Water quality protection note no. 56

December 2018

# Tanks for fuel and chemical storage near sensitive water resources

## Scope

This water quality protection note (WQPN) provides best management practices for liquid chemical and fuel storage tanks in and near sensitive water resources (see WQPN no. 4: *Sensitive water resources* for a definition). It applies to tanks, drums and intermediate bulk containers – including pipework fittings and filling and dispensing apparatus – that are:

- 250 litres and above in capacity
- permanent and temporary
- above-ground and underground
- outside or within another structure (e.g. shipping container, shed, trailer).

It replaces:

- WQPN 56: Tanks for elevated chemical storage (2006)
- WQPN 58: Tanks for temporary elevated chemical storage (2009)
- WQPN 60: Tanks for mobile fuel storage in public drinking water source areas (2013)
- WQPN 61: Tanks for ground level chemical storage (2008)
- WQPN 62: Tanks for underground chemical storage (2013)
- WQPN 64: Tanks – closure of underground storage (2013).

This note does not apply to solids, gas, water or wastewater storage. Transport and handling of chemicals and fuels are addressed in WQPN no. 65: *Toxic and hazardous substances.* Standard information to be read in conjunction with this note is in WQPN no. 3: *Using water quality protection notes*.

## Relevant legislation

Fuel and chemical storage in Western Australia (WA) is regulated via the following legislation:

- *Occupational Safety and Health Act 1984*
- Environmental Protection (Controlled Waste) Regulations 2004 (managed by Department of Water and Environmental Regulation)

- *Dangerous Goods Safety Act 2004* and Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 (managed by Department of Mines, Industry Regulation and Safety).

Fuel and chemical storage in public drinking water source areas (PDWSAs) is covered by the *Metropolitan Water Supply Sewerage and Drainage Act 1909* and associated 1981 by-laws, and the *Country Areas Water Supply Act 1947* and associated 1957 by-laws. For consistency, and because updated legislation is planned, some of the requirements of the metropolitan act and by-laws are extended to all PDWSAs in WA as best management practices to help protect drinking water quality and public health.

## Water quality contamination risks

Tanks can cause contamination if the fuels and chemicals they contain escape into the environment, posing risks to ecosystems in waterways and groundwater, and to public health if they enter stormwater or recreational waters.

Chemicals and fuels that enter a drinking water source can be harmful to the health of people and animals consuming the water. Some contaminants may pose a risk even at very low concentrations, and water treatment processes cannot be guaranteed to remove all contaminants. Some chemicals, at certain concentrations, can affect people's health, causing illness, hospitalisation and even death. For example, benzene (a petroleum hydrocarbon) is carcinogenic (NHMRC & NRMMC 2011). For these reasons, systems need to be developed, established and followed to ensure fuel and chemicals are correctly stored and used.

For general information about protecting water quality, see WQPN no. 8: *Further reading*.

## Recommendations

Before installing fuel and chemical storage tanks, we recommend that you:

- consider alternative energy sources (such as solar or gas) that pose a lower risk to sensitive water resources before deciding to store fuel
- consider alternatives to using chemicals, such as using steam for weed control, to avoid the need to store chemicals.

If a tank is required, we recommend the following best management practices to protect sensitive water resources.

### Location

*Within public drinking water source areas*

- To avoid the risk of contamination, consider locations outside of PDWSAs for fuel and chemical storage and handling. For example, can vehicles and machinery be transported outside the PDWSA to be refuelled?
- If tanks must be placed within PDWSAs, see Table 1 for requirements.

To find out what PDWSAs are and how the department manages them, see Strategic policy: *Protecting public drinking water sources in Western Australia* and WQPN no. 25: *Land use compatibility tables for public drinking water source areas*.

*Table 1: Requirements for fuel and chemical tanks in PDWSAs*

| Type of tank | P1 | P2 | P3 |
|---|---|---|---|
| Above-ground tanks (no portion of the tank is on or below the ground) | Incompatible[1] | Compatible with conditions:<br>• Outside wellhead protection zones (WHPZs)[2]<br>• Capacity of 5000 L or less[3]<br>• Outside reservoir protection zones (RPZs). If this is not possible then 100 m away from centreline of waterways and less than 250 L capacity<br>• Best management practices as outlined in the rest of this note | Compatible with conditions:<br>• Outside WHPZs and RPZs. If this is not possible, then 100 m away from bore or centreline of waterway and less than 250 L capacity<br>• Best management practices as outlined in the rest of this note |
| Underground tanks (the whole tank or a portion of it is on or below the ground) | Incompatible[4] | Incompatible[4] | Compatible with conditions:<br>• Outside RPZs[5]<br>• 100 m away from bores and the centreline of waterways[5]<br>• Outside WHPZs; if not possible, then less than 250 L capacity<br>• 2 m separation to maximum seasonal groundwater table<br>• Best management practices as outlined in the rest of this note |

