Veolia Environmental Services (Australia) Pty Ltd.

Re: EPL- Annual Assessment of Monitoring Data at the Woodlawn Bioreactor & Intermodal Facility.

Report – 7 January 2008. **(Ref: E2W-083A R001)**

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Project: EPL- Annual Assessment of Monitoring Data at the Woodlawn Bioreactor & Intermodal Facility.

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1.0 INTRODUCTION

Earth2Water Pty Ltd (E2W) was engaged by Veolia Environmental Services Pty Ltd (Veolia) to review and assess the annual monitoring data for the Woodlawn Bioreactor site and associated Environmental Protection Licence (EPL) requirements. Veolia operates under an EPL (11436) for the Woodlawn Bioreactor site and EPL (11455) for the Crisps Creek Intermodal Facility Site. This is the first annual monitoring report for the EPL's, which are combined in this report.

The site occupies approximately 3,000 hectares and also contains the Woodlawn Mine Lease requirements (SML20, Figures 1 & 2).

This "EPL" report presents a review and assessment of the monitoring data (dust, air, groundwater, surface water) at Veolia's Bioreactor and Intermodal Facility. The report includes historic and recent monitoring data, conceptual models, data assessment, conclusions and recommendations for improving future monitoring (where required).

2.0 BACKGROUND

The NSW Department of Environment and Climate Change (DECC) regulates numerous waste management and disposal facilities in NSW. DECC issues licences to permit and regulate waste disposal activities, and licence conditions typically include requirements to monitor leachate quality, groundwater quality and surface waters in and around landfill sites.

This report aims to provide Veolia with an independent review of the monitoring data and results obtained to date (2004 to 2007).

E2W scope of work has included the review of available technical reports, historic and current monitoring data (dust, air, water), well monitoring networks, surface water storages, hydrogeology, and relevant environmental information to assess the monitoring data at the Woodlawn Bioreactor and Intermodal Facility.

E2W has recently provided Veolia with a comprehensive assessment of the water monitoring systems at the site (Status of Water Monitoring Systems at the Woodlawn Bioreactor Site, dated November 2007). This report has sub-dividing the site into ten "systems" or sub-sites (e.g. mine void, tailing dams-South, North, West, evaporation dams-1,2,3, waste rock dump, disused plant area, Intermodal facility) based on the unique landform features to simplify the large and complex site (Figure 1).

3.0 LANDFILL DESIGN, OPERATIONS AND HISTORY

The Woodlawn mine was typical of a large scale open cut and underground mine operation. The mine infrastructure included the construction, operation and maintenance of the following:

- Waste Rock Dump (WRD),
- Tailing dams,

- On-site ore processing facilities (plant area),
- Evaporation Dams (ED1,2,3),
- Underground operations; and
- Open-pit operations.

The former mining components of the Woodlawn operations still exist and are illustrated on Figures 1 and 2. A summary of the site history is outlined in Table 3.1.

The Woodlawn Bioreactor occupies the mine void (200 metres below ground) and comprises approximately 25 million m^3 of landfill space. Landfilling and gas collection commenced in late 2004.

Table 3.1 Milestones & History

Date	Event
1978	Woodlawn open cut mine activities commence.
22-12-1982 Aerial	Plant area and dams present. North & South Tailings are constructed used for tailings/water storage. West tailings dam is under construction together with the waste rock dump. Plant collection dam/lagoon is full of water- irregular area.
9-6-1987 Aerial	Tailings dams (north & south) full of water, tailings comprising ~20% of available area. ED-1 under construction, with waste rock dam being raised (several benches visible) and includes leachate sump. Dolerite stockpile is visible on west side of mine void. Bunding structure visible at Plant collection dam with minor water. Raw water dam is constructed and full of water. ED-3 area comprises series of small dams
1989	Expansion and development of plant infrastructure. Open cut mine workings reach approx 200m depth, commence underground mining.
15-7-1989 Aerial	ED-1 construction complete and full of water. ED-3 (south) is in process of construction Dolerite stockpile is increasing in size. West Tailings dam is constructed and full of water. Plant collection dam is full of water.
11-9-1990 Aerial	West tailings dam is larger and full of water and tailings occupy approx 10% of available area. ED-2 has been constructed and now full of water ED-3 construction practically completed (dry) Plant dam is enlarged and full of water
30-9-1991	Tailings at the two tailings dams (north, south) cover approx 50% of available surface area. West tailings dam- new section being added on SW corner. Lower benches of waste rock dam appear to be revegetated. ED-3 (north) being constructed and nearly completed (dry)
11-9-1994 Aerial	ED-3 (north & south) are complete and full of water. West tailings dam – new SW addition is complete and full of water North tailings dam is subdivided in smaller cells on west side and through centre. ED-2 has defined internal bund on NW corner (visible from 1990). Waste rock dump is being rehabilitated and revegetated. Water visible at bottom of the void.
5-10-1995 Aerial	Rehabilitation/revegetation of Waste rock dump is nearing completion.
11-11-1996 Aerial	ED-1 & 2 high water level. ED-3 also full
March 1998	Administrators appointed to Denehurst Ltd
17-9-2004 Aerial	Water in E-1,2,3 at low levels

	Tailings in north, south and west dams have consolidated with ~15% deep visible
October 1999	Commission of Inquiry – Woodlawn Waste Management Facility
November 2000	Minister grants consent for Woodlawn
February 2002	Revised EIS prepared
August 2002	Minister grants Development Approval for Clyde Transfer Terminal
February 2003	Land and Environment Court Hearing into Clyde Transfer Terminal
September 2003	All Bioreactor and Inter-modal construction complete
December 2003	Clyde Waste Transfer Terminal (Special Provisions) Act (2003) passed by State Govt
Jan – June 2004	Clyde Transfer Terminal construction
October 2004	Wind farm DA and EIS lodged
September 2004	**Landfill gas collection system installed at base of void.** **First waste load delivered to site**
February 2005	Mining Operations Plan approved.
May 2005	Planning Focus Meeting held on the Alternative Waste Technology proposal
June 2005	First stage of gas extraction system and flaring initiated
October 2005	Wind Farm DA approved
January 2006	Started construction the first power generator hub
November 2005	Mixing of acid mine drainage and landfill leachate in the void sump and discharge to ED-3 (N&S).
April 2006	Environment, Safety and Quality accreditation gained
August 2006	Power generation Hub completed
July 2007	Application for temporary storage of leachate in ED-3 from mine void. Construction of segregated dams (ED-3 lagoons) within ED-3 for temporary storage. Bioreactor has received 970,000 tonnes of waste since commencement.
September 2007	Approximately 40m of waste placed in landfill since commencement (pit base from 200 to 160 m below perimeter). Leachate level of approximately 10m to 15m below waste level.

Note: "Aerial"=historical information sourced from an aerial photograph.

4.0 ENVIRONMENTAL SETTING

The environmental setting of the site including the site topography, soils, hydrology, geology and hydrogeology are described in the following subsections.

The main site features and hydrogeology are included in Figures: 1, 2, 3A, 4 and 5.

4.1 Site Location

Woodlawn Mine is located some 7 km west of Tarago, approximately 8.5 km south west of Lake Bathurst, and around 7.5 km east of Lake George. Situated some 250 km south west of Sydney, the mine site is approximately midway between Goulburn and Canberra. The land is situated within Mulwaree Local Government Area (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999).

The Woodlawn Mine is situated on a property formerly owned by Denehurst Pty Ltd which has a land area of approximately 3,000 ha. The property includes the mine void, waste rock dump, tailings dams, evaporation ponds, disused mining infrastructure and surrounding rural land and pine forest. The area surrounding the property is characterised by large rural holdings which are lightly timbered with stands of woodland. A sewerage treatment plant is located on Collector Road adjacent to the site.

The closest township to the mine site is Tarago. It is a small rural service centre which consists of a railway station, school, hotel, small commercial centre and a number of residences.

4.2 Climate

The long term climatic data at Woodlawn indicate that evaporation exceeds rainfall on an annual basis. For the reporting period July 2006 to June 2007 the total rainfall recorded was 534.5mm; which is considerably lower than the 21 year average for the July to June period of 637.3 mm. The annual average rainfall over the last 21 years for January to December is 628.5mm, with the total rainfall for 2006 of 507.1mm.

The average evaporation (17 year average) at the site is 1420 mm/year (AEMR, 2003). The evaporation rates far exceed annual rainfall, making evaporation processes very effective for onsite water management.

Rainfall recorded at Woodlawn was 534.5mm for the July to June 2007 period, considerably lower than the previous reporting year of 733.5mm.

4.3 Topography

The natural ground surface surrounding the mine void lies at an elevation of approximately 800 m AHD, with the base elevation of the mine void at approximately 630 m AHD. The landfill site is situated on a ridge which forms part of the Great Dividing Range. The topography of the surrounding area comprises rounded hills that rise up to approximately 1,000 m AHD, particularly to the north and south of the landfill site (Figures 1, 3A).

