

# Water Quality Protection Note

## Extractive Industries within Public Drinking Water Source Areas

### Purpose

These notes provide the Commission's views on practices and activities related to the quality of the State's water resources. They are recommendations only, and may be varied at the discretion of the Commission.

The notes provide a basis for developing formal best management practice guidelines in consultation with key stakeholders.

Extractive industries have the potential for direct impact on water quality via turbid run-off from disturbed soils or indirectly from chemicals used and wastes stored on-site.

### Scope

These notes apply to the establishment, operation and rehabilitation of extractive industries within Public Drinking Water Source Areas (PDWSAs) across the State. This note addresses the extraction of four basic raw materials - gravel, clays, hard rock and limestone. For operations outside PDWSAs the Commission endorses the Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines

Specific requirements for the operation and management of sand mining activities within PDWSAs are defined within the Commission's Policy and Guidelines on Construction and Silica Sandmining in Public Drinking Water Source Areas and are therefore not addressed within this document.

### Commission's drinking water source management strategy

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission utilises policies for the protection of public drinking water sources that include three levels of priority classification of lands within PDWSAs.

Priority 1 (P1) source protection areas are defined to ensure that there is no degradation of the water source. P1 areas are declared over land where the provision of the highest quality public drinking water is the prime beneficial land use. P1 areas typically include land under Crown ownership. P1 areas are managed in accordance with the principle of risk avoidance. Land development is generally unacceptable in P1 areas.

Priority 2 (P2) source protection areas are defined to ensure that there is no increased risk of pollution to the water source. P2 areas are declared over land where low intensity development (such as rural) already exists. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of risk minimisation and so some development is accepted under specific conditions.

Priority 3 (P3) source protection areas are defined to manage the risk of pollution to the water source. P3 areas are declared over land where water supply sources need to co-exist with other land uses such as residential, commercial and light industrial developments. Protection of P3 areas is achieved through management guidelines for land use activities. If the water source does become significantly contaminated, then extracted water may need to be treated or an alternative water source found.

In addition to Priority areas, Well-head Protection Zones and Reservoir Protection Zones are defined to protect the water source from contamination in the immediate vicinity of production wells and reservoirs. Well-head Protection Zones are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. Reservoir Protection Zones usually consist of a 2 kilometre buffer area around the top water level of reservoirs and include the reservoir itself. These zones do not extend outside water reserves. Special conditions apply within these zones. For further details refer to Water Quality Protection Note (WQPN) – Land Use Compatibility in Public Drinking Water Source Areas.

## General recommendations

### Siting considerations

The Commission considers extractive industries are a generally acceptable land use in PDWSAs subject to conditions designed to meet water source protection objectives. Proponents should submit a notice of intent to operate an extractive industry to the Commission for approval, with details of measures proposed to protect water resources. Special focus be given to the storage of chemicals, stormwater management and rehabilitation.

Within P1 water source protection areas: The Commission requires a minimum of 3 metres of undisturbed soil / rock profile as a buffer between the base level of the excavated area and the maximum anticipated water table. In special circumstances, this buffer may be reduced to a minimum of 2 metres, if the operator can demonstrate effective risk management measures and acceptable rehabilitation to a final 3 metre buffer.

Within P2 and P3 areas: The Commission requires a minimum of 2 metres of undisturbed soil/ rock profile as a buffer between the base level of the excavated area and the maximum anticipated water table.

The Commission's Perth Groundwater Atlas provides information on maximum water tables in the Perth Metro Region. In other areas, a qualified and experienced environmental consultant should be engaged to determine the maximum anticipated water table for the site in liaison with the Commission.

### Chemical Storage

Elevated tank systems may have a maximum capacity of 5000 litres, unless the Commission is satisfied that there are special circumstances warranting additional storage. Elevated chemical storage tank system (including fuels) must not be installed within wellhead protection zones.

Above ground bulk (> 250 litres) chemical storage may be installed in P1, P2 and P3 areas with prior written approval of the Commission and in compliance with the WQPN - Toxic and Hazardous Substance Storage in PDWSAs. All vehicle and plant fuelling facilities (including mobile generators) should be placed and operated within low permeability bunded compounds (<10<sup>-9</sup> m/sec) designed to allow recovery of any chemical spill without losses to the environment. The WQPN -Above Ground Chemical Storage Tanks in PDWSAs provides guidance on this issue. Mobile tanks should conform with the WQPN - Temporary Above Ground Fuel Storage in PDWSAs.

Underground storage tank systems (USTs) may not be installed within a P1 or P2 areas or within wellhead protection zones. USTs may be installed in P3 areas where approved with conditions from the Commission.

### Surface Water Management

All stormwater runoff should be initially contained on site to remove sediments and turbidity. Overland stormwater flows from outside of the project area should be diverted via bypass drains / earthen bunds around disturbed surfaces and stockpiled matter. Sedimentation basins should be designed and maintained as described in the Mining and Mineral Processing Guideline No 6 -Mine-site Stormwater

In P1 areas, the following buffer distances from disturbed areas to surface water resources are recommended:

Description	Minimum buffer dimension in metres		
	Standard	Quality assured	Best Practice
To reservoir top water level	200	150m	100m
To streams within 1000 m of a reservoir	200m	100m	50m
4 <sup>th</sup> order streams	100m	50m	30m
3 <sup>rd</sup> order streams	50m	30m	20m
2 <sup>nd</sup> order streams	30m	20m	20m
1 <sup>st</sup> order streams	20m	15m	15m

**Notes :** 1. Stream order is determined by the number of tributaries

Interpretation of the information on minimum buffer zone dimensions:

- Standard: Involves limited but tolerable risk minimisation, containment and intervention capability;
- Quality Assured : With approved QA contaminant containment process and effectively trained operators; and
- Best Practice: With QA and trained operator processes, plus 24 hour supervision and intervention capability and track record of contamination avoidance.

