



Water quality protection note 65

April 2015

Toxic and hazardous substances

Purpose

Toxic and hazardous substances (THS) are materials that are widely used to fuel machinery, clean equipment, control pests and support our lifestyle. If mismanaged, they can poison living things (humans, animals and plants, as well as aquatic ecosystems), disrupt reproductive processes and habitats, and may generate fires or explosions. While the appropriate use of THS is widespread and generally necessary, they can cause considerable harm if allowed to enter sensitive water resources. Many THS are highly mobile in the environment; and do not degrade, bind to soil particles or precipitate in water resources. Some are harmful even at very low concentrations (in the parts per billion range). Once THS enter soil or water bodies they may go undetected for long periods, cause extended harm to water uses and aquatic ecology and can be very costly to remedy.

Toxic and hazardous substances could impact on the environment from:

- fluid leakage from damaged or corroded chemical storage systems
- accidental spills during transport or maintenance of equipment
- poor chemical handling or vandalism
- runoff or leakage of THS contaminated water during control of fires
- THS misuse during application resulting in dispersion of chemical residues in stormwater or irrigation drainage.

This department is responsible for managing and protecting the state's water resources. It is also a lead agency for water conservation and reuse. This note offers:

- our current views on the storage and management of THS that pose a risk to human or animal health and aquatic ecology
- guidance on acceptable practices used to protect the quality of Western Australian water resources
- a basis for the development of a multi-agency code or guideline designed to balance the views of industry, government and the community, while sustaining a healthy environment.

The aim of this note is to inform industry operators, government officers, environmental consultants and community members on water quality protection aspects of this activity from its establishment, through facility construction, operation and potential closure. Appendices provide additional background and technical advice as follows:

- A. Information on sensitive water resources, note limitations and updates
- B. Relevant statutes and administering agencies
- C. Data needed for assessing developments, followed by references and further reading, note disclaimer and how to provide feedback.

Scope

This note applies to the storage and use of THS, that if released into the environment in significant quantities, may harm living things dependent on good quality water resources.

THS include pesticides, herbicides, fuel, explosives, flammable liquids, cleaners, alcohols, fertilisers, medical or veterinary chemicals, pool chemicals and corrosive substances, and are defined as substances listed in:

- the current schedules of the *Poisons Act 1964* (Appendix B)
- the *Australian code for the transport of dangerous goods by road and rail* (reference 3)
- the *Australian and New Zealand guidelines for fresh and marine water quality* or the *Australian drinking water guidelines* (references 2c and 2d) that have the potential to contaminate waters to the extent that they become unsafe for human, plant or animal use, or may significantly disrupt ecological processes.

Materials not covered by recommendations in this note include:

- THS in low quantities (typically less than 25 L), that are used solely for non-commercial purposes such as cleaning or household pest control. However these THS should be carefully stored, handled and used as recommended by suppliers to avoid harming people, animals or ecosystems
- uncontaminated soil; common mineral salts such as calcium, iron, magnesium, potassium or sodium chlorides, carbonates and sulphates; nutrient-rich materials (commercial fertilisers and animal manures); natural organic materials that deplete oxygen when they decay; vegetable oils and detergents.

Advice and recommendations

Location of new or expanded THS storage facilities

- 1 THS storage facilities should not be situated near sensitive water resources (Appendix A) where loss of chemicals could cause significant or persistent environmental harm, and where alternatives exist. Appropriate location is essential to minimise the risk of environmental impact. The highest risk of harmful leaching from THS applies where sand, gravel or limestone soils overlay a shallow ground-water resource.

Within public drinking water source areas (PDWSAs)

- 2 In priority P1 (P1) areas (see Appendix A), reservoir protection zones (RPZs) and wellhead protection zones (WHPZs), above and below ground THS storage tanks are incompatible (reference 8b). The installation or enlargement of such tanks will be opposed.
- 3 In priority 2 (P2) areas, below-ground THS storage is incompatible with water source protection policy and their installation will be opposed. Above-ground THS storage is compatible and may be approved with environmental protection conditions.