The Woodlawn Mine property lies at the head of the Allianoyonyiga and Crisps Creek catchments. Allianoyonyiga Creek is upstream of the Lake George catchment, whilst Crisps Creek connects to the Mulwaree River.

4.4 The Landfill/Void Area

The bioreactor lies within the former Woodlawn Mine site and is located some 500 m south of Collector Road on top of a ridgeline which forms part of the Great Dividing Range (Figure 1).

The landfill site occupies an area of approximately 38 ha which comprises the open cut mine void, the access road into the site and an area to the north east of the void where the associated site facilities such as the weighbridge and site office would be located. A waste rock dump and a number of tailings dams are located to the south and south east of the landfill site. Hickory's Paddock lies to the east and disused mine facilities are located to the north east. Evaporation ponds are located to the north west of the landfill site (Figure 1).

The open cut mine void where landfilling is proposed has a volume of approximately 25 million m^3 and a depth of about 200 m. The void consists of a number of benches and a haul road, sediment ponds, and the base of the void contains highly acidic sulfate rich water.

The base of the void is at approximately 630 m relative to Australian Height Datum (AHD) with the low point of the rim of the void at around 800 m AHD (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999).

4.5 Geology and Hydrogeology

The hydrogeology of the site is dominated by the hard rock geology and mine/landfill activities. The regional groundwater flow regime is an altered system due to the mine void (induces large inward hydraulic gradients) and various water storages (tailings dams, ED1,2,3) which recharge and mound the water table.

The inferred groundwater flow regime for the site is presented in Figure 1. The geology and hydrogeology is presented in Figures 1, 4, and 5.

The landfill site lies in a regional geological setting of volcanic rocks which form part of the Lachlan Fold Belt of south eastern NSW. The geological sequence of the site itself includes Ordovician and Siluro-Devonian age lithified volcanogenic, volcanoclastic and sedimentary shales and sandstones. These units are regionally faulted and jointed with a synclinorial-anticlinorial fold pattern which results in a significant lack of continuity in the horizontal plane (Reference; URS, Geotechnical Investigation, November 2004).

The hydrogeology of the mine void and surrounding area is dominated largely by volcanic rocks within which the mineralised zone occurs. The rockmass is generally of low permeability but fractures and joints, where interconnected, create minor storage and some secondary permeability. These provide modest water supply to horizontal drains drilled around the mine void and to some exploration drill holes. Regional groundwater gradients pre-mining were not established but recent investigations show the regional water table to be a subdued reflection of surface topography with gradients away from the Great Dividing Range towards Crisps Creek and Lake George. (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999).

The basement rocks generally exhibit low hydraulic conductivity. Rock permeability is due almost entirely to fractures. The low bedrock surrounding the mine void exhibits low bulk permeability due to the action of metamorphism and hydrothermal fluids which have sealed the primary porosity of the bedrock. It has been observed, that the seepages from the base of the open cut, occurs primarily through two fault/fracture zones (the 690 etc) located on opposite ends of the pit. Seepage is also known to occur via old exploration drill holes, and horizontal drain holes which were designed to relive hydraulic pressures from the pit walls.

Secondary permeability potentially exists where the rocks have been sheared by faulting, or where the rock exhibits cooling fractures (dolerites). However, the secondary porosity has been largely sealed by clays formed during the weathering of the mineral compounds of the basement rocks.

Aquifer tests have been carried out in selected horizontal bores, piezometers and monitoring bores within the void, and surrounding area, to determine the permeability and transmissivity of the bedrock. The results indicate low to extremely low values of transmissivity, with some of the monitoring bores taking a week or more to fully recover after purging of a single bore volume. (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999).

Despite the fact that the mine void is over 180 m deep and extends for at least 160 m below the natural water table the total groundwater inflow into the mine void is approximately 1 L/sec – 2L/sec. The main seepage locations are shown in Figure 1, together with the location of the fault zones (760, and 750/790) through the void.

The inferred directions of groundwater flow in the bedrock aquifer are presented in Figure 1. Dewatering associated with mining operations has created a steep cone of depression in the void area. (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999). The steep hydraulic gradients into the void are indicative of the impervious bedrock characteristics and slow seepage velocities in the bedrock (Figure 5).

Overlying the basement fractured rock aquifer on some hill-sides, are recent deposits of hillwash (colluvium) sediments which grade laterally into alluvial sediments in the valleys. This alluvial aquifer may forms a conduit through which groundwater discharges to the downstream environment.

Figure 1 shows the inferred direction of groundwater flow within the alluvial aquifer in the Crisps and Allianoyonyiga Creek catchments, based on the surface water flow system. The approximate extent of the alluvial aquifer is shown on Figure 1.

The sedimentary deposits show highly variable permeability, and have generally confined conditions at the head of the catchment. Down catchment, the aquifer becomes unconfined, with discharge to the creek surface water system, and to boggy areas adjacent to the streams. Relatively high permeability aquifers exist where the sediments occur in the base of the valleys and to a lesser degree of the slopes.

A schematic of the aquifer units present at the site are shown in Figure 4. In the current state, the Void acts like a hydraulic trap due to the steep inward hydraulic gradients (Figure 5).

4.6 Groundwater Recharge and Discharge Areas

Groundwater recharge to the bedrock occurs primarily through direct rainfall infiltration to open fractures and joints in areas where bedrock is exposed at the ground surface. Enhanced recharge was observed immediately south of the mine void (adjacent to the waste rock dump) and seeps after rainfall in the southern portal (Reference: Woodlawn Waste Management Facility Environmental Impact Statement, Woodward-Clyde, February 1999).

Evidence of recharge in the void is illustrated with the groundwater level changes in existing piezo-meters located on the batters and perimeter of the void. Several piezometers (44A, 110A) are potentially located on a fault zone and show moderate fluctuations (~10m) during rainfall recharge and are also in proximity to seepage locations (Figure 1, Appendix D).

The low bulk permeability of the bedrock in the mine area means that significant discharge of groundwater would only occur where open fracture conduits exist, and where the permeability is sufficient to produce a flow rate which is significant in the context of local catchment vegetation and hydrology.

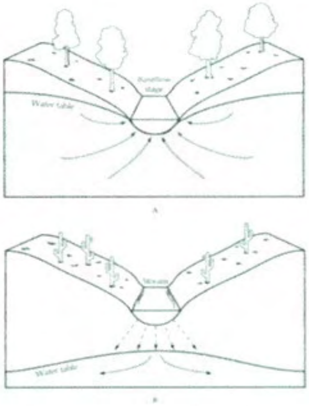


Figure 4.6: E2W interpret that Crisps Creek is ephemeral and generally a losing stream (bottom figure) during dry seasons. The stream would revert to a gaining stream during wet seasons. The type of Creek system will determine the discharge regime, fate and transport of groundwater pollution. The creek systems are generally ephemeral in nature.