In P2 and P3 areas: a minimum vegetated buffer of 50 m to surface water bodies is recommended.

Any surface waters flowing from areas disturbed by the project or site de-watering, should pass through effective settling pits designed to minimise turbidity. The pits should be designed and maintained to provide a minimum of 2 hours run-off storage resulting from a 10 year return frequency storm event, when calculated in accordance with the Institution of Engineers current version of Australian Rainfall and Runoff. The pits should be operated with an surface scum trapping system which prevents discharge of floating matter.

## Waste Management

Extractive industry operations may generate waste from employee amenities, mechanical servicing and washdown of mechanical equipment. Routine servicing and washdown of operating equipment is unacceptable in P1 and P2 PDWSAs. Running repairs may be conducted if measures are in place to prevent fluid loss to the environment. Routine servicing and wash-down are accepted in P3 areas where the operator can demonstrate effective procedures for the capture and transport of waste liquids to an approved disposal site.

All wastes from on-site employee amenities should be managed to the requirements of the local government authority. The wastewater system (ie septic tanks or alternative treatment unit) should be installed on site with prior approval from the Commission and in accordance with Health Department requirements.

All stockpiled material awaiting transport off-site or held for rehabilitation should be located within the upstream catchment of turbidity control facilities.

Excavated areas should have security fencing and be locked to prevent access outside operating hours. all Fencing should be maintained in serviceable condition to guard against illegal waste dumping and vandalism.

## Accidents and emergency response

An environmental response program should be in place for accidental chemical spills. The Department of Environmental protection (DEP) should be notified immediately after a spill providing details and proposed corrective actions. The program should include adequate warning and communications systems, provision of support equipment, responsibility designation and training of response personnel.

A fuel management plan must be in place that has been approved by the Department of Minerals and Energy and addresses the following criteria:

- Fuel spill prevention at storage areas;
- Details of fuel transport and refuelling;
- A contingency plan for dealing with fuel spillage;
- A groundwater monitoring program for petroleum hydrocarbons.

### Site closure and rehabilitation

The site operator should prepare and implement on pit closure, a rehabilitation plan that prevents adverse environmental impacts such as dust, erosion, silt deposition, and turbidity. The rehabilitation plan should also satisfy the relevant local and state government agencies.

The site should be rehabilitated to an environmental condition that ensures the maintenance of background water resource quality and is compatible with the intended end land use. A qualified and experienced consultant should prepare the plan for the operator to be submitted to the Commission for approval. The plan should (in addition to standard rehabilitation details required by other government agencies) include:

- Detailed information on the types, sources and quantities of materials to be used for back-filling;
- An assessment of the potential groundwater contamination threats posed by the materials used for backfilling, including leach test (US EPA TCLP) analysis for any materials used on-site that may pose a threat to water quality;
- Proposals for any pesticide application at the site;
- Methods of site remediation and clean up after mining operations,
- Details of end land uses

### Statutory requirements

Acts regulating extractive industries include:

- Town Planning and Development Act (1928)
- Mining Act (1978)
- Environmental Protection Act (1986)
- Country Areas Water Supply Act (1947)
- Metropolitan Water Supply, Sewerage and Drainage Act (1909), and
- Rights in Water and Irrigation Act (1914)

Where groundwater is to be abstracted on-site, a licence will be required under the Rights in Water and Irrigation Act (1914). Advice on licensing requirements can be obtained by contacting the Commission's regional offices.

### Appendices

### References

1. Department of Environmental Protection (1990). *Environmental Code of Practice – Extractive Industries*, DEP, Perth, 1990.
2. Department of Minerals and Energy (1991). *Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines*, DME, Perth.
3. The Institution of Engineers, Australia (1987). *Australian Rainfall and Runoff: A guide to flood estimation*, IEA, ACT.
4. Water and Rivers Commission (1997). *Perth Groundwater Atlas*, WRC, Perth, 1997.
5. Water and Rivers Commission (1998). *Water Quality Protection Note: Temporary Above Ground Fuel Storage in Public Drinking Water Source Areas*, WRC, Perth, 1999.
6. Water and Rivers Commission (1999). *Policy and Guidelines on Construction and Silica Sand Mining in Public Drinking Water Source Areas*, WRC, Perth, 1999.
7. Water and Rivers Commission (1999). *Water Quality Protection Note: Toxic and Hazardous Substances in Priority Drinking Water Source Areas*, WRC, Perth.

8. Water and Rivers Commission (1999). *Water Quality Protection Note: Above Ground Chemical Storage Tanks in Priority Drinking Water Source Areas*, WRC, Perth.
9. Water and Rivers Commission (2000). *Water Quality Protection Note: Land Use Compatibility within Public Drinking Water Source Areas*, WRC, Perth.
10. Water and Rivers Commission (2000), *Water Quality Protection Guidelines No.6, Mining and Mineral Processing - Minesite Stormwater*, WRC, Perth.

## More information

The Commission welcomes your comment on these notes. They will be updated from time to time as comments are received or industry standards change.

If you wish to comment on the notes or require more information, please contact the Commission's Resource Quality Branch at the Hyatt Centre in East Perth.



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