- 4 In priority 3 (P3) areas, above and below ground THS tanks are compatible with conditions. This means they are compatible with water resource protection objectives providing the proponent installs and maintains high quality tank systems with effective water contamination barriers and employs approved site management practices to prevent loss of THS from the site.
- 5 In underground water pollution control areas (UWPCAs), THS storage within P2 and P3 areas requires written approval from this department under catchment protection bylaws. This approval may contain construction, operating and monitoring conditions to protect water resources, such as means to contain chemical spills, manage wastes, and constraints on the use of pesticides.

Within waterways management areas

- 6 Adequate vegetated buffers should be maintained between any THS storage and wetlands, estuaries and streams to minimise the risk of water quality contamination due to spills or leakage.
- 7 If a proposed THS storage facility is located within any designated management area under the *Waterways Conservation Act 1976*, written approval must be sought from this department. These management areas include the Albany Waterways, Avon River, Leschenault Inlet, Peel-Harvey estuary, Wilson Inlet and their surrounds.

Within the Swan River Trust managed area

- 8 If a THS facility is located where it could affect the Swan and Canning Rivers system, approval should be sought from the Swan River Trust in accordance with the *Swan and Canning Rivers Management Act 2006*.
- 9 THS storage should have an appropriate buffer to waterways determined on the basis of scientific evaluation of local biophysical criteria. A minimum separation distance of 50 m from the THS management facility to the banks of any waterway is recommended. THS should not be stored or used within riparian vegetation or on land subject to flooding, unless prior approval in writing is given by the Swan River Trust.

Near conservation valued wetlands

- 10 THS storage or use near recognised conservation and resource enhancement category wetlands should have an adequate separation buffer to the wetland and associated vegetation to ensure that its ecological value is preserved. These buffers should be determined by scientific evaluation of the local biophysical criteria (reference 5a).

Other location constraints

- 11 THS storage should be located at least 2 m above the maximum (end of wet season) groundwater level.
- 12 Any THS storage or use proposed within recommended buffer distances should be referred to the appropriate regulatory agency (Appendix B) for assessment with supporting technical data.
- 13 Where the proponent demonstrates adequate water resource protection measures are provided, reduced separation distances may be negotiated.
- 14 THS storage should be located on gently sloping ground with gradients between 1 in 10 and 1 in 200. Slopes with gradients more than 1 in 10 are likely to produce

excessive runoff capable of generating foundation erosion/ flood risk. Excessive runoff and boggy areas foster the movement of soil contaminants into water-bodies.

- 15 To gain environmental approval, operators should demonstrate, under a range of operating conditions, that materials and processes managed on site do not pose a significant risk to local water resource values (see reference 2a and Appendix C).

Construction of THS storage facilities

- 16 Facilities should be constructed so THS cannot escape to the environment under any foreseeable conditions, i.e. during normal operations, equipment maintenance or malfunction, adverse weather, or as a result of fires or vandalism.
- 17 THS should be stored in secure chemical-resistant containers. Containers with a capacity of less than 250 L should be held in weather-proof buildings, on reinforced concrete floors, that grade to spill containment sumps or have perimeter bund walls.
- 18 Any container storage racks should be constructed to minimise the risk of accidents during handling.
- 19 Flooring, drains and collection sumps should be constructed or sealed with protective coatings to prevent seepage, damage or deterioration resulting from contact with the stored or spilt fluids.
- 20 Storage compounds should have a minimum capacity of 110 per cent of the largest chemical container, plus 25 per cent of the aggregate capacity of all other stored individual containers. If located outdoors, capacity should provide for rainfall storage.
- 21 Separate compartments and contained drainage should be used to isolate incompatible materials such as those likely to react with each other, resulting in fires or explosions. Where THS are poorly soluble and have a density less than water, drains should be fitted with a water trap to assist spill recovery. For more information see Australian Standard 3780 *The storage and handling of corrosive substances* (reference 9a).
- 22 Storage compounds with vehicle access should be protected by well-graded ramps, safety bollards and floor markings that permit the safe passage of people and vehicles, while maintaining effective fluid containment.
- 23 Any THS stored in buried tanks should be held in double-containment systems that are effectively protected against corrosion caused by both tank contents and external soils. The tank systems should conform to our Water quality protection note (WQPN) 62 *Tanks for underground chemical storage* (reference 8b).
- 24 THS held in elevated or surface-mounted bulk storage tanks (with a capacity greater than 250 L) should conform to recommendations given in our WQPN 56 *Tanks for above ground chemical storage* and WQPN 61 *Tanks for ground level chemical storage* (reference 8b).