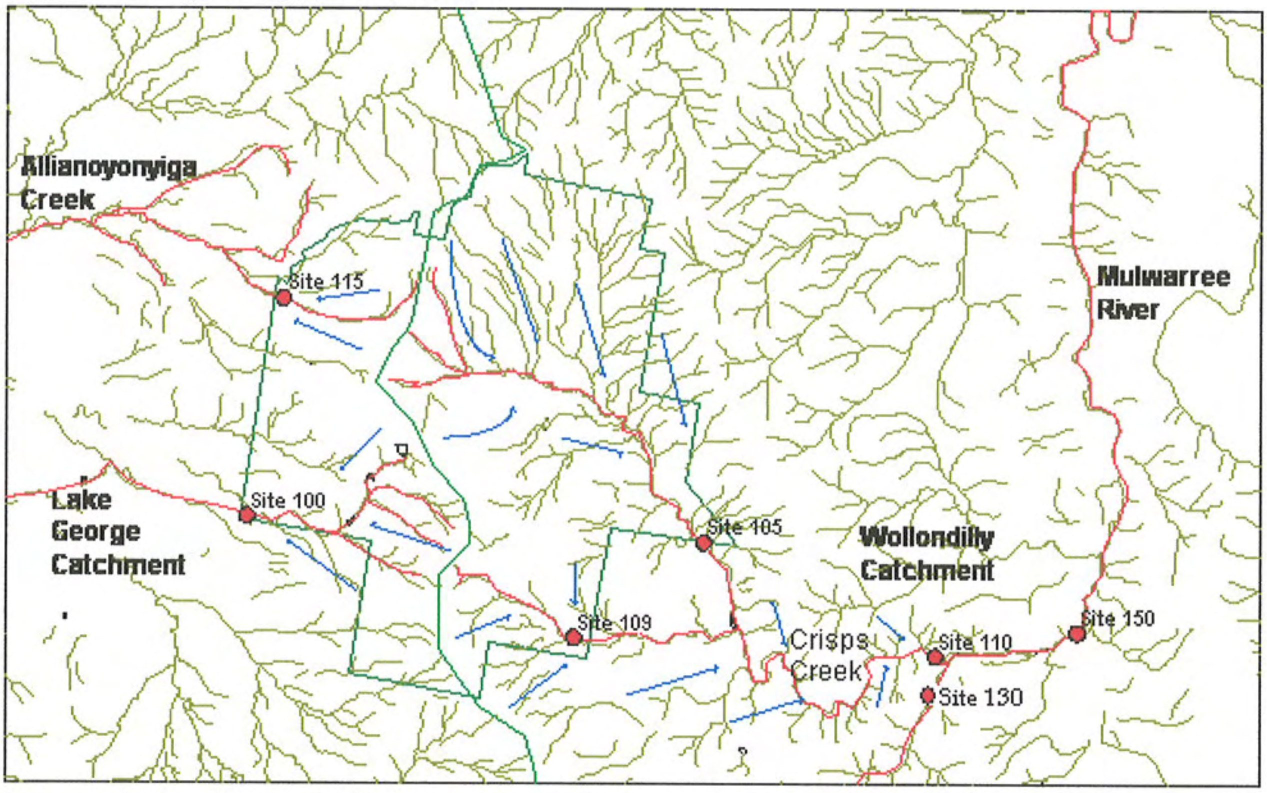
4.7 Hydrology

Allianoyonyiga and Crisps Creek are considered to be the primary receptors for discharges occurring from the Woodlawn site. The great diving range bisects the void and diverts flows to the Lake George (south- via Allianoyonyiga Creek) and Wollondilly (north via Crisps Creek) catchments (Figure 1, and Figure 4.6 below).

Surface water management strategies are implemented by Veolia to proactively manage any adverse impacts on the receiving waters of the Lake George and Wollondilly catchments. Routine monitoring of surface waters is undertaken to measure the effectiveness of water management systems. Five creek locations are monitored on Crisps Creek (flow, water quality) as shown on Figure 3B, and in the below text and Figure 6.5 (below):

- Site 100 Woodlawn/Willeroo boundary south.
- Site 105 Crisps Creek - Pylara Boundary (i.e. Bioreactor EPL requirement).
- Site 109 Pylara boundary below south tailings dam.
- Site 110 Crisps Creek downstream at bridge (i.e. Intermodal EPL requirement).
- Site 115 Woodlawn/Willeroo boundary north (i.e. Bioreactor EPL requirement).
- Site 150 Crisps Creek Downstream (i.e. Intermodal EPL requirement).

Figure 4.6: Hydrology at Woodlawn



Source: Veolia AEMR, 2006-2007. Arrows indicate flow directions, whilst the light green line represents the Great Dividing Range. The dark green line is the site boundary.

5.0 AVAILABLE MONITORING DATA & REPORTS - WOODLAWN BIOREACTOR

The majority of the laboratory data is from Ecowise Pty Ltd, whilst Veolia staff and Coffey Sciences Pty Ltd have undertaken the monitoring and sampling activities.

Some early mine data commences from the late 1980's, with progressive expansion through to late 2007 when additional locations are installed and monitored. Additional monitoring locations were added when the landfill activities commenced (eg. Mine Void, Intermodal Facility) and some locations were decommissioned and/or sampling frequency reduced due to cessation of the mine activities.

5.1 Available Water Monitoring Data & Assessment Strategy

A review and statistical analyses of the available data was undertaken and included the following:

- Review the quality of the laboratory and field data set. Some anomalies were identified and corrected in the electronic data set. Adjusting some negative results (data reported below LOR), and removing zero laboratory results when "no data" was collected.
- Calculation of minimum, maximum, average and standard deviation of selected laboratory (selection of; major ions, metals, nutrients) and field results (pH, EC, water level) at each monitoring location. The statistics were designed to highlight trends, anomalies, and characterize the data population and range of results obtained. The statistics (eg. standard deviation) were aimed to support the water quality criteria adopted for the site (i.e. no

significant change to water quality, nil discharge). The statistics were provided for pre-mining conditions (late 1980's to 2004) and current landfill activities (2005 to date) to assess water quality changes before and after landfill operations (where possible).

Hydrochemical diagrams were produced to further assess water quality trends at each monitoring location. The water and trend analyses were as follows:

- Based on the statistical and data analyses selected monitoring locations were transferred onto a selection of Expanded Durov, Piper tri-linear diagrams and/or time series graphs (selected parameters). The graphs (durov and piper) were produced by using Rockware Pty Ltd software (AqQa) and/or Excel (Note: not all graphs could be produced using excel due to the inconsistent data format). The analyte concentrations are shown on graphical form in order to assess water quality trends over time. Consistent rising trends of some parameters (i.e. Zn, Cd and stable Cl) are considered to reflect an expanding plume(s) and/or mobilization of polluted water. Locations where decreasing trends (eg. salinity, neutralising pH, lower heavy metals) are observed, it is considered that the change to water quality is beneficial due to the diminishing effects of previous mining activities (eg. storage of water in the tailings or evaporation dams). The key analytes included in the graphs were; iron, sulfate, zinc, cadmium, chloride (pH/EC assessed but not graphed if stable trend apparent). Where quality trends show a sympathetic rising trend (eg. Zn, EC, and Cl) for all parameters it is interpreted that evapo-concentration process are occurring, reflecting natural salinisation of the water body due to containment (water storage).

5.2 Assessment of Noise and Air Monitoring Data

The laboratory testing for dust monitoring was carried out by Australian Laboratory Services Pty Ltd. Air and gas monitoring is conducted by Veolia Environmental Services. The results are presented in Appendix G.

5.3 Information Review

The information reviewed by E2W for the Woodlawn Bioreactor site includes numerous reports and investigations conducted by previous consultants;

- Douglas Partners Pty Ltd, September 1999. Report on Quarterly Water Quality Monitoring (DP, 1999).
- Golder Associates Pty Ltd, August 2006. Phase I Environmental Site Assessment Former Woodlawn (included in Volume 3).
- Final Report. Site Hydrogeological Evaluation Woodlawn Mines, New South Wales July 1997 (included in Volume 3).
- Woodward-Clyde Pty Ltd, February 1999. Woodlawn Waste Management Facility Environmental Impact Statement Woodward-Clyde February 1999 (included in Volume 3).
- Collex Pty Ltd. Woodlawn Bioreactor Alliance Report 08/04/2003.
- Veolia Environmental Services Pty Ltd, 2006. Annual Environmental Management Report (SML20) 2005-2006.
- Collex Pty Ltd, November 2005. Annual Environmental Management Report (SML20) 2004-2005.

- Woodward Clyde Pty Ltd, July 1997. Site Hydrogeological Evaluation, Woodlawn Mines, NSW (included in Volume 3).
- Woodward Clyde Pty Ltd, January 2000. Water Management Plan Woodlawn Waste Facility (included in Volume 3).
- Woodlawn Mines Pty Ltd. 2004. Annual Environmental Management Report for the Year Ending 30 June 2004.
- Woodward Clyde Pty Ltd, February 1999. Woodlawn Waste Management Facility Environmental Impact Statement (Volume 1 – Main Report) (included in Volume 3).
- Woodlawn Mines Pty Ltd. 2 August 2001. Annual Environmental Management Report for the Year Ending 30 June 2001.

A summary of the monitoring locations, frequency and laboratory testing suite is provided in the EPL (summarized in Appendix A and C).

6.0 LICENSING & MONITORING OBJECTIVES- WOODLAWN BIOREACTOR

The Woodlawn Bioreactor and Intermodal facility is controlled by EPL 11436, and EPL 11455, respectively. The monitoring locations (water, dust, noise) are presented in Appendix A (i.e. summary of test locations) and Figures 3A and 3B.

The key parts of Veolia's monitoring activities at Woodlawn are summarized below.

6.1 Water Monitoring

The monitoring locations (surface water, groundwater, air) are presented on Figures 3A, 3B and Tabulated in Appendix A (i.e. EPL monitoring locations and analyses).

The objective of water monitoring is to measure if there are any changes occurring in groundwater or surface waters that may indicate contamination that can be directly attributed to the Site.

As the site is located in a mineralized area (massive sulphide ore body) naturally elevated concentrations of heavy metals and acidic water can occur naturally in the groundwater and surface water system. Therefore, establishment of water quality trends over time is fundamental to assess compliance with the criteria (no change, nil discharge).

EPL 11436 outlines that 'there is to be no pollution of surface water or ground water'. Therefore, the objectives are the same to monitor any change rather than against any set limits.

There are only two set limits for water quality on site and that is for waters to ED3 (TOC of 1 mg/L and ammonia 0.03 mg/L). Veolia are currently applying to modifying the licence regarding discharge to ED3 to further expand on evaporative control measures.

Over the past 3 years monitoring has taken place as outlined in the Landfill Environmental Management Plan (LEMP) and Environmental Protection Licences for Woodlawn and Crisps Creek. Veolia compliance report for the monitoring activities (2004 to 2007) is attached in Appendix C.

