



Groundwater bores in development areas - information for developers and consultants

Overview

The Department of Water and Environmental Regulation manages a large network of groundwater monitoring bores across the state. These bores are located in state forest, regional parks, crown land, road reserves and freehold land. They are used to assess the quantity and quality of the state's groundwater resources. It is inevitable that from time-to-time these bores will be in areas where new developments are proposed.

This document provides guidance on how to identify and manage department owned groundwater monitoring bores in development areas. There will be one of three possible outcomes for each bore. These are:

1. Modify the development footprint to avoid disturbing the bore.
2. Drill and install a replacement groundwater monitoring bore at an approved location and decommission the existing bore (once a relationship between groundwater levels of the old and new bores has been established).
3. Decommission the bore (where the department considers the existing bore is not required).

This document outlines the process for managing department-owned groundwater monitoring bores for each of these outcomes, including information needed by the department to inform decision making, and requirements of drilling a replacement bore and bore decommissioning work.

Bore identification

There are different types of department owned groundwater monitoring bores. Often the appearance of the headworks is related to the bore's purpose. The bore headworks is the protective metal casing that can be seen at ground level and is designed to protect and secure the bore.

The department's highest priority groundwater monitoring bores are referred to as Groundwater Assessment Network (GWAN) bores. These are most commonly characterised by their galvanised steel headworks which come in a variety of sizes. These headworks are generally constructed with a hinged lid, are secured with a padlock and have identification stickers.

Where necessary, GWAN and non-GWAN bores may be installed with flush fitting lids at ground level. Other non-GWAN bores may be constructed with a variety of older style steel headworks. A range of department-owned monitoring bores are shown below.



Steel headworks
(non-GWAN)



Flush mount headworks
(GWAN and non-GWAN)



Galvanised steel headworks
(GWAN)



Flush mount headworks
(GWAN and non-GWAN)

You can confirm whether the bore/s are owned by the department by checking our [Water Information Reporting system](#).

You can also contact the Groundwater Asset Management Group by emailing measurement@water.wa.gov.au or calling 1800 645 191.

To allow us to correctly identify the bore you'll need to provide the following:

- Accurate information on the bore/s, including its location in the form of GPS co-ordinates (preferably Eastings and Northings) and/or the proximity of the bore to the nearest landmark or road intersection.
- Photographs of the bore if possible, ensuring that any reference numbers and identifying stickers are clearly visible.

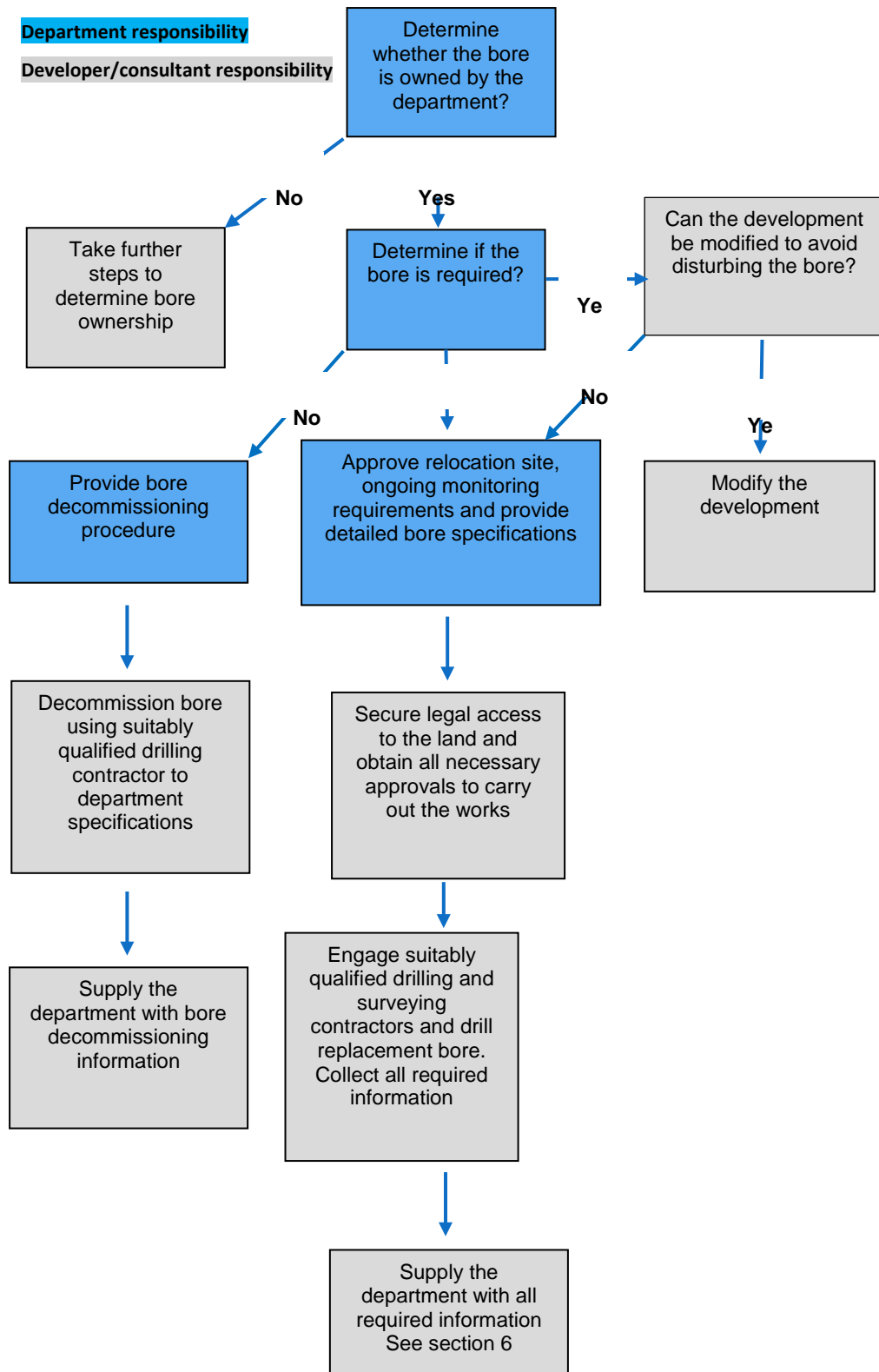
Managing department-owned groundwater bores