Stormwater management

- 25 Stormwater from roofs and clean paved areas should be directed away from potentially contaminated areas where THS are stored or handled. Stormwater that may be contaminated should be treated to reclaim THS. Uncontaminated stormwater should be managed as recommended in the *Stormwater management manual for Western Australia* (reference 8d).

Signage near sensitive water resources

- 26 Clearly visible signs should be erected and maintained at all THS storage or handling site entries, stating:

This site is located near sensitive water resources. Chemical losses to the environment could harm these.

<description or image> are stored and handled on-site.

For threats to life or property, phone 000

Report uncontained chemical spills to the Department of Environment Regulation's Pollution Watch Hotline 1300 784 782

For sites within any public drinking water source area, add:
and the Water Corporation on 13 13 75

General

- 27 Long established sites that do not conform to the recommendations in this note may continue to operate. Operators should however ensure that high-risk facilities are contained (where necessary using temporary measures), staff are trained to understand the risks and are equipped to manage incidents such as chemical spills. Support advice may also be obtained from the Department of Mines and Petroleum (dangerous goods section), Worksafe and the Department of Fire and Emergency Services.
- 28 Operators should develop and progressively implement a timely program to bring their facilities into line with current best industry practice, taking into account technical, economic and physical constraints. Effort should be directed (on a priority basis) into improving those facilities posing the greatest risk to the environment. Significant penalties under the *Environmental Protection Act 1986* apply to those who discharge contaminants without approval or pollute the environment.

Development or expansion approvals

- 29 Those proposing to store THS should initially contact the Department of Mines and Petroleum (dangerous goods section). Online advice on regulatory requirements covering toxic and hazardous substance transport and storage is available (reference 7).
- 30 Proposals to regulatory agencies for facilities involving THS storage should include data described in Appendix C.
- 31 Environmental Protection Authority policy and environmental impact assessment details are available online at <www.epa.wa.gov.au>. For works approval, licensing requirements and other regulatory measures under Part V of the *Environmental Protection Act 1986*, and the locations of sensitive terrestrial or aquatic environments contact the Department of Environment Regulation (reference 5).

THS use near sensitive water resources

The protection of sensitive water resources is a priority for this department. The aim is to ensure ecosystems are not put at risk, that water drawn from the environment is safe to use without a need for complex and expensive treatment; and all present environmental values (including recreational water and aesthetic use) are sustained.

- 32 For short-term (typically less than 12 months) or mobile THS storage facilities, temporary chemical containment compounds, such as plastic membrane lined pits, should provide for capture of spills from chemical storage vessels. To effectively protect the environment, sufficient additional capacity should be provided to contain water from at least one hour's firefighting within buildings, plus any captured stormwater.

THS use within public drinking water source areas

- 33 The use of pesticides in proclaimed public drinking water source areas should comply with our departmental policy *Pesticide use in public drinking water source areas* (reference 8a) and the Department of Health's guidance statements (reference 6).
- 34 If the THS will be applied to land within a designated underground water pollution control area (groundwater sources in the Perth region), prior written approval from our regional office should be sought under the Section 5 of the Metropolitan Water Supply, Sewerage and Drainage by-laws 1981 (Appendix B).