According to the EPL, the Annual Return is to include a graphical representation of all monitoring data and an analysis of the data to determine whether activities at the premises are impacting on the environment.

6.2 Leachate Management

The mine void must be managed to ensure the groundwater gradient directs groundwater flows toward the mine void, unless otherwise approved in writing by the DECC.

Veolia is permitted to transfer up to 40 megalitres of Acid Mine Drainage and leachate mixture from the landfilled waste for storage in the purpose built dams named ED3N-1, ED3N-2 and ED3N-3 (Appendix J). Water from the West Ridge Catchment does not drain into the mine void.

Other aspects of the EPL and leachate management include:

- O6.2 Evaporation Dam 3 must not receive water stored in the Waste Rock Dam.
- O6.3 Stormwater in the mine void must only be discharged into Evaporation Dam 3, or used for operational purposes within the landfill such as bioreactor water and dust suppression as approved in writing by the EPA.

Water monitoring is performed in two sediment holding ponds (ponds 2 and 3) which are located adjacent the haul road into the void. Monitoring of leachate quality occurs from the leachate dam.

6.2.1 Volumes in ED-3

- Whenever the volume of water stored in Evaporation Dam 3 exceeds 323ML, the licensee must notify the EPA in accordance with the requirements of R2 and provide a written report to the EPA within 1 month. This has not occurred since operations began in 2004.

6.3 Air and Dust Monitoring

The parameters and results for dust and gas emissions for the Sub surface gas monitoring and surface gas monitoring (methane % by volume), volume flow and temperature from the gas flare is attached in Appendix H & I.

All conditions have been complied with by Veolia. The landfill gas engine has not been commissioned at the Woodlawn site.

6.4 Landfill Gas Collection & Monitoring

The licensee shall ensure that as much landfill gas as is practicable is collected and treated by flaring or beneficially used in the landfill gas fired power station.

- O11.2 The flare system must provide a destruction efficiency of volatile organic compounds, air toxics and odours of not less than 98%. The flare must be at ground-level and shrouded. The flare must be provided with automatic combustion air control, automatic shut-off gas valve and automatic restart system.

- The landfill gas fired power station must provide a minimum destruction efficiency of 98% for volatile organic compounds, air toxics and odour, and the discharge point(s) must be designed (i.e. stack height, diameter, discharge velocity etc.) to ensure that the design ground-level concentration criteria specified in the following tables are not exceeded at any location at or beyond the boundary of the premises.

All conditions have been complied with by Veolia.

6.5 Noise Monitoring

The noise limits for Woodlawn are as follows

- L6.1 Noise from the premises must not exceed 35 dB(A) LAeq (15 minute) at the most affected residential receiver.

- Where LAeq means the equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

Since commissioning of the Woodlawn site no noise monitoring has been conducted, as no complaints have been received.

6.6 Metereological Monitoring

M7.1 The licensee must undertake the following monitoring of meteorological parameters in accordance with the methods and frequencies specified in the table.

EPA Point No.	Parameter	Units of measure	Averaging Period	Method[1]	Frequency
15	Wind Speed @ 10 m	m/s	1 hour	AM2 & AM-4	Continuous
15	Wind Direction @ 10 m	°	1 hour	AM-2 & AM-4	Continuous
15	Sigma Theta @ 10 m	°	1 hour	AM-2 & AM-4	Continuous
15	Temperature @ 10 m	K	1 hour	AM-4	Continuous
15	Temperature @ 2 m	K	1 hour	AM-4	Continuous
15	Solar Radiation	W/m^2	1 hour	AM-4	Continuous
15	Rainfall	mm	24 hours	AM-4	Continuous
	Additional requirements		**Method**[1]		
15	Siting		AM-1 & AM-4		
15	Measurement		AM-2 & AM-4		

Note [1]All methods are specified in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

All conditions have been complied with by Veolia.

7.0 LICENSING & MONITORING OBJECTIVES- INTERMODAL FACILITY

The location of monitoring locations at the Intermodal Facility is presented in Figure 3B, and summarized in Appendix A.

7.1 Surface water

Surface water monitoring is conducted at three locations (2 upgradient) and 1 downgradient locations (i.e. 110. 130, 150). Some of the surface water control measures for the site are as follows:

- O4.1 Paved and sealed areas must be provided with a first flush stormwater management system designed to capture the first 15 millimetres of stormwater for each square metre of catchment area. The paved and sealed areas must also extend to include any rail unloading areas.

- O4.2 All areas that involve the handling of containerised waste including container transfer and handling areas, clean container storage areas and internal roadways must be sealed.

- O4.3 Contaminated storm water and any sludges collected at the premises must be disposed of at the Woodlawn Bioreactor Facility (Environment Protection Licence No. 11436).

- O4.4 There must be no vehicle or container wash down at the premises.

- O4.5 All sewage generated on the premises must be disposed of into the sewerage system at the Woodlawn Bioreactor Facility (Environment Protection Licence No. 11436).

- O4.6 Uncontaminated storm water collected by the first flush system may be applied to vegetated areas at the premises in a manner that does not exceed the capacity of the areas to effectively utilise the storm water.

All conditions have been complied with by Veolia.

7.2 Air

Air monitoring is required at the nearest residential receptor. No limits are provided, however any changes are to be investigated. The noise and dust monitoring locations are presented in Figure 3B.

7.3 Waste

- L5.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.
- L5.2 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.

All conditions have been complied with by Veolia.

7.4 Noise Limits

- L6.1 Except as provided in condition L6.2, noise from the premises must not exceed an LAeq (15 minute) noise emission criterion of 35 dB(A) at the most affected residential receiver.
- L6.2 Noise emissions from freight trains entering and leaving the premises must not exceed the noise limit of 45 dB(A) LAeq (15 minutes) prior to 7:00 am and 50 dB(A) LAeq (15 minutes) after 7:00 am. These limits apply only where there are no more than two freight trains entering and leaving the premises per day, otherwise the limit in condition L6.1 applies.

All conditions have been complied with by Veolia since commissioning of the site and no noise monitoring has been conducted as no complaints were received.

7.5 Dust Control

- O3.1 All operations and activities occurring at the premises must be carried out in a manner that minimise dust at the boundary of the premises.

All conditions have been complied with by Veolia.

8.0 WATER MANAGEMENT- WOODLAWN BIOREACTOR

Woodlawn is a "zero discharge site" which means that water in contact with disturbed areas such as the mine void and plant area is captured and contained on site. A detailed description of the water management system is contained in the Landfill Environmental Management Plan (LEMP) for the Woodlawn Bioreactor (Collex, 2004).

Within the Woodlawn site there are two areas of water management – the Mine Lease Area (SML20) and the Environment Protection Licence area (EPL 11436). Water within these areas can be split into three main types, as follows:

1. Acid Mine Drainage (AMD) - Low pH with high salinity and metals
2. Landfill Leachate - High organics and nutrients
3. Clean water - Comprises rain and fresh bore water

Within the Mine Lease all clean water is directed off site while all waters from contaminated areas are stored on site for evaporation. The long term climatic data at Woodlawn indicate that evaporation exceeds rainfall on an annual basis. The climate (~1400mm evaporation far exceeds rainfall ~690mm) at the Woodlawn site supports the evaporation strategy implemented at the site.

Rainfall flowing down the walls of the void become contaminated with AMD are pumped to two holding ponds (**Pond 2 and Pond 3** part of EPL requirement) constructed on the haul road in the void and then ultimately out of the void to Evaporation Dam 3 (ED3). Recently (2005) the water contained in ED3 has become contaminated with landfill leachate. Since the contamination event, ED-3 has been split into three sections, ED3N which contains leachate contaminated AMD, ED3S which now contains storm water AMD from the walls of the void, and ED3N Lagoon 1, which is currently temporarily storing AMD leachate from within the waste.

The surface water storage volumes measured onsite (Veolia, AEMR 2006-2007) are summarised in Table 8.1. The storage volumes for ED3 are presented in Appendix J.

Table 8.1: Water volumes stored onsite.

Water Storage	Quality	Volumes held (ML)		
		July 2006	June 2007	Storage Capacity
Plant Collection Dam	Varying quality (contaminated)	1	1	60
Evaporation Dam 1	Contaminated	<200	<200	1345
Evaporation Dam 2	Contaminated	<150	<150	846
Evaporation Dam 3 (N)	Contaminated	<45	<45	183
Evaporation Dam 3 (S)	Contaminated	106	<50	183

Reference: Veolia, AEMR 2006-2007. Storage in ED3 was below the 323 ML EPL requirement from 2004 to 2007.

Inputs (volume and water quality) to the void are summarized in Appendix K.

8.1 Void

Water management within the mine void has changed due to the construction of the Bioreactor in 2004.

Inflows into the void include incident rainfall, landfill materials, and groundwater seepage. Recent seepage monitoring undertaken by Veolia indicate approximately 1-2 L/sec of inflows occurs consistently at primarily 2 locations (Figure 1). The location of the seeps is interpreted to correlate with fault zones identified during former mining activities.