Once it has been confirmed that the bore is owned by the department, you should provide information on your development regarding the proposed work near the bore/s. For example, whether the bore is in a proposed housing footprint, a future road reserve or future park land. This will help determine whether there is a possibility the bore can be retained in the proposed development or retained through modifications of the development.

A discussion should be held with the department to agree on a development timeline. This timeline should include when a bore will be decommissioned if it cannot be maintained in the development, when the replacement bore will be installed (if required) and its agreed location. The timeline should also include an agreed method to satisfy the monitoring requirements, outlined in Section 5 of this document. Access to the bore/s on an ongoing basis must also be facilitated to ensure the department can satisfy its ongoing monitoring requirements and collect the required information to establish a relationship between the old and new bore.

The following process describes the steps involved in managing department-owned bores in development areas. The parts of the process that are indicated as being the proponent's responsibility, are to be undertaken at the proponent's expense.

Process for managing department-owned bores in development areas



Supply all information to DWER Groundwater Asset Management Group by emailing measurement@water.wa.gov.au or calling 1800 645 191

Responsibilities

The following provides an outline of the roles and responsibilities for the different stages of the above process for the Department of Water and Environmental Regulation and the developer or the developer's consultant.

Department of Water and Environmental Regulation (DWER)

- Confirm if bores are department-owned assets
- Determine if bores need to be retained or can be decommissioned
- Approve the alternative bore replacement site/s
- Provide bore replacement and/or decommissioning procedures
- Supply bore headworks, fit identification stickers and reflective tape
- Confirm the bore/s have been constructed or decommissioned in accordance with our requirements.

The developer/consultant

- Advise the department's groundwater asset management group, before commencement of any bore replacement or decommissioning, as we may choose to supervise the works
- Secure legal access to the land where the bore replacement or decommissioning works are proposed
- Obtain all necessary local, state and federal government approvals for the works
- Engage a suitably qualified drilling contractor (see section 4.0 below)
- Ensure the hole is logged (lithology and geology) by a qualified environmental scientist/geologist/hydrogeologist
- Ensure that the site is left in a neat and tidy condition to the satisfaction of the department and landholder
- Engage a licensed surveyor to provide the elevations requested in Appendix 1 and shown in Appendix 2
- Provide all bore replacement and/or decommissioning information requested in Section 6. Ensure all information for the new bore is submitted to the department in the templates provided in Appendix 1.