Within P1 or P2 areas, WHPZs and RPZs

- 35 Written applications for approval for use of THS in these areas should be sought from this department. We will oppose any THS use where the proponent fails to demonstrate that the activity will be conducted without significant risk to water resources. For location information on these sites see our Geographic Data Atlas, available <www.water.wa.gov.au>, or contact our nearest regional office.

Within P3 areas

- 36 Proposals for the application of THS to land or disposal of THS contaminated water should be referred to this department for assessment and written response.

Within declared Waterways management areas

- 37 In management areas proclaimed under the *Waterways Conservation Act 1976*, development proposal and management plans for THS facilities should be referred to our regional office for assessment.
- 38 Conditions for THS storage or use may also be defined in an *Environmental Protection Act 1986 -Part V* works approval or licence, or via written approval by the Department of Environment and Conservation (reference 5).

Near conservation valued wetlands

Many wetlands have been recognised for their conservation value (under the Ramsar convention, the Australian Government's *A directory of important wetlands in Australia*, Western Australian environmental protection policy, or the report *Wetlands of the Swan Coastal Plain*, (reference 5a and Appendix A).

- 39 Conservation wetlands require special protection if their ecological, social and scientific values are to be preserved. This is achieved by use of protective native vegetation buffers, drainage and land use planning controls and community awareness programs. Advice from the Department of Parks and Wildlife (reference 5) should be sought when development is planned within 500 m of any wetland.

THS management practices

- 40 THS formulation, mixing, processing, container transfers and decanting should take place within the weather-proof buildings or approved equivalent containment facilities. Bulk containers used to decant THS should be fitted with drip trays. Any THS entering containment sumps should immediately be transferred to containers for recycling or offsite disposal at an approved site.
- 41 Transfer of liquids from bulk tankers to storage should take place within chemical-resistant, sealed containment areas that permit full recovery of any spills.
- 42 THS containers should not be held outside containment areas, except where containers are empty and have been triple rinsed pending disposal or reuse. Rinse water should be contained, then either stored to dilute future chemical application batches (if practical) or disposed at an approved waste disposal site.
- 43 Site testing or laboratory analysis should be used to confirm the acceptability of liquids for discharge. Laboratory analyses should be conducted at a facility accredited by the *National Association of Testing Authorities* (NATA) for the specific test, and conducted in accordance with the current edition of *Standard methods for the examination of water and wastewater* (reference 1), unless otherwise approved.
- 44 Any liquids discharged to the environment (via soakage or ground application) should have been tested as compatible with downstream water resource values. Discharge to drains or waterways should not occur due to the risk of release of contaminated water. The effluent quality should be determined by sampling in accord with Australian Standard 5667 *Water quality sampling* (reference 9b).
- 45 Test results should be compared against relevant criteria for local water values given in the *Australian and New Zealand guidelines for fresh and marine water quality 2000* or the *Australian drinking water guidelines 2004* as appropriate (references 2c and 2d).
- 46 Pesticides should be applied in accordance with the regulator's (*Pesticides advisory committee* chaired by the Department of Health) and the supplier's recommendations for use of the substance. Chemical concentrations, quantities and frequency of application should be the minimum necessary to achieve the desired result.
- 47 Operators using THS should:
 - a be trained in the safe use of the chemicals
 - b ensure that application equipment is in good repair and delivers chemicals controlled at the correct rate
 - c follow the supplier's relevant material safety data sheets
 - d apply chemicals strictly in accordance with manufacturer's / supplier's instructions
 - e observe constraints such crop harvest and wet weather withholding periods
 - f be prepared and equipped to take effective remedial action during a spill emergency or equipment failure.

Waste disposal

- 48 Waste liquids, used containers, rinse residues or THS contaminated litter from spill clean-up should not be buried on site or discharged to drains or soakage. These wastes should be effectively contained until recycled or disposed of at a site approved under the *Health Act 1911*, which is remote from any sensitive water resource.