Outflows from the mine void include evaporation and frequent pumping of stormwater to Evaporation Dam 3. Recirculation and management of leachate from the landfill/void is required to lower water levels and to maximize gas production.

Storm water collection within the void is a key aspect of Bioreactor operations, as acid rock drainage is prevalent within the mine void due to exposed sulfides. The contact of this low pH water with the waste in the Bioreactor can be detrimental to Bioreactor performance.

Two large ponds (Pond 2 and Pond 3) provide storage capacity for short duration high intensity storm events, while pumps are used for longer duration rainfall events. Additional smaller interception sumps and pumping systems are located below Pond 2. The LEMP contains a full description of the mine void water management system.

Water collected in the ponds (Pond 2& 3) is pumped automatically to ED3.

9.0 THE WOODLAWN BIOREACTOR SYSTEM & MONITORING NETWORKS

The monitoring locations (air, noise, surface water and groundwater) are shown on Figures 3A and 3B. The details of the Void and ED3 area are presented in the subsections below and in Figure 1 and 5.

9.1 Void

The landfill void is a distinctive large scale open cut mine (void) with unique hydrogeological conditions (i.e. inward hydraulic gradients, Figure 5).

The open cut mine void (1978-1989) where landfill is occurring has a massive storage (approximately 25 million m3). The void consists of a number of benches and a haul road intersecting variable bedrock, and the base of the void contains highly acidic sulfate rich water. The base of the void is at approximately 630 m relative to Australian Height Datum (AHD) with the low point of the rim of the void at around 800 m AHD.

The mine void (200m below ground) acts as a hydraulic trap (groundwater sink) for the groundwater due to the depth of the void (200m depth, whilst surrounding discharge creek systems are much ~100m shallower), and intersection of the water table. Flow into the void is primarily via fractures/faults and seepage ports (horizontal bores through the slopes).

Once the void is filled with waste and leachate extraction ceases the groundwater flow system will recover and merge with the prevailing regional flow regime. Rehabilitation of the void (50yrs time) and subsequent leachate management measures (eg. pumping) will determine the extent of groundwater migration from the void.

Monitoring Well Network

Four deep groundwater monitoring wells (WM1, 3, 4 & 7) were installed within the mine void perimeter (August 2003, Note: WM5& 6 were installed outside the void) in order to assess groundwater quality and water levels prior to and during the bioreactor operations. These wells are sampled quarterly as per EPL conditions to determine baseline water quality data to monitor impacts from landfill operations.

Sampling of the four wells began in August 2003. The analytical suite is presented in the EPL licence for Woodlawn Bioreactor (**Appendix A, and C**). Well construction details are summarized in Appendix B for all EPL wells (where available, Figure 3A).

Twelve piezo-meters are also monitored (water levels) in the Void and include:

- P100A/B, P44A/B, P45A/B, P38A/B, P58A/B, and P59A/B (no borelogs are available),

Surface Water (Void)

Catch Drains run either side of the length of the haul road. During a rainfall event, water collects in these drains and is carried to either Pond 2, Pond 3 or to a constructed clay pond at the northern end of the Void . Water is then pumped progressively via Pond 2, Pond 3 a holding tank and then on to Evaporation Dam 3 (Reference: Woodlawn Bioreactor Alliance Report 08/04/2003).

9.2 Evaporation Dam No. 3 (ED-3)

Evaporation Dam No. 3 was formed in approximately 1991 by the construction of several low embankments and diversion drains around the perimeter of an area which had been used to source clay borrow for the capping of the Woodlawn spoil piles. (Woodlawn Mine, Evaporation Dam No. 3 Surveillance Report, URS November 2001).

The total storage capacity of the three cells is 366ML (@ 2001, Figure 3A. The storage at ED-3 is subdivided into three cells (northern cell- 7ha, Central cell-8ha, South cell-2.8ha):

Veolia are currently modifying the storage dams at ED-3 to allow separation of different water types.

Veolia are planning to modify the extraction system (landfill leachate and acid mine drainage) from the landfill void to improve bioreactor performance and gas generation from the waste. This will include the temporary storage of leachate and AMD in ED-3 (i.e. the ED-3 lagoon) in the near future (October 2007). The temporary storage will be in a specially constructed lagoon of approximately 0.5 ha in area, and located to the north of ED-3 North. Another two ponds of similar size will be constructed for further storage potential (all new ponds will be clay lined). An updated leachate treatment system will be developed for the long term leachate and AMD management (November 2007).

Monitoring Well Network

Wells located in vicinity of ED-3 are summarised as follows:

- Shallow wells (<6m): MB10, MW6, MW7, ED3B
- Deep wells (~25m): MB1, MB4, MB6, MB7

(Note: MW6 was damaged well and replaced in November 2007. An additional four wells MW8S/ MW8D, MW9S, MW10S were installed downdradient of ED-3N during October and November 2007).

Surface Water Monitoring Locations

Surface Water monitoring is undertaken at two locations within ED-3:

- ED-3 North (WM203)
- ED-3 South (WM202)

Surface water is monitored downgradient of ED-3 south at location WM200 (reflects downstream area together with the waste rock dump). ED-1 (location ED1) is the surface water receptor downstream of ED-3.

Surface water samples are routinely collected from two locations at the Disused Plant Area (i.e. WM201) which reflect modified drainage systems. The DPA consists of the demolished remains of the former plant area from the mine processing equipment and associated infrastructure.

- Location "Spring 2" is at Crisps Creek (upstream of Bioreactor and opposite of Crisps Creek)) and flows during wet weather.

Surface Water sample locations which may receive discharges from the Void or ED3 are summarised below (Part of EPL):

- Site 105 Crisps Creek - Pylara Boundary (i.e. Bioreactor EPL requirement) which downstream of the Void and tailings impoundments.

- Site 115 is at the Woodlawn/Willeroo boundary to the north (i.e. Bioreactor EPL requirement) and situated downstream of the ED2 (& part of ED1, ED3N) water storage systems.

9.3 Air and Gas Monitoring Locations

The air and noise monitoring locations are presented on Figure 3A and 3B.

- Dust monitoring is performed at two locations (DG22, DG24) within the Woodlawn Bioreactor Site (i.e. east and west of the Void), and one location (DG28) situated off site at the nearby Pylara Farm.
- Surface gas monitoring is conducted on the landfill surface within the Mine Void.
- Subsurface Gas monitoring is conducted at 3 locations around the perimeter of the Mine Void. For reasons undetermined, only3 of the 4 monitoring locations where installed in a previous reporting period. Thus only 3 Gas Monitoring Bores are able to be assessed for methane during the reporting period, this includes GMBH1, which is located on the northern side of the void, GMBH2 located on the eastern side of the mine void, GMBH4 located on the western side of the void (Figure 3A).
- Noise monitoring locations are not situated within the Woodlawn Bioreactor site (i.e. only required near neighbouring residences).
- Landfill Gas Flare is situated at the edge of the disused plant area, adjacent to the current Power Generation Hub. The function of this flare is to destroy landfill gas generated with the bioreactor.
- Landfill Gas Engine is situated at the edge of the disused plant area, within the Power Generation Hub.

10 INTER-MODAL FACILITY (IMF) SYSTEM & MONITORING NETWORK

The Intermodal facility is designed to transfer containers of waste (28 tonnes) from the railway to trucks. The trucks transport the waste to the Woodlawn Bioreactor. All containers (54 per day) are shifted by container handler forklift onto the trucks and back onto the rail when they have been emptied.

The IMF covers a length of approximately 500m along an existing railway. The surface water, noise and air monitoring locations are shown on Figure 3B and in the sub sections below. Monitoring wells are not available at the IMF.

10.1 Surface Water

The site is well downstream from the mine and is influenced by many general factors. The hill slopes surrounding Crisps Creek feed a confined alluvial aquifer, which further downstream becomes unconfined with discharges to the creek surface water system, and to boggy areas adjacent to the creek.

Surface water samples are routinely collected from three downstream locations (i.e. 110, 130 and 150). The EPL requires sampling only from two locations (110 and 150).

- Site 110 is situated at Crisps Creek approximately eight kilometres downstream from the mine immediately upstream from the Crisps Creek/Mulwaree River confluence and the Intermodal Facility.
- The site 110 and 130 is identified as an upstream monitoring point for the Intermodal Facility.
- Location 150 is situated on the Mulwaree River and approximately 2.5 km downgradient of the IMS (Figure 3B).

10.2 Dust

- Dust monitoring is performed at one location (DG18) at the IMF and is situated at the nearest residential building to the Intermodal facility. Due to the low dust depositions recorded and as the initial construction of the facility has been completed, the EPA has determined that DG18 will no longer be a licence requirement, and as of February 2007, this gauge was removed from the monitoring schedule.

10.3 Noise

- Noise monitoring is assessed when required at the nearest residential receptor, which is situated to the north of the IMF (noise monitoring performed only if complaints are received).

