

Our Ref: NH: L.B19000.005.Oakleigh Monitoring Results.docx

3 July 2012

New Hope Group
PO Box 47
Ipswich Q 4305

Attention: Ross Bennett

Dear Ross

RE: OAKLEIGH VOID MONITORING

This letter contains a summary of the results from the Oakleigh Void Monitoring carried out on the 15th of June 2012. The Monitoring consisted of:

- Bathymetry Survey of the void;
- *In-situ* water quality measurement; and
- Analysis of water samples for potential contaminants.

Bathymetry Survey

The depth and position data collected during the survey has been transferred into two GIS (MapInfo) table files with a projection of AMG Zone 56 (AGD 84). These files have been attached to this letter.

The file called "Complete_Survey.tab" is a complete set of depth and position results. The file called Weed_Line_Survey.tab is a portion of the survey that tracked the perimeter of the weed bed around the edge of the void. Screen images of each file are presented in Figure 1 and Figure 2.



Figure 1- Complete Survey



Figure 2 – Weed Line Survey

In-situ Water Quality Measurement

Using a calibrated Yeo-Kal water quality instrument, measurements were taken at three locations and multiple depths within the void. The results are presented in the table below. Recorded values that exceed the WQOs are highlighted in yellow.

Site	Depth (m)	Temp (°C)	EC (µS/cm)	pH	DO (% sat)	DO (mg/L)	Turbidity (NTU)
Site #1	0.3	16.07	616	8.68	88.6	8.6	10.5
Site #2	0.3	15.77	614	8.53	74.8	7.4	8.5
	1.0	15.60	615	8.54	74.5	7.4	8.5
	2.0	15.54	613	8.55	75.1	7.5	8.2
	2.3	15.54	615	8.38	63.4	6.5	13.1
Site #3	0.3	16.00	616	8.52	72.4	7.1	6.8
	1.0	15.95	615	8.48	69.3	6.9	8.5
	2.0	15.49	617	8.41	63.7	6.3	14.2
Water Quality Objective ¹		N/A	770	6.5 – 8.0	85 – 100%	NA	<17

¹ Water Quality Objectives are derived from Schedule 1 of the *Environmental Protection (Water) Policy 2009* (EPP Water) for lowland freshwaters of the Bremer River catchment - moderately disturbed ecosystem.

Analysis of Water Samples

Water samples were collected from one location in the centre of the void at a depth of 1m. The samples were analysed by the NATA accredited Symbio Alliance Laboratory in Eight Mile Plains. The results of the analysis, and a comparison the water quality objectives are shown in the table below. Recorded values that exceed the WQOs are highlighted in yellow.

Analyte	Units		WQO ¹
Total suspended solids	mg/L	<2	6
Total dissolved solids	mg/L	409	2,500 ^
Hydroxide Alkalinity	mg/L	<1	-
Carbonate Alkalinity	mg/L	<1	-
Bicarbonate Alkalinity	mg/L	197	-
Total Alkalinity	mg/L	197	-
Sulphate	mg/L	20.0	-
Chloride	mg/L	90	-
Calcium	mg/L	14.3	-
Magnesium	mg/L	15.2	-
Sodium	mg/L	109	-
Potassium	mg/L	3.2	-
Total Cyanide	mg/L	<0.004	-
Total Metals/Metalloids			
Aluminium	mg/L	0.04	-
Arsenic	mg/L	0.0021	-
Cadmium	mg/L	<0.0001	-
Chromium	mg/L	<0.0005	-
Copper	mg/L	0.0072	-
Nickel	mg/L	0.0026	-
Lead	mg/L	0.0003	-
Zinc	mg/L	0.0113	-
Manganese	mg/L	0.0279	-
Iron	mg/L	0.18	-
Mercury	mg/L	<0.0001	-

Analyte	Units		WQO ¹
Dissolved Metals/Metalloids			
Aluminium	mg/L	<0.01	0.055
Arsenic	mg/L	0.0016	0.024
Cadmium	mg/L	<0.0001	0.0002
Chromium	mg/L	<0.0005	0.001
Copper	mg/L	0.0016	0.0014
Nickel	mg/L	0.0008	0.011
Lead	mg/L	<0.0001	0.0034
Zinc	mg/L	0.0010	0.008
Manganese	mg/L	0.0013	1.9
Iron	mg/L	0.01	-
Mercury	mg/L	<0.0001	0.0006
Nutrients			
Total nitrogen	mg/L	0.87	0.5
Ammonia	mg/L	0.074	0.02
NOx	mg/L	0.03	0.06
Total phosphorus	mg/L	0.04	0.05
Reactive phosphorus	mg/L	<0.005	0.02
Organochlorine Pesticides (OC)	µg/L	<LOR [~]	
Organophosphorus Pesticides (OP)	µg/L	<LOR	
Polynuclear Aromatic Hydrocarbons (PAH)			
Naphthalene	µg/L	<1	-
Acenaphthylene	µg/L	<1	-
Acenaphthene	µg/L	<1	-
Fluorene	µg/L	<1	-
Phenanthrene	µg/L	<1	-
Anthracene	µg/L	<1	-
Fluoranthene	µg/L	<1	-
Pyrene	µg/L	<1	-
Benz(a)anthracene	µg/L	<1	-
Chrysene	µg/L	<1	-
Benzo(b)fluoranthene	µg/L	<1	-
Benzo(k)fluoranthene	µg/L	<1	-
Benzo(a)pyrene	µg/L	<1	-
Indeno(1.2.3.cd)pyrene	µg/L	<1	-
Dibenz(a,h)anthracene	µg/L	<1	-
Benzo(g,h,i)perylene	µg/L	<1	-
Total Petroleum Hydrocarbons (TPH)			
C10 - C16 Fraction	µg/L	<50	-
C16 – C34 Fraction	µg/L	<100	-
C34 – C40 Fraction	µg/L	<100	-

¹ Water Quality Objectives are derived from Schedule 1 of the *Environmental Protection (Water) Policy 2009* (EPP Water) for lowland freshwaters of the Bremer River catchment - moderately disturbed ecosystem, and ANZECC/ARMCANZ (2000) for dissolved metals/metalloids based on a 95% level of species protection.

[^] TDS WQO derived from protection of stock watering environmental value from Schedule 1 of the *Environmental Protection (Water) Policy 2009* (EPP Water) – TDS level below which no adverse effects to dairy cattle.

[~] Limit of Reporting (LOR)

Summary of Results

- The average recorded depth in the void was 1.2m, with a maximum recorded depth of 2.5m.
- The average recorded % dissolved oxygen was 72.7%
- The average recorded conductivity was 615 $\mu\text{S}/\text{cm}$.
- The average recorded pH was 8.5.
- The recorded concentration of dissolved copper level was 0.0016 mg/L compared to the WQO value of 0.0014 mg/L.
- The recorded concentration of total nitrogen was 0.87 mg/L compared to the WQO value of 0.50 mg/L.
- The recorded concentration of ammonia was 0.074 mg/L compared to the WQO value of 0.02 mg/L.

Yours faithfully

BMT WBM Pty Ltd

A handwritten signature in black ink, appearing to read 'Nigel Hardie'.

Nigel Hardie

Environmental Engineer