Accidents and emergency response

- 49 Operators of THS stores should prepare and implement an emergency response plan. The plan provides for protective and recovery actions in the event of foreseeable emergency situations such as chemical spill incidents, equipment malfunctions, storms, fires or vandalism. These procedures should be accessible to the Department of Fire and Emergency Services in Perth, for the use of the Westplan-HAZMAT response coordinator.
- 50 Means should be available to immediately reclaim and contain any spilt THS. The site should have stocks of absorbent material for spilt fluid clean up. THS contaminated materials should be contained in secure skips, pending disposal at an approved site.
- 51 Site employees should be trained in the safe management of THS, what to do in the event of a THS spillage and the implications of loss of these chemicals to the environment. Key staff should be given designated roles to minimise harm during any accident or emergency involving these substances.

Closure of THS stores

- 52 On permanent closure of any chemical storage facility, operators should remove all THS and clean up any residues within storage and handling areas. Where the site use changes or it is transferred to a new operator, a competent and experienced environmental consultant should be used to assess the site and certify it is free from contamination.

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

Sensitive water resources

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

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 in significant quantities are washed or leached into water resources.

Sensitive waters include estuaries, natural waterways, wetlands and groundwater. These 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 source. PDWSA include underground water pollution control areas, water reserves and catchment areas administered by the Department of Water under the 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 PDWSA, see our Geographic Data Atlas, available < www.water.wa.gov.au >.

Within PDWSA, priority areas (priority 1 (P1), priority 2 (P2) and priority 3 (P3) are defined via publicly consulted drinking water source protection reports or land use and water management strategies. Priority areas are used to guide land planning, rezoning and development approval processes. Priority areas are assigned considering 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. The Department of Water develops these documents in consultation with other government agencies, landowners, industry and the community.

P1 areas are defined to ensure human activity does not degrade a water source. These areas are declared over land where the provision of high-quality drinking water for public use is the primary beneficial land value. P1 areas typically cover land controlled by the Government of Western Australia or one of its agencies. These areas are managed under the principle of *risk avoidance*, so most land development and human activity is normally opposed.

P2 areas are defined to ensure 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 exists (involving rural usage such as dry land grazing or cropping). Protection of public water supply sources is a high priority in P2 areas. These areas are managed in accordance with the principle of *risk minimisation*, and so the intensity of development should be restricted (via management conditions) and activities with a low water contamination risk are normally considered acceptable.

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 co-exist with other land uses such as residential, commercial and/or light industrial development. Protection of P3 areas is mainly achieved through land use management measures e.g. contamination barriers. Environmental guidance (such as these notes) or site-specific development approval conditions are used to limit the water resources contamination risk from the land use or activity. If, however, the water source becomes contaminated, then water supplied from P3 sources may need to be more intensively treated or an alternative water supply source commissioned.

Additional protection zones are defined close to the point where drinking water is extracted or stored. These zones are called wellhead protection zones (WHPZs) and reservoir protection zones (RPZs). Statutory land use constraints apply to activities within these zones surrounding sources to safeguard these waters most vulnerable to contamination.

WHPZs are assigned around water production wells based on hydrological factors. Statutory land use restrictions apply within these zones as groundwater moves rapidly towards wells due to aquifer depressurisation by pumping. Any contaminants 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 radius of 500 m in P1 areas and 300 m in P2 and P3 areas. These zones do not extend outside PDWSA boundaries.

RPZs are defined over and around public water supply storage or pipe-head reservoirs. Statutory access and land use restrictions apply in RPZs. The aim is to restrict the likelihood of contaminants being deposited or washing into water sources in any runoff. RPZs are normally within state-controlled areas encompassing land up to 2 km measured outward from the reservoir top water-level and include the inundated area when the reservoir is full.

