areas Clearing of native vegetation in the Mundaring, Wellington, Harris, Denmark, Warren or Kent catchments	*Metropolitan Water Supply, Sewerage and Drainage Act 1909* *Country Areas Water Supply Act 1947*	
Discharges into the Swan-Canning Estuary	*Swan and Canning Rivers Management Act 2006*	Swan River Trust www.swanrivertrust.wa.gov.au
Storage of fuels, solvent, explosive and dangerous goods	*Dangerous Goods Safety Act 2004* Dangerous goods safety regulations 2007	Department of Mines and Petroleum www.dmp.wa.gov.au
Management of human wastes Community health issues Nuisance Excessive fly breeding	*Health Act 1911* Health (Garden soil) Regulations 1998	Department of Health www.health.wa.gov.au Local government
Emergency response planning	*Fire and Emergency Services Authority of WA Act 1998*	Fire and Emergency Services Authority www.fesa.wa.gov.au
Discharge to sewer (industrial waste permit) or to main drain	*Metropolitan Water Supply, Sewerage and Drainage Act 1909* *Country Towns Sewerage Act 1948*	Water Corporation www.watercorporation.com.au Designated water services provider
Noise, smell and chemical spray drift from rural properties	*Agricultural Practices (Disputes) Act 1995*	Agricultural Practices Board www.agric.wa.gov.au
Occupational safety and health, including potential toxic gases from organics	*Occupational Safety and Health Act 1984*	Department of Commerce www.commerce.wa.gov.au/WorkSafe

Relevant statutes are available from the *State Law Publisher* at <www.slp.wa.gov.au>

Appendix C - Key data we need to support project assessments

Where facilities near sensitive waters are to be constructed or upgraded, the following data should be supplied with the development proposal:

1 Site owner or operating tenant's name and contact details.

2 A site plan showing the location of the project relative to lots and roads. The plan should show the topography, remnant vegetation cover, existing and proposed development areas and on-site water features and sources.

3 Details of site investigation of soil strata, depth to watertable (if applicable) and available data on the hydrology and quality of local water resources.

4 The present local government land use zoning. Current land use description, any site contamination history and its remediation.

5 Full description and scale of the activities planned for the project site, (site amenities, infrastructure and chemical applications), construction and operating workforce and planned project operational life. Describe intended commissioning date, operating hours and any expansion options.

6 Details of any proposed vegetation clearing, environmental buffers, site earthworks and services including water supply, sewage and drainage.

7 Description of all materials and chemicals to be stored or handled on site in commercial quantities.

8 A water-use budget.

9 Description of the types, quantities and quality of solid and liquid waste (if applicable) that will be generated in or disposed from the facility.

10 Description of planned material containment and waste management methods (treatment and disposal), with an environmental management plan and nutrient and irrigation management plan (where applicable).

11 Details of any environmental modelling conducted to demonstrate the effects of the project on local water resources.

12 Planned operational and equipment maintenance procedures.

13 Details of any contingency measures proposed to minimise the impacts of chemical spills and safely dispose of contaminated waters that may result from storms, fire, flood or equipment malfunction or vandalism. Information should include details of workforce training, site monitoring and emergency response facilities.

14 Any project contractual agreements or regulatory approvals received.

For major projects, development proponents should engage the services of a qualified and experienced consultant to professionally prepare their development proposal. This should ensure that government agencies can efficiently assess and respond to the proposal without delays caused by inadequate or poorly defined information.

References and further reading

1 Australian Government – Bureau of Meteorology – rainfall and evaporation data, available online at <www.bom.gov.au> select *WA* > *climate information*.

2 Australian Government Department of Environment, Water, Heritage and the Arts, *National water quality management strategy papers* available online at <www.environment.gov.au> select *water* > *water policy and programs* > *water quality*.

3 Department of Environment and Conservation:

- *Draft environmental guidelines for organic waste recycling facilities,* June 2010, in development, Department of Environment and Conservation, Perth. When published it should be available at <www.dec.wa.gov.au> *Pollution prevention* > *Licensing and regulation* > *Publications* > *Guidelines*
- Towards zero waste website <www.zerowastewa.com.au>
- *Position statement – wetlands,* 2001, available at <www.dec.wa.gov.au> select *Management and protection* > *wetlands*
- *Protecting native vegetation – new laws for Western Australia* available at <www.dec.wa.gov.au> select *Management and protection* > *plants* > *native vegetation* > *compliance.*

4 Department of Water:

a Water quality protection notes available online at <www.water.wa.gov.au> select *publications* > *find a publication* > *series browse* > *water quality protection notes*:

- WQPN 6 – Vegetated buffers to sensitive water resources
- WQPN 22 – Irrigation with nutrient rich wastewater
- WQPN 25 – Land use compatibility in public drinking water source areas
- WQPN 33 – Nutrient and irrigation management plans
- WQPN 36 – Protecting of public drinking water source areas
- WQPN 37 – Pesticide management and use near sensitive waters
- WQPN 39 – Ponds for stabilising organic matter
- WQPN 56 – Tanks for above ground chemical storage
- WQPN 58 – Tanks for temporary elevated chemical storage
- WQPN 60 – Tanks for mobile fuel storage in public drinking water source areas
- WQPN 61 – Tanks for ground level chemical storage
- WQPN 62 – Tanks for underground chemical storage
- WQPN 64 – Tanks: close of underground storage
- WQPN 65 – Toxic and hazardous substance storage and use
- WQPN 111 – Landfills for disposal of putrescible materials.

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