11.0 ASSESSMENT OF THE MONITORING RESULTS

The Woodlawn Bioreactor and Intermodal facility are assessed with regard to the pollutant source, pollution migration, and adequacy of the associated monitoring activities.

11.1 Woodlawn Bioreactor

The location of the void and associated monitoring network is presented on Figures 1, 3A and 5. Assessment of the monitoring data is summarised in Appendices (D,E to K) and in the subsections below:

11.2 Review of Current Monitoring Data

Groundwater Quality Monitoring

Groundwater monitoring wells (WM1, 3, 4, 5, 6 & 7, MB1, MB4, MB6, ED3B) are monitored by Veolia on a quarterly basis to assess the baseline water quality data and levels in the void. The four monitoring wells (WM1,3,4,7) are located within the void and target the floor area (~200m depth) containing landfill waste (approximately 40m thick in 2007).

The wells (WM-5, WM-6, MB-6, ED3B) are located in vicinity of ED-3. Peripheral downgradient wells (MB1, MB4) are located between the void and Crisps Creek (Figure 3A, Appendix D).

11.2 Hydraulics & Flow Regime

Wells in the void are interpreted as downgradient locations given they are at an (artificial) regional discharge area.

The depth to water (mbgl and RL) measured in the piezometers and wells are presented in Time Series Graphs (Appendix D) and Tables 1A & 1B (Statistics). The water level time series graphs for all wells at the Bioreactor (as per EPL requirements as shown in Table 1 of Appendix A) are presented in Appendix D. The reduced water levels and inferred groundwater contours are presented in Figure 3A.

It is noted that perched groundwater and/or mounded groundwater levels are likely to be present in vicinity of large scale water storage (eg. ED3).

Differences in water depth are apparent in the 12 piezometers (piezo) and four wells which reflect well location and position on the steep drawdown halo (Appendix C). The water levels are hosted in variable bedrock formations which may be stratified and/or slightly fractured/faulted.

The 12 piezo and 4 monitoring wells show variable water level fluctuations, but generally a slight response to rainfall recharge. The time series graphs are indicative of the (tight) bedrock geology and generally low groundwater recharge conditions.

Several bore locations (WM3, WM2/7 and P44A, P110A, and P58B) show a more pronounced (>10m over time) water level change from rainfall recharge and interpreted to intersect faulting/fracturing. Fault planes and increased rainfall recharge is interpreted to cause the fluctuating water levels in the wells and piezo's (Figure 1, and Appendix C).

The RL of the water table in the 12 piezo located in the void range from 700m AHD (P100B) to 790 m AHD (P59A). The water level is approximately 20m to 100m above the current waste level of 680 m AHD, and leachate level at ~ 670m AHD.

The location of seepage points (from base of the void, & through horizontal conduits) and depth to water (piezometers/wells) clearly shows an inward steep cone of depression at the void (Figure 1, 5).

The water levels in the 12 piezo and surrounding wells indicate that the pumping from the base of void, or fluctuating leachate levels (waste 40m thick) have no obvious effect on the local water levels. The current data supports the impervious nature of the bedrock, and limited hydraulic connection of local groundwater and landfill leachate levels.

The inferred groundwater flow regime at the void is presented in Figures 1, 3C and 5. The flow regime is based on previous assessment by URS (1999) and E2W review of current (average) water levels from existing piezometers and monitoring wells (Tables 1A, 1B).

The groundwater levels in measured in wells outside of the Void (eg. MB1 to 17) show variable trends ranging from stable levels (MW15, 16, ED3B), variable and fluctuating (MB1, MB8, MB7, MB-12), however most wells (MB2, MB3, MB5, MB10, MB-11, MB-14 MB17, are showing a deepening of the water table.

The deepening of the water at some locations (MB10, MB2, MB5) are interpreted to relate to the depletion of water storages (ED1 or WRD), and/or mine cessation/rehabilitation works. The drought conditions in the past few years are considered to cause the deepening of the ground table on a regional scale.

11.3 Groundwater Quality & Trends

Piper tri-linear and expanded Durov hydrochemical diagrams for the four wells (MW1, 3, 4, 7) in the void are presented in Appendix D. The hydrochemical fingerprint from each well is different, indicating the contrasting hydrogeology in the void (i.e. tuff, dolerite, schist, sulfide ore body).

A summary of the water chemistry is as follows:

Groundwater

- WM1: Ca-SO4 water type, brackish (2 mS/cm), neutral pH (7)
- WM3: Ca –SO4 water type and relatively acidic (PH 3.5) and brackish (7 mS/cm)
- WM4: Ca/Mg-SO4, fresh-brackish (1.5 mS/cm), and pH neutral
- MW5: Na-Cl water type, brackish (5 mS/cm), and pH 7.5
- WM6: Na-Cl water type, brackish (8 mS/cm), and pH 6.5
- MW7: Ca-SO4 , brackish (4 mS/cm) and neutral pH
- MB-1: Ca/Mg-SO4 water type, fresh (1.85 mS/cm), and pH 7
- MB-4: Na-Cl water type, fresh (1.1 mS/cm), and PH 5.7
- MB-6: Na-Cl water type, brackish (2 mS/cm), and pH 6.5
- ED3B: Na-Cl water type, brackish (8 mS/cm), and pH 6.5

Discussion of Results & Trends

One well (MW7) shows a larger scatter of test points on Piper/expanded Durov diagram indicating potential (slight) mixing of water types (eg. rainfall, leachate, AMD).

The water quality trends presented in the time series graphs indicate a range of trends and fluctuations, with the significant water quality changes described below:

- MB-1: Concentrations of sulfate and Zn/Cd show a fluctuating trend from 1998 to 2002. Iron has an increasing trend since 2002 together with more alkaline pH conditions and a decrease in conductivity. MB1 has a larger scatter of sample points on the expanded Durov diagram indicating more recharge and flushing relative to other wells (MB2, 10 etc). The borelog (MB1) indicates that a fracture within dolerite bedrock was encountered at 21.5m depth.
- MW-3 and MW-7: In late 2005 a change in the water quality trend is apparent in the drop in conductivity and sulfate concentrations (& Zn for MW3), and a slight (temporary) rise in ammonia. The trends pre and post 2005 monitoring indicate a return of more stable water quality trends. The groundwater quality trends are interpreted to relate to earthworks (i.e. removal of several thousand tones of waste rock from the old haul road near WM3/portal during mid to late 2006) in the void which reduced the seepage in that area. The removal of the waste rock also affected the water level at MW3 during 2006.

Slight variations observed in key analytes (ammonia, Fe, Zn, SO4, pH, EC) in the remaining time series graphs of wells in the Void is interpreted to relate to the precision of the sampling procedures, difficulty in purging deep low yield wells, and collecting unstable anaerobic groundwater from the void. Variations in water quality are also anticipated from seasonal changes and rainfall recharge effects.

Based on the water quality trends (time series graphs of TDS, K, BOD, TOC, Ammonia, SWL) in surface water and available groundwater wells at ED3 area, E2W interpret that groundwater pollution has not occurred from landfill leachate to areas to the south, north and east of the ED3 evaporation dams. The status of groundwater conditions downgradient of ED-3N is not known as monitoring wells were only recently installed in November 2007.

- All pesticide results (OC/OP) from the surface and groundwater water monitoring locations were reported below laboratory detection limits.

11.4 Well Construction Issues

Construction details for the monitoring wells are presented in Appendix B (where available). It is noted that the floor of the mine is at RL 640 (240 mbgl), whilst the depth of waste is approximately RL 680m (40m deep). The void monitoring wells are generally terminated at 115m to 85m depth and target the base of the mine void (RL 630 to 670).

The bore depths and well construction design is considered to be suitable for the early stages of the bioreactor monitoring (eg. 60m of waste). However, as the void is progressively filled with waste and above (eg. >30m) the existing well screen intervals, additional stratigraphic (intermediate wells) are proposed for monitoring potential or actual groundwater pollution migrating from the void. However, it is well recognized that the potential for leachate escape from the void with the existing inward hydraulic gradient is very low.

11.5 Adequacy of the Monitoring Network

The monitoring of water quality within the void system is considered to be (currently) adequate (Figure 5). This interpretation is based on the following attributes:

- The void invert (240 m below ground level) is below the water table (~20m below ground) which induces a steep inward hydraulic gradient that produces a hydraulic trap (i.e. no escape of landfill leachate away from the void). As the flow is inwards, the wells need to demonstrate that the inward gradient exists, which is very clear based on the water level graphs and inferred flow regime (Figures 3C, and 5).

The monitoring network within the void demonstrates the inward hydraulic gradient (i.e. a hydraulic trap) and containment of the leachate within the void (Appendix C, Figure 5).

The monitoring network outside of the Void and ED3 is considered (recently) to be adequate, given that an additional 4 (deep/shallow) wells (MW8S/8D, MW9S, MW10S and a replacement of WM6) were installed downgradient of ED-3N in November 2007 (Refer E2W Earth2Water Pty Ltd, June 2007. Woodlawn Evaporation Dam 3 and Monitoring Issues).