For additional explanatory information on PDWSA, see our Water quality protection note (WQPN) 25 *Land use compatibility in public drinking water source areas*, WQPN 36 *Protecting public drinking water source areas*, WQPN 75 *Proclaimed public drinking water source areas*, note 76 *Land use planning in PDWSA* and WQPN 77 *Risk assessment in PDWSA*. These notes are available online at <www.water.wa.gov.au> select *publications* > *find a publication* > *series browse*.

Established activities within PDWSAs

Many land use activities were approved and established before publication of a source protection plan or land use and water management strategy.

Activity operators should ensure that modern environmental facilities and practices are progressively implemented and maintained so that the water resource contamination risk is minimised (within practicable and economic constraints).

New or expanded activities in PDWSA

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

The development proposal may be:

- approved (with or without conditions)
- delayed pending receipt of additional information before a decision is made; or
- opposed due to a statutory or policy conflict or inadequate protective measures provided to safeguard the water source.

To assist the assessment, operators should demonstrate that under all operating conditions the facilities and processes used on-site do not pose a significant water contamination risk.

Buffers to water supply sources

Native vegetation buffers should be used to separate compatible land use areas from the sources of drinking water including the full supply margins of reservoirs, their primary feeder streams and/or production bores. Advice on suitable buffer forms and dimensions is provided in our WQPN 6 *Vegetated buffers to sensitive water resources*.

Within clearing control catchments

Controls on vegetation clearing for salinity management in country areas 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 of clearing controls may be obtained from our regional offices, see online information at <www.water.wa.gov.au>, select *Contact us*.

Private water supply sources

Private water sources vulnerable to contamination include:

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

Underground ecosystems

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

Waterway ecological and social values

Waterways that have high social and conservation significance are described in the Western Australian Environmental Protection Authority (EPA) 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 *policies and guidelines > environmental assessment guidelines > guidance statements*.

The Department of Water manages natural waterways under Section 9 of the *Water Agencies (Powers) Act 1984* and the *Rights in Water and Irrigation Act 1914*. Apart from aquatic ecosystems and water sources, waterways provide social values including aesthetic appeal, drainage pathways and recreational opportunities for watercraft use, fishing, tourism, swimming and related aquatic activities.

This department also administers the *Waterways Conservation Act 1976* which defines Western Australian waterways subject to specific regulatory controls. Currently proclaimed waterways include the Avon River, Peel-Harvey Inlet, Leschenault Inlet, Wilson Inlet and Albany waterways management areas.

Within the Swan-Canning Estuary catchment

The Swan River Trust is responsible for the protection and management of the Swan-Canning River system. The Trust safeguards ecological and social values under the *Swan and Canning Rivers Management Act 2006*. Written approval is needed for any land- or water-based development within the Swan, Canning, Helena or Southern Rivers and their associated foreshore areas within the *Swan River Trust development control area (DCA)*. Human activity and development close to these areas are likely to have an effect on the

waters of the river system. Development proposals within or abutting the DCA should be referred to the Trust for assessment.

Developments outside the DCA, but near river tributaries or drainage systems should also be referred to the Trust for assessment and advice. This is because water quality within the area may be affected by chemicals leached into groundwater flow. For detailed information, see online advice at <www.swanrivertrust.wa.gov.au>, phone 9278 0900 or email: planning@swanrivertrust.wa.gov.au .

Wetland ecology

Many important wetlands have been given conservation status under the Ramsar convention (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).

Wetlands are also protected under various national and Western Australian government policies. Conservation wetland data to guide land planning and development activities is provided via the following publications:

- *Directory of important wetlands in Australia* defines wetlands scheduled by the Australian Government. It is available online at <www.environment.gov.au> select *water > water topics > wetlands*.
- Wetlands with defined high conservation significance are described in the EPA (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 *policies and guidelines > environmental assessment guidelines > guidance statements*.

The Department of Parks and Wildlife is the custodian of the state wetland datasets, and is responsible for maintaining and updating relevant information. These datasets are available online at <www.dpaw.wa.gov.au>.