Driller licensing

It is mandatory that drillers undertaking any drilling and/or decommissioning works hold the relevant Australian Drilling Industry Association (ADIA) licence in accordance with the three licence classifications below.

- **Class 1:** This licence is restricted to drilling operations in non-flowing (sub-artesian) single aquifer systems.
- **Class 2:** This licence, in addition to operating in Class 1 conditions, permits operations in non-flowing (sub-artesian) multiple aquifer systems.

- **Class 3:** This licence, in addition to operating in Class 1 and Class 2 conditions, permits drilling operations in flowing (artesian) aquifer systems.

Once the department has advised you of the class of driller required, you should find a suitably qualified driller to do your work. A list of qualified drillers can be obtained by contacting the ADIA on (08) 6305 0466.

Any drilling or decommissioning of bores should be done in accordance with, *Minimum Construction Requirements for Water Bores in Australia, Edition 3*.

Bore monitoring requirements

Monitoring bores that are replaced should be monitored for water levels on a monthly basis, for at least one year after the replacement bore has been drilled. This is necessary to establish a relationship between the old and new bores. A shorter timeframe may be negotiated with the department depending on the circumstances.

The department's information requirements

Information regarding the drilling and installation of a replacement bore and the decommissioning of a bore needs to be provided to the Department of Water and Environmental Regulation. All information should be emailed to measurement@water.wa.gov.au.

Bore decommissioning

The following information should be provided following bore decommissioning:

- Decommissioning date
- Name and licence details of drilling contractor
- Details of casing perforation at depth (if appropriate)
- Cement plug setting depths
- Grout volume pumped
- Casing packer setting depth
- Length of casing grouted

Drilling and installation of replacement bore

When drilling and installing a replacement groundwater monitoring bore, the template in Appendix 1 needs to be completed and emailed to DWER Groundwater Asset Management Group measurement@water.wa.gov.au.

Appendix 1: Bore replacement information

Location and identification

Owner	Department of Water and Environmental Regulation		
Location			
Mga ref	Zone	Eastin g	Northin g
Survey accuracy	Surveyed $\pm 0.1\text{m}$ (horizontal) $\pm 0.003\text{m}$ (vertical)		
Purpose / status	Monitoring bore		
Dwer site ref			

Bore construction

Drilled by		
Drill method		
Drill date		
Elevation	Surveyed levels (mAHD)	
	Survey method:	
	Ground level	
	Top of headworks	
	Top of casing	
	Cement block	
Drilled diameter		Depth (m bgl)
	Surface Casing	
	Pilot/Main hole	

Depth intervals (m bgl)		Type	ID (mm)	OD (mm)
		12" Galvanised steel bore cover		
		Mild steel surface casing 10" NB; 9.3 mm WT		
		Blank PVC casing 100 ND: Class 12, Wall thickness 6.3 mm, bell joints		
		Screen interval PVC casing 100 ND, 1 mm aperture slots: Class 12,		
		Blank PVC casing 100 ND, with PVC end cap: Class 12,		

Annulus fill

Depth intervals (m bgl)		Fill type	Cement (SG)
0	6	Steel surface casing Cement grouting of 10" NB steel surface casing <input checked="" type="checkbox"/> Tremmie <input type="checkbox"/> Pressure	1.6
		Natural Pack (Backfilled cuttings)	NA
		Bentonite Seal (Pellets)	NA
		Graded Gravel Pack (1.6 – 3.2 mm)	NA

Geological data

Sampling interval	Drill cutting samples at 1 m intervals
Logged by	

Stratigraphic summary

Depth (m bgl)	Formation

Hydrogeological summary

Aquifer screened	
Groundwater level	
Groundwater level date	

Bore development

Bore development method	
Duration	
Airlift rate	
Water level	

Airlift water quality

Ph	
Conductivity ($\mu\text{s}/\text{cm}$)	
Temperature	

Lithology log

From	To	Lithology	Lithology description
0	2	Sandy clay	Colour, grain size, sorting, sphericity, mineralogy and other observations
2	6	Sand	Example: Pale beige/white, fine to coarse grained, moderately-well sorted, sub-angular to rounded, quartz, trace iron, minor iron staining.
		Clay	
		Limestone	
		Silt	
		Silty sand	
End of hole at XX m bgl.			

Appendix 2: Bore survey elevations

The picture below shows the vertical elevations that the department requires for each new monitoring bore, requested in Appendix 1.

