

## Groundwater quality at DPI Mangrove Mountain poultry burial sites project

### Project information sheet No.21 – October 2020

#### Background

Poultry carcasses and shed materials were buried in three containment pits in response to the Newcastle Disease Virus of Poultry Emergency at Mangrove Mountain on the Central Coast Plateau in 1999.

A project comprising three to four monitoring bores surrounding each pit to monitor potential impact from the sites on groundwater quality commenced in 2001.

Routine project activities also include:

- Landfill gas monitoring.
- Design, installation and supervision of site maintenance works.
- Decision-support for impact mitigation options.

#### Key actions (2019-20)

1. Key results from Groundwater Monitoring Events (GME26 – June 2020) are reported in this information sheet.
2. Monitoring of pit surface soils for evidence of cracks, surface slumping or subsidence.

3. Extraction of waste-water (leachate) at the Waratah Road site (Total to 01 Jan to 01 Oct 2020 = 35,350 litres).
4. Installation of two new up-gradient monitoring bores at the Waratah Road site.
5. Routine site maintenance, including minor landscaping and grass mowing.

#### Monitoring results

Initial results for June 2020 Groundwater Monitoring Event (GME26) were received in August 2020.

#### General comments

Zinc concentrations reported in all project monitoring bores exceed the ANZECC (2000) trigger values for protection of freshwater aquatic ecosystems.<sup>1</sup>

Concentrations are well below the Australian Drinking Water Guideline (ADWG, 2011) levels.<sup>1</sup>

The nickel concentration did not exceed the ANZECC (2000) trigger value or the ADWG (2011) level in any monitoring bore in this round.

The ANZECC (2000) trigger value for total nitrogen was exceeded in the majority of project monitoring bores, aside from BH6 and BH8 at the George Downes Drive site and BH1 at the Bloodtree Road site.

<sup>1</sup>See notes on page 3 for background information relating to water quality guideline levels.

### **Bloodtree Road site**

Groundwater flow direction (calculated from the Standing Water Level of monitoring bores) is generally west.

The concentrations of aluminium and nickel declined from GME25 and were well-below the ADWG (2011) level and the ANZECC (2000) freshwater trigger value.

The ANZECC (2000) trigger value was exceeded for nitrate in all bores. The level is comparatively low and slightly higher than GME24. The highest level is in up-gradient bore BH3 and in BH2, reflecting an apparent regional trend.

Phosphorus was below detection limits in Bloodtree Rd monitoring bores.

### **George Downes Drive site**

Calculated groundwater flow direction in this round is generally to the north-west.

Groundwater samples could not be taken from BH5 due to a blockage in the well. This will be fixed before GME27.

The iron level was less than the detection limit (50 micrograms/L) in all bores on the site.

The manganese level exceeds the ADWG (2011) (aesthetic) level in BH7 and BH8. Levels reported were below the ADWG (2011) (health) level and ANZECC (2000) trigger value.

The nitrate level exceeds the ANZECC (2000) trigger value in BH4 and BH7. Levels are well below the ADWG (2011) (health)

level. Levels in BH4 (up-gradient) and BH7 have declined since GME25.

Phosphorus was reported below detection limits in BH5 and BH6 and at very low levels in BH7 and BH8.

### **Waratah Road site**

Calculated groundwater flow direction in this round was north-east.

The lead level in down-gradient bore BH5W exceeds the ANZECC (2000) trigger value and is just over the ADWG (2011) (health) level. It was reported at low levels in BH9W and BH12W and was below the detection limit in other bores on the site.

The ADWG (2011) (health) level for manganese was exceeded in the down-gradient bores BH5W, BH9W and BH12W in this event. The concentrations in BH5W also exceed the (higher) ANZECC (2000) trigger value for manganese. The ADWG (2011) (aesthetic) level was exceeded in BH11W.

Aluminium exceeds the ADWG (2011) (aesthetic) level in down-gradient bores BH5W, BH9W, BH11W, BH12W, BH14W and BH15W. Levels in BH5W and BH9W remain very high.

The ANZECC (2000) trigger value and ADWG (2011) (aesthetic) level for ammonia is exceeded in the down-gradient groundwater monitoring bores, BH5W and BH12W. The ANZECC (2000) trigger value is exceeded in BH14W.

The ANZECC (2000) trigger value for nitrate is exceeded in all bores, aside from down-gradient bore BH14W. The ADWG (2011) (health) level for nitrate was exceeded in down-gradient bores BH5W, BH9W and BH15W.

Liquid seepage from the poultry shed litter containment pit, along with the nutrient legacy from previous land use on this site

(intensive piggery), are potential sources of the contaminants reported.

## Next steps

- Groundwater Monitoring Event (GME27) (November 2020).

## More information

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**Or via DPI web-site** [Mangrove Mountain groundwater monitoring](#)

<sup>1</sup>The ANZECC (2000) trigger values for protection of freshwater aquatic ecosystems (95% level)(superseded); ANZECC (2018) ANZ freshwater guidelines were developed for surface waters, not groundwater. NSW EPA *Guidelines for the Assessment and Management of Groundwater Contamination* indicate that the trigger values should be used as Groundwater Investigation Levels (GILs). Exceedance of GILs indicates a need for detailed assessment. This is because natural background concentrations, diffuse regional contamination, the fate and transport of contaminants in groundwater and potential exposure pathways must all be considered. For example, there is diffuse regional contamination by nitrate in the Mangrove Mountain area.

Revisions to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality Toxicant default guideline values for water

quality in aquatic ecosystems (revised 2018) can be viewed at:

<http://waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/toxicants>

**Note 1:** *An increase in soluble metals is often associated with a decline in groundwater pH. Minor increase or exceedance of GILs for metals is not assumed to relate to contamination from the burial pits. Seepage from the pits would likely also result in a significant increase in ammonia, nitrate, Total Dissolved Solids and electrical conductivity, for example.*

**Note 2:** *The National Health and Medical Research Council's Australian Drinking Water Guidelines are not specifically for regulation of groundwater quality. They are an excellent source regarding the health issues related to drinking water. They can be viewed on-line or downloaded at [Australian Drinking Water Guidelines \(2011; updated 2018\)](#) Fact sheets provide background regarding health considerations of key water quality parameters.*

**Reference number:** INT21/33880

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