[1] This land use is incompatible unless special circumstances apply (see 'Special circumstances' on page 8 of WQPN no. 25: *Land use compatibility tables for public drinking water source areas*). Subject to confirmation of these special circumstances, this land use may be considered to be compatible with conditions if it is directly associated with a primary land use that is compatible with conditions or acceptable with the applicable priority area. If these circumstances apply and management practices are acceptable, tanks must be located outside WHPZs[2] and RPZs and be 5000 L or less in capacity[3].
[2] Under the Metropolitan Water Supply, Sewerage and Drainage By-laws 1981 ('the by-laws') (5.6.2), above ground tanks are prohibited in P1 and P2 WHPZs.
[3] Under the by-laws (5.6.5), above ground tanks over 5000 L require Minister for Water approval.
[4] Under the by-laws (5.6.2), underground tanks are prohibited in P1 and P2 areas of an underground water pollution control area (UWPCA).
[5] Under the by-laws (4.6.5.1 and 5.5.4), underground tanks are prohibited in RPZs and within 100 m of a bore or centreline of a waterway.

*Waterways*

- Tanks should be located above the 1 per cent annual exceedance probability (AEP) flood level. To find out flood areas within Western Australia, visit www.data.wa.gov.au.
- Areas subject to seasonal inundation or waterlogging should be avoided.
- Maintain an adequate buffer to help prevent contamination in the event of a fuel or chemical spill, between the tank and any waterways (including their foreshore areas). Refer to Appendix C: *Is a foreshore area sufficient to protect water quality in the waterway?* of Operational policy 4.3: *Identifying and establishing waterways foreshore areas*.
- For any land- or water-based developments or activities near the Swan, Canning, Helena or Southern rivers, please contact the Department of Biodiversity, Conservation and Attractions for special requirements.

*Wetlands*

- To find out the locations of wetlands, visit www.data.wa.gov.au.
- For advice on wetland management requirements, contact your local government in the first instance, or the Department of Biodiversity, Conservation and Attractions.

*Landscape*

- Rocky slopes, steep slopes and land prone to erosion are not suitable for fuel and chemical storage tanks.

*Other land uses*

- Separation distances between your proposed land use or activity and sensitive land uses – such as urban areas – may apply, as per the Environmental Protection Authority's Guidance statement no. 3: *Separation distances between industrial and sensitive land uses*.

**Approvals**

- Please refer to WQPN no. 14: *Statutory approvals* for a list of approvals that you may need to obtain before commencing your proposed development or activity, and which agency is responsible for them.
- WQPN no. 18: *Information the department requires to assess a proposed development or activity* provides a list of what you may need to submit to our department.

**Design**

- Tanks should be designed in accordance with the appropriate Australian Standards, such as:
  - AS 1692:2006 *Steel tanks for flammable and combustible liquids*
  - AS 1940:2017 *The storage and handling of flammable and combustible liquids*
  - AS 3735:2001 *Concrete structures retaining liquids*
  - AS/NZS 4766:2006 *Polyethylene storage tanks for water and chemicals*

- AS 4897:2008 *The design, installation and operation of underground petroleum storage systems*
- AS 4944:2008 *Petroleum products – Pipeline, road tanker compartment and underground tank identification.*

- In addition, if the tank is in a PDWSA:
  - Effective secondary barriers need to be installed to contain the system. For example, double-containment tanks (including pipework) with engineering controls such as sensors and shutdown devices will help to minimise the risk to drinking water quality. See Department of Mines, Industry Regulation and Safety's *Storage and handling of dangerous goods – code of practice* (2010) and Australian Standard 1940:2017 *The storage and handling of flammable and combustible liquids* for more information.
  - An adequate containment system or bunding must prevent the escape of contaminants into the environment, including capacity for contingencies such as malfunctions, firefighting water, storms and floods. Bunding is to be maintained in a good state of repair at all times. Consider installing enclosures or roofing to reduce the capacity required.
  - Manage fuel and chemical quantities so that only the required amounts are stored onsite.
  - A spill prevention kit should be readily accessible at all times.
  - Operators should be adequately trained and aware of the risks in PDWSAs.

**Operation and management**

*Toxic and hazardous substances*

- Handling and use of chemicals and fuels should be in accordance with WQPN no. 65: *Toxic and hazardous substances*, and the following Australian Standards:
  - AS 1940: 2017 *Storage and handling of flammable and combustible liquids*
  - AS 3780:2008 *Storage and handling of corrosive substances*
  - AS/NZS 4081:2001 *The storage and handling of liquid and liquefied polyfunctional isocyanates*
  - AS 4326:2008 *Storage and handling of oxidizing agents*
  - AS/NZS 4452:1997 *Storage and handling of toxic substances*
  - AS 4681:2000 *The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*
  - others as appropriate.
- If a tank's contents are dangerous goods, ensure that tank placarding is consistent with Dangerous Goods Safety (General) Regulations 2007. If the contents are not dangerous goods, it is advisable to identify the contents for occupational health and safety purposes. This may include using a label or sign.