11.6 Analytical Testing and Monitoring Issues

The analytical and field testing procedures are considered to be appropriate for the wells and surface water in the landfill. Some monitoring issues to consider for future monitoring include:

- Address the pH variations between field and lab measurements (up to 1 unit difference). Due to the anaerobic and reduced nature of the deep groundwater (in & around the Void) the short holding times for pH are difficult to overcome when laboratories are located offsite. Priority should be given to use of calibrated field instruments and measurements.

- The brief review of laboratory quality control results indicates laboratory QA/QC results are generally within acceptable range for all analyses, including the ionic balances, where undertaken.
- A quality control program (sampling protocol) should be implemented to check the laboratory data which is to include re-analyses of anomalous data (where present). The inclusion of blind field duplicates (1:20), and decontamination procedures would be beneficial to assess laboratory performance.

11.7 Recommendations (groundwater)

The existing well network and analytical program is considered to be satisfactory for water monitoring at the Woodlawn Bioreactor.

As the landfill material rises over time additional strati-graphic wells (eg. intermediate depth) are required to the monitor water quality with regard the prevailing waste level RL. Intermediate wells to monitor the groundwater at the void are proposed when the tip face is greater than ~30m above the existing wells screens.

E2W offer the following suggestions for improving the monitoring and laboratory results for the site:

- Low pH (MW3) – include all carbon species (carbonic acid is dominant at PH <4) for acidic groundwater conditions. Alkalinity, carbonate and bicarbonate species are not present at acidic pH.
- Field filtering and preserving of heavy metal samples in the field would be required to ensure representative dissolved metal concentrations. Appropriate containers should be provided by the laboratory that includes preservatives for unstable analytes (heavy metals, and nutrients).
- Monitoring wells should be purged of 3 bore volumes (if possible) or when field measurements (pH, EC etc.) are stable before sampling. Low flow purging techniques may improve the consistency of the monitoring results with the deep low yielding wells.

11.8 Assessment of Surface Water Monitoring Data

The requirements for the surface water monitoring is outlined in Appendix A and shown on Figures 3A, 3B and Appendix E. Surface water is collected from within the Void and surrounding water bodies and creeks.

- Ponds 2 and 3 (lined sediment ponds capturing runoff entering the void)
- Leachate Dam (use to collect and treat leachate at top of the Void)
- ED-3 North (WM203 ponded water in ED3N)
- ED-3 South (WM202 ponded water in ED3S)
- WM200: surface collected from the creek located downgradient from the waste rock dump, raw water dam and ED3S.

11.8.1 Surface Water Quality Results

A summary of the surface water chemistry is as follows:

- ED-3N (WM202): Mg-SO4 water type, brackish (12 mS/cm), acidic at pH 3
- ED-3S (WM202): Mg-SO4 water type, brackish (15 mS/cm), acidic at pH 3.5
- WM200: Na/Mg-Cl/SO4 water type, brackish (2 mS/cm), pH 6.5
- WM201: Na-SO4/Cl water type, fresh (1 mS/cm), and pH 6.6.
- Location 105: Na/Mg-Cl water type, fresh to brackish (1.4 mS/cm) and pH neutral (7)
- Location 115: Na-Cl water type, fresh (0.9 mS/cm), pH 7.5.
- Spring 2: Ca-So4 water type, fresh to brackish (1.5 mS/cm), pH 5.9.

Ponds (Void):

- Pond 2: Mg-SO4 , brackish (9 mS/cm) and acidic pH (3.9)
- Pond 3: Ca-SO4 , brackish (13 mS/cm) and acidic pH (3.7)
- Leachate dam: Mg/Na-SO4, brackish (22.7 mS/cm), and acidic (PH 4.8)

The surface water monitoring data and statistics (min, average, max, standard deviation) is summarized in Tables 2 to 4, and within Appendix E.

11.8.2 Discussion of Results

All pesticide results (OC/OP) from the surface water monitoring locations were reported below laboratory detection limits.

- Water quality at Ponds 2 & 3 show variable but generally rising trends for iron. PH and sulphate levels are variable over time indicating that potentially waste rock (containing pyrite) is impacting runoff entering the Void and holding ponds.
- Most parameters are relatively stable with surface water, with possible exception of iron which is rising slightly. Elevated metals are also reported at WM201 (Zn). The high metal concentrations at WM201 may represent background levels or impact from the DPA.
- Location 115 (surface water at downstream area) results also show a fluctuating trend for Zn, Cd, and sulfate. The trend is interpreted to reflect variable flow conditions due to climate. The creek system is ephemeral and considered to be primarily a losing stream since mine closure.
- Spring 2 shows decreasing trends for majority of key parameters (EC, SO4, Cl, Zn, Fe), however the water has become more acidic (~2 pH units) over time (but stable pH over past 2 years). As the spring 2 location is upstream of the dams and Void, the spring may represent background changes due to the drought.
- The time series graph for location 105 indicates fluctuations (but generally stable) of key parameters over time reflecting the contribution of runoff, evaporation processes and groundwater baseflow.
- E2W understand that the discharge into the dams (ED-3N, ED-3S) from 2005 represents a combination of acid mine drainage (AMD), and landfill leachate. Generally, the two water types are separated in the evaporation dams, however it is understood that the programmed pumping from the under liner drainage sump in the landfill void resulted in the mixing of leachate and AMD, which was inadvertently pumped into the ED3 system. The mixing of AMD/leachate (high nutrients/TOC) is indicated in ED-3 South in early 2005, and late in 2005 for ED-3 North (Appendix E).

The landfill leachate (ED3S/ED3N- maximum concentrations) is characterized by the following:

- Ammonia =178 mg/L

- Total organic carbon = 798 mg/L
- BOD =1020 mg/L
- Potassium =120 mg/L

The surface water quality does not appear to have impacted the local groundwater quality. The time series graph for location WM200 indicates the following trends:

- Rising sulfate, zinc, manganese and cadmium trends are noted from 2004 to date. As chloride trends are stable over time, the rising trends are considered to reflect pollution of seepage waters (runoff or groundwater). No monitoring wells are located in the vicinity of WM200 to assess if the pollution results from groundwater.

The trends observed at WM200 may arise from polluted discharge from two creek catchments (i.e. ED3S, and dolerite stockpile area/waste rock dump).

11.8.3 Adequacy of the surface water monitoring network

Due to the dynamic nature of the surface water monitoring additional details are required with sampling (climate, flow rates, turbidity). The sampling locations are considered to be generally satisfactory, however timing of the sampling events should be co-ordinated with representative dry and wet periods to better characterize the nature of potential pollutant source(s).

11.8.4 Recommendations (Surface Water)

- Include additional sampling details regarding the climate and flow regime at time of surface water sampling.
- Collect additional surface water samples upstream of WM200 to locate the source of the rising (SO4, Zn, Mn, Mg) water trend (i.e. ED3S or WRD, water trend may relate to the capping material using on the WRDump and/or reflect the rising SO4, Zn, Mn, Mg trend at ED-3S) .
- Investigate the changing PH of Spring 2 and confirm if the water is becoming more acidic over time and identify potential causes.

11.9 Dust

- Dust Gauge 24, is situated on the western side of the mine void and in close proximity to where earth works have occurred in past few years. With subsequent activities being reduced, a reduction in dust deposition has also occurred.

- Dust Gauge 22, is down wind of DG24 on the eastern side of the void. This dust gauge has shown lower readings than DG24 during the same reporting period, which suggests that localised dust from the earthworks are not travelling far.

- Dust Gauge 28 is situated at an offsite location at Pylara farm; the results achieved suggest that dust generated from Woodlawn has not migrated offsite.

11.10 Landfill Gas Management

A key aspect to the Woodlawn Biroeactor is the control and utlisation of the landfill gas. Landfill gas is produced as a by-product of the decomposition of organic matter in waste. Methane production typically begins 6 to 12 months after waste placement and may last for decades. Landfill gas generally contains methane, carbon dioxide, nitrogen and trace elements of hydrogen sulphide and oxygen. Landfill gas migration and emissions are assessed by Veolia at varying locations to determine the correct method of control and ensure that emissions do not pose adverse risk to public health and safety (Reference: LEMP, Collex, August 2004). Gas extraction infrastructure developed at the Woodlawn is used to mitigate the effect of gas emissions into the surrounding environment. Monitoring locations around the site and used to determine the effectiveness of the extraction system.

11.11 Subsurface Gas

Subsurface gas monitoring is conducted at 3 locations around the perimeter of the void, and used to assess if landfill gas is migrating through the soil and rock profile beyond the mine void. As Methane is the main constituent of landfill gas, assessing concentrations of this gas is monitored and recorded. Monitoring is conducted quarterly as per the guidelines as specified in the approved methods for sampling and analysis of air pollutants in NSW.

Methane concentrations achieved this reporting period have shown that no landfill gas is being detected at the subsurface locations, indicating that gas migration is not occurring (Appendix H).

