

Mangrove Mountain groundwater monitoring

DPI Mangrove Mountain groundwater monitoring project – May 2012

Background

- Poultry carcasses and shed materials were buried in three separate disposal pits during the 1999 Newcastle Disease Virus emergency response at Mangrove Mountain on the Central Coast Plateau
- A groundwater monitoring project comprising three to four monitoring bores surrounding each disposal pit was commenced in 2001 to monitor potential impact from the disposal sites on groundwater quality
- A second stage of the groundwater monitoring project commenced in 2006. In addition to undertaking the Mangrove Mountain Groundwater Monitoring Project, the hydro-geological consultants employed by NSW Department of Primary Industries undertook the following tasks:
 - » Landfill gas monitoring;
 - » Design, installation and supervision of disposal pit maintenance works; and
 - » Decision-support for impact mitigation options

Key Actions 2012

1. Supplementary (quarterly) groundwater monitoring at down-gradient bores at the George Downes Drive and Bloodtree Road sites and at all bores at the Waratah Road site, including the two new bores installed in October/November 2011 (Event J – January 2012)
2. Monitoring of pit surface soils for evidence of cracks, surface slumping or subsidence
3. Project Technical Committee teleconference in May 2012 to review quarterly groundwater monitoring results, progress and future actions
4. Extraction of around 7500 litres of waste-water (leachate) from the large-diameter in-pit leachate well at the Waratah Road site
5. Completion of turf application to the renovated pit surface at the Bloodtree Road site
6. Routine maintenance at the George Downes Drive and Bloodtree Road poultry burial sites, including minor landscaping and mowing. Grass slashing of cleared land (~ 8 Ha) and mowing/herbicide application within fenced compounds at Waratah Road
7. On-site meetings with prospective contractors regarding proposed further maintenance actions, such as Bloodtree Road leachate well

Groundwater Monitoring Results

The results from the quarterly down-gradient bore monitoring (Event J; January 2012) were received in March 2012. The annual full-round groundwater quality monitoring event (Event 11) is being scheduled at the time of writing.

Note: The ANZECC (2000) *Trigger Values for the Protection of Freshwater Aquatic Ecosystems (95% level of protection)* were developed for surface waters, not groundwater. However the NSW OE&H “*Guidelines for the Assessment and Management of Groundwater Contamination*” indicate that these trigger values should be used as Groundwater Investigation Levels (GILs). The EPA guidelines also state that 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 nitrates in the Mangrove Mountain area.

• Bloodtree Road Site

- » Calculated groundwater flow direction from the Standing Water Level of monitoring bores is generally to the west-south-west
- » Levels of metals have generally declined below trigger values except for a slight exceedance of the ANZECC (2000) trigger value for protection of freshwater aquatic

ecosystems for zinc in the downgradient monitoring bore (BH1B).

- » An exceedance of the ANZECC (2000) trigger value for nitrate in BH1B seems to reflect a regional trend and is well below the Australian Drinking Water Guideline level
- **George Downes Drive Site**
 - » Calculated groundwater flow direction from the standing water level of monitoring bores is generally to the north
 - » Bores sampled in Event J was the down-gradient bore BH5
 - » There was a slight exceedance of the ANZECC (2000) trigger value for copper and zinc in BH5
 - » The levels are not regarded as a threat to human health and groundwater is subject to considerable dilution before any likely discharge to surface waters
- **Waratah Road Site**
 - » Calculated groundwater flow direction from the standing water level of monitoring bores is generally to the east-south-east, now that further water level data points are available from the addition of a further two new groundwater monitoring bores
 - » All eight bores at the site were sampled in the January quarterly round (Event J)
 - » There were slight exceedances of the ANZECC (2000) trigger value for copper in seven of the eight bores. The levels recording were well below the Australian Drinking Water Guideline Level
 - » There was an exceedance for lead in the down-gradient bore BH5W. The lead level in BH5W exceeds the Australian Drinking Water Guideline. To date, no source of lead has been found on the site
 - » The ANZECC (2000) trigger value for zinc was exceeded in six of the eight monitoring bores. Zinc does not have a threshold established in the Australian Drinking Water Guidelines
 - » There was a slight exceedance of the ANZECC (2000) trigger value for cadmium in BH12W, a newly installed bore. The observed level was well within the Australian Drinking Water Guideline Level
 - » There was an exceedance of the Australian Drinking Water Guideline aesthetic value for iron in the up-gradient bore, BH11W
 - » The ANZECC (2000) trigger value and Australian Drinking Water Guideline level for ammonia and nitrate continues to be exceeded in the down-gradient bore (BH5W)

- » The ANZECC (2000) trigger value for nitrate is exceeded in all bores on the site. The levels in five of the eight bores are much lower than observed in BH5W, BH9W and BH12W
- » The Australian Drinking Water Guideline level for nitrate is exceeded in the new downgradient groundwater monitoring bores BH9W and BH12W on either side of BH5W
- » The relative nitrate concentrations between the adjacent down-gradient monitoring bores east of the pit supports the presumption of easterly groundwater flow direction and the presence of liquid seepage from the poultry shed litter burial pit, along with the nutrient legacy from previous landuse on this site (intensive piggery development)

Next Steps

- Groundwater sampling and analysis will continue with the annual full-round groundwater monitoring event due to commence in May 2012
- Installation of a new down-gradient groundwater monitoring bore at the George Downes Drive quarry site that was abandoned due to ongoing wet weather at the end of 2011 is rescheduled to occur by June 2012 (pending availability of contractor)
- Regular waste-water extraction from the Waratah Road poultry shed litter burial pit will continue to reduce the liquid levels within the pit
- Request for quotations for 3-year groundwater monitoring project (2012-2015) to be posted
- Strategic planning, including options for future management is proposed
- Maintenance actions will be scheduled, as required, depending on the availability of contractors and resources

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<http://www.dpi.nsw.gov.au/agriculture/livestock/poultry/health-disease/newcastle-disease/mmgm>

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