*Stormwater*

- Uncontaminated stormwater from roofs and clean hardstand areas should be directed away from potentially contaminated areas and bunding capture zones, and managed as recommended in our *Stormwater management manual for Western Australia* (generally infiltrated onsite).
- Stormwater that may be contaminated should be treated and reused in the operations if appropriate, or appropriately disposed of (outside PDWSAs).
- See WQPN no. 52: *Stormwater management at industrial sites* for more information.

*Vehicles*

- Any vehicle or machinery servicing and repairs should be in accordance with WQPN no. 28: *Mechanical servicing and workshops*.
- Wash down of vehicles and any mechanical equipment should be undertaken as outlined in WQPN no. 68: *Mechanical equipment wash down.*
- All contaminated wash down water should be directed to an appropriate wastewater treatment system or disposed of appropriately (outside PDWSAs).

*Monitoring and maintenance*

- The tank system should be maintained in a good state of repair at all times to reduce the risk of leaks to the environment. This can be achieved via a regular inspection, testing and maintenance program. Refer to Australian Standard AS 4971:2008 *Inspection and integrity monitoring of large steel vertical petroleum storage tanks*.
- Administrative controls should be in place to ensure that the risk of contamination is managed, such as regular housekeeping and good operating procedures (Department of Mines and Petroleum 2010).
- There should be a system in place for immediately reporting and addressing leaks and spills. See *Incident response* heading for more information.
- Adequate security should be in place to deter unauthorised entry and possible vandalism, which could lead to damage of tanks and leaks to the environment.

*Personnel*

- If operating within a PDWSA, staff should be aware of this and how important it is to protect that drinking water source, and understand the incident response procedures. See our brochure *Living and working in PDWSAs*, and make this available to your staff.
- Staff should be trained so that they are able to follow required procedures in a safe manner. Training should include reference to the relevant *safety data sheets*.

*Incident response*

- Fuel or chemical spills or leaks that escape containment should immediately be reported to the department's Pollution Watch Hotline (1300 784 782) and if in a PDWSA, the Water Corporation (13 13 75).

- Dangerous goods incidents should be reported to the Department of Mines, Industry Regulation and Safety, see *Reporting dangerous goods incidents – Guideline* (Department of Mines and Petroleum 2011).
- A contingency plan should be available to address emergency situations such as accidents, fires, spills, leaks and vandalism that could impact on the drinking water source. See WQPN no. 10: *Contaminant spills – emergency response* for more information.

### Decommissioning tanks

- Careful management is required when emptying and disposing of the contents of tanks (and pipework) to ensure none escapes to the environment. Tanks and pipework need to be fully emptied into suitable storage vessels and transported off-site for correct disposal. Please contact the department for suitable disposal locations and methods.
- Contact the Department of Mines, Industry Regulation and Safety for guidance for decommissioning tanks.
- For closure of underground fuel tanks, refer to Australian Standard AS 4976:2008 *The removal and disposal of underground petroleum storage tanks*.

### Contaminated sites

- Leaks or spills from fuel or chemical storage tanks can cause a site to become contaminated. Please contact the department's contaminated sites branch for more information about reporting and managing contaminated sites.

## References

Further reading is available in WQPN no. 8: *Further reading*. References cited in this note are as follows:


Department of Health 2017, *A compilation of Australian Standards on water holding tanks,* Government of Western Australia, Perth.

Department of Mines and Petroleum (now known as Department of Mines, Industry Regulation and Safety) 2010, *Storage and handling of dangerous goods – code of practice,* Government of Western Australia, Perth, available www.dmirs.wa.gov.au.

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Department of Water (now known as Department of Water and Environmental Regulation) various dates, Water quality protection notes (WQPNs), Government of Western Australia, Perth, available www.dwer.wa.gov.au.

- WQPN no. 3: *Using water quality protection notes*
- WQPN no. 4: *Sensitive water resources*
- WQPN no. 8: *Further reading*
- WQPN no. 10: *Contaminant spills – emergency response*
- WQPN no. 14: *Statutory approvals*
- WQPN no. 25: *Land use compatibility tables for public drinking water source areas*
- WQPN no. 28: *Mechanical servicing and workshops*

- WQPN no. 65: *Toxic and hazardous substances*
- WQPN no. 68: *Mechanical equipment wash down*

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Standards Australia 1997, *AS/NZS 4452:1997 Storage and handling of toxic substances,* SAI Global, Sydney, available www.standards.org.au.

——2000, *AS 4681:2000 The storage and handling of Class 9 (miscellaneous) dangerous goods and articles,* SAI Global, Sydney, available www.standards.org.au.

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## Disclaimer



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