Wetlands datasets identified for conservation value or for resource enhancement include:

- *Geomorphic wetlands of the Swan Coastal Plain*
- *South coast significant wetlands*
- *Geomorphic wetlands Augusta to Walpole* (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

Many Western Australian aquifers, waterways and wetlands await detailed scientific evaluation, present 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, provision of sustainable protection services 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. This note's recommendations shall not be used as this department's policy position on a specific matter, unless confirmed in writing. In addition, regulatory agencies should not use this note's recommendations in place of site-specific development conditions based on a project's assessed environmental risks. Any regulatory conditions should consider local environmental values, the safeguards in place and take a precautionary approach.

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

Water quality protection note updates

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 covering this activity include:

What's regulated?	Western Australian statutes	Regulatory agency
Control of pollution by regulatory processes	<i>Environmental Protection Act 1986</i> , Part V Environmental Regulation Environmental Protection (Unauthorised Discharges) Regulations 2004	Department of Environment Regulation < www.der.wa.gov.au >
Management of human wastes Community health issues	<i>Health Act 1911</i> <i>Poisons Act 1964</i>	Department of Health < www.health.wa.gov.au > Local Government (council)
Transport, storage and handling of fuels, solvents, explosive and other dangerous goods	<i>Dangerous Goods Safety Act 2004</i> Dangerous goods safety regulations 2007	Department of Mines and Petroleum – Resources Safety Division < www.dmp.wa.gov.au >
Licence to take surface water and groundwater	<i>Rights in Water and Irrigation Act 1914</i>	Department of Water – regional office
Industrial sites in existing public drinking water source areas	<i>Metropolitan Water Supply Sewerage and Drainage Act 1909</i> <i>Country Areas Water Supply Act 1947</i>	< www.water.wa.gov.au >
Licence to discharge waters into managed waterways.	<i>Waterways Conservation Act 1976</i>	
Emergency response planning	<i>Fire and Emergency Services Authority of WA</i>	Department of Fire and Emergency Services

What's regulated?	Western Australian statutes	Regulatory agency
	<i>Act, 1998</i>	< www.fesa.wa.gov.au >
Impact on the values and ecology of land or natural waters	<i>Environmental Protection Act 1986, Part IV</i> Environmental Impact Assessment	Minister for the Environment advised by the Environmental Protection Authority < www.epa.wa.gov.au >
Discharges into the Swan-Canning estuary	<i>Swan and Canning Rivers Management Act 2006</i>	Swan River Trust < www.swanrivertrust.wa.gov.au >
Discharge to sewer (industrial waste permit) or to main drain	<i>Metropolitan Water Supply Sewerage and Drainage Act 1909</i> <i>Country Towns Sewerage Act, 1947</i>	Water Corporation < www.watercorporation.com.au > Designated water services provider
Subdivision of land Land zoning and development approval	<i>Planning and Development Act 2005</i>	Western Australian Planning Commission Department of Planning < www.planning.wa.gov.au > Local government

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

Appendix C: Data needed for assessing developments

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

- 1 Site owner/operating tenant's name and contact details.
- 2 A site plan showing the location of the project facilities relative to tenements, leases, lots and roads. The plan should show the topography, remnant vegetation cover, existing and proposed development areas and onsite water features and sources.
- 3 Details of site investigation of soil strata, depth to water table (if applicable) and data on the location, extent, hydrology, quality and dependencies on local water resources (including any seasonal variations) that could be affected by site operations or facilities.
- 4 The present local government land use zoning (where applicable). 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, crops, animals, earthworks and chemical applications), construction and operating workforce and planned project operational life.
- 6 Describe intended commissioning date, operating hours and any expansion options.
- 7 Details of any proposed vegetation clearing, environmental buffers, site earthworks and services including water supply, sewage and drainage.
- 8 Description of all materials/chemicals to be stored or handled on site in commercial quantities, including a water use budget.
- 9 Description of the types, quantities and quality of solid and liquid waste (if applicable) that will be generated or disposed from the facility.

- 10 Description of planned material containment, waste management (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 workforce training, site monitoring and emergency response facilities.
- 14 Any project contractual agreements or regulatory approvals received.

For significant 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 American Public Health Association, American Water Works Association, Water Environment Federation publication see internet site <www.standardmethods.org> *Standard methods for the examination of water and wastewater* (current edition).
- 2 Australian Government - *National water quality management strategy* papers, available online at <www.environment.gov.au> select *water* > *water policy and programs* > *water quality*:
 - a *Paper 2 - Policies and principles*, 1994
 - b *Paper 3 - Implementation guidelines*, 1998
 - c *Paper 4 - Australian and New Zealand guidelines for fresh and marine water quality*, 2000
 - d *Paper 6 - Australian drinking water guidelines*, 2011
 - e *Paper 7 - Australian guidelines for water quality monitoring and reporting*, 2000
 - f *Paper 21 – Australian guidelines for water recycling: Managing health and Environmental risks (phase1)*, 2006

To obtain printed copies of the papers, see internet site <www.awa.asn.au>, request by email at <bookshop@awa.asn.au> or obtain them from a library.
- 3 Australian government – National Transport Commission publication, available for purchase online at <www.ntc.gov.au> *Australian code for the transport of dangerous goods by road and rail*, 2007.
- 4 Department of Agriculture and Food publication, available online at <www.agric.wa.gov.au>, search *Chemicals code* *Code of practice for use of agricultural and veterinary chemicals in Western Australia*.
- 5 The previous Department of Environment and Conservation publications, available <www.dpaw.wa.gov.au> or <www.der.wa.gov.au>:

- a Wetlands policy and guidelines
Position statement – Wetlands 2001
 - b Waste management
 - *Guidelines for acceptance of solid waste to landfill 2001*
 - *Landfill waste classification and waste definitions*
 - c Contaminated sites guidance series.
- 6 Department of Health publications, available online at <www.public.health.wa.gov.au>, select *health hazards in the environment > chemicals and pesticides > hazardous chemicals*
- a *Using pesticides safely*
 - b *PSC 88 Use of herbicides in water catchment areas*
- 7 Department of Mines and Petroleum dangerous goods management guidelines, available online at <www.dmp.wa.gov.au>, select *resources safety > publications > dangerous goods safety*.
- 8 Department of Water publications, available online at <www.water.wa.gov.au>
- a Water policies, select *publications > find a publication > series browse > State-wide policy*
 - *Foreshore policy 1 Identifying the foreshore area, WRC 2002*
 - *State-wide policy 2 Pesticide use in public drinking water source areas 2000.*
 - b Water quality protection notes (WQPN), select *publications > find a publication > series browse > water quality protection notes*
 - *WQPN 20 General and heavy industry near sensitive waters*
 - *WQPN 25 Land use compatibility with public drinking water source areas.*
 - *WQPN 56 Tanks for above ground chemical storage*
 - *WQPN 61 Tanks for ground level chemical storage*
 - *WQPN 62 Tanks for underground chemical storage.*
 - c Water notes, select *publications > find a publication > series browse > water notes*
 - *Water note 11 Identifying the riparian zone*
 - *Water note 23 Determining foreshore reserves.*
 - d Stormwater guidelines, select *publications > find a publication > series browse > Stormwater management manual for Western Australia 2004.*
- 9 Standards Australia publications available online at <www.saiglobal.com/shop/script/search.asp>
- a *AS 3780 – The storage and handling of corrosive substances*
 - b *AS 5667 – Water quality-sampling (including parts 4–11).*

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Feedback

We welcome your thoughts on this note. Feedback will help us prepare future versions. To comment on this note or seek any clarification, please contact our water source protection planning branch (details below), citing the note topic and version.

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