11.12 Surface Gas

Surface gas monitoring at the Woodlawn bioreactor is used to assess gas migration out of the waste mass and into the surrounding environment. Monitoring is conducted quarterly as per the guidelines as specified in the approved methods for sampling and analysis of air pollutants in NSW.

Similar to subsurface gas monitoring, methane is the measurable pollutant as determined by the DECC. Results achieved during this reporting period are below the notafiable level of 1.25% by volume. With the highest reading recorded being 0.4% (Appendix H).

During the reporting period, an independent analysis was conducted by GHD to assess the level of gas extraction and efforts to mitigate the migration of methane into the atmosphere. GHD calculated that 92% of the methane is captured, this is a good outcome considering that a conventional landfill gas capture is 70-75% (Inside Waste, WMAA, Sept/Oct 2007, page 23).

11.13 Landfill Gas Flare

The landfill gas is collected by active extraction and combusted through an enclosed high temperature flare. The flare system provides a means of destroying the landfill gas compounds. Gas flow and temperature are recorded in accordance with the approved methods specified by the DECC.

During the reporting period, monitoring of the flare has been conducted to assess the gas extraction potential from the bioreactor. The landfill gas flare at full operational capacity is designed to burn 1500m^3/hr of landfill gas. The data recorded during this reporting period has showed that gas extraction volumes have been on the increase, however not at level to reach the maximum operational capacity (Appendix I).

With the increase in gas production from the bioreactor, the ability to burn more landfill gas through the flare has been possible. Additional burners have been progressively installed in the flare to increase the operational potential. Monthly temperature and flow volumes have reflected the increase in gas yield (see Appendix I). A gas flow meter was installed in August 2007, to accurately measure gas flow volumes delivered to the flare. As production reaches the 550 to 600m^3/hr, Veolia will be ultilising the gas for power generation.

11.14 Landfill Gas Fired Engine

The Woodlawn Bioreactor is designed to encourage the decomposition of waste, which in turn promotes the development of landfill gas production. When suitable volumes of gas is achieved, power generation become feasible, thus landfill gases will be converted to electricity utilising the landfill gas fired engine. Landfill gas will be delivered by a positive displacement blower, which will then filter the gas prior to being used as a fuel in the engine.

During the reporting period, the landfill gas engine was not commissioned to generate electricity and thus no monitoring was conducted. Power generation is set to occur in the next reporting period. Monitoring will be conducted as specified by the licence conditions at the discharge point at the Generation Hub.

12.0 INTERMODAL FACILITY (IMF)

The location of the IMF is presented on Figure 3B. The monitoring data is limited to three surface water monitoring locations (110, 130, 150) on Crisps Creek (note: only 2 locations are required for the EPL). The monitoring data and graphs is presented in Appendix F, Table 4 (statistics) and in the subsections below.

12.1 Review of Current Monitoring Data

Monitoring wells are not available at the IMF. The surface water monitoring locations are as follows:

Surface Water

- Site 130: This site was commissioned in 2002 to assess water quality upstream from the Intermodal Facility in the Mulwaree River before the confluence at Crisps Creek. The site was sampled six times during 2006/2007 for a wide range of parameters. Results from 130 are used to assess downstream water quality from the Intermodal site.
- Site 150 is located on the Mulwaree River approximately 2 km downstream from the Intermodal Facility. Quarterly monitoring has been undertaken from 1998 to 2007 for a broad range of analyses.
- Site 110 is located on Crisps Creek downstream at the bridge crossing on Bungendore Road. Quarterly monitoring has been undertaken from 1993 to 2007 for a broad range of analyses.

A first flush system and monitoring is also undertaken by Veolia at the IMF.

Noise & Dust

The noise and dust monitoring data is available for the following location (refer to Figure 3B):

- DG18 is located at the Chinnery.

Due to the low dust depositions recorded and as the initial construction of the facility has been completed, the EPA has determined that DG18 will no longer be a licence requirement, and as of February 2007, this gauge was removed from the monitoring schedule (Appendix G).

Noise measurements were not undertaken during the operation stage given that there were no registered noise complaints from neighbours throughout the reporting period. However, should any construction occur at the facility, noise monitoring would be conducted as per the LEMP and the conditions of consent.

The results of the noise and dust monitoring are provided in Appendix G (DG18). Exceedance of the EPL limits is not indicated by the monitoring data from 2004 to 2007.

12.2 Water Quality & Trends (surface water)

The statistics and time series graphs for the IMF monitoring data are presented in Appendix F and Table 4. The water chemistry for the surface water locations are summarized below.

- 150: Na-Cl water type, fresh (0.5 mS/cm), and pH 7. The water monitoring data indicate rising trends for TOC, reactive phosphorous, and potentially iron, whilst other parameters are relatively stable and/or fluctuating.
- 110: Na-Cl water type, fresh (1 mS/cm), and pH 7. The water monitoring indicate rising trends for zinc, and reactive phosphorous, whilst other parameters are relatively stable and/or fluctuating.
- 130: Na-Cl water type, fresh (0.5 mS/cm), and pH 7. The monitoring data indicates slightly rising trends for sulphate, iron, conductivity and reactive phosphorous. Other parameters fluctuate and/or are relatively stable.

The surface water monitoring indicate potential nutrient pollution from the IMF. Other sources of nutrients could arise from the agricultural catchment (farming activities) and evaporation processes. The monitoring data should be observed closely in the near future to assess the nutrient sources in the catchment (eg. fertilizer application). However, the first flush monitoring results from the IMF indicate that nutrients are relatively low and with stable trends (TOC, ammonia, P)

12.3 Adequacy of the Monitoring (IMF)

The monitoring at the IMF is considered to be generally adequate due to the nature of the sampling locations (i.e. up and down gradient of the IMF). However, the downstream location (150) could be situated closer to the IMF site (eg 200m downstream) to minimize (nutrient) contribution with the surrounding agricultural areas.

Monitoring at the IMF should be undertaken during dry and wet periods to assess potential impacts to the aquatic environment. Potential leakage from the waste containers would be picked up in the first flush system, however this is not evident in water quality testing (Appendix F).

12.4 Analytical Testing and Monitoring Issues (IMF)

Analytical and field testing suite is provided for the IMF from the 1990's to 2007 for 110 and 150, whilst 130 data commences in 2004. The monitoring program currently includes major ions, metals, nutrients, PH, EC which are appropriate parameters for the IMF.

E2W offer the following suggestions for improving the monitoring and laboratory results for the site:

- Provide QA/QC for PH and EC field measurements (calibration records, instrument models etc).
- Record flow, climate and water conditions (algae, turbidity etc) at each location and compare with the first flush water quality.
- Include "total" metal concentrations for surface water analyses (dissolved metals is mainly for groundwater).

12.5 Noise and Air Results

- As the construction phase of the IMF was completed in 2004, the associated dust and noise emissions of the operations have been reduced. Considering the low deposition results recorded at DG18, the EPA determined that dust monitoring was no longer a licence requirement, and such was removed from the monitoring schedule. As Veolia has not received any complaints associated with noise, no monitoring as occurred, showing that IMF operations are having minimal impact on the surrounding community.

12.6 Recommendations (IMF)

The recommendations for the IMF are as follows:

- Samples should be collected according to climate (dry/wet) as much as possible with details recorded regarding the nature of flows and any observations (algae, odour, turbidiy, debris).
- Due to the rising TOC and reactive phosphorous water trends at the downstream location (150), it is recommended that the monitoring location is moved closer to the IMF (ie. 200m downstream of the IMF).

12.0 COMPLAINTS

A total of five complaints were received regarding the Woodlawn Bioreactor during the reporting period, however no complaints were reported for the Crisp's Creek Intermodal Facility. These complaints concerned odour being detected locally. Meteorological data was used to establish prevailing wind conditions and assess the bioreactor's potential to have impinged upon the local ambient air quality.

In the previous reporting period, investigation into the complaints discovered the odours were emanating from Evaporation Dam 3. Veolia subsequently completed trials to inhibit odour from this source, resulting in the decrease in amount of odour complaints. Table (12.1) below outlines the complaints received in the reporting period.

Table 12.1: Complaints Register 2005-07

Date:	Time:	Complaint:	Location:	Veolia response:
9/9/2006	10.01am	Odour	Collector Road	Called complainant 5 times, with no response
20/4/2007	9.30am	Odour	Taylor's Creek Road	Complainant is working with Veolia to notify any incidents of odour
7/5/2007	12.00pm	Odour	Taylor's Creek Road	Complainant is working with Veolia to notify any incidents of odour
7/5/2007	12.00pm	Odour	Taylor's Creek Road	Complainant is working with Veolia to notify any incidents of odour
4/6/2007	12.30pm	Odour	Tarago - Village	Complaint was received by GMC.

In light of the previous odour incidents recorded in the previous reporting period. Veolia has been working with local residents in identifying when an odour is detected, and types of odour. Veolia is encouraging locals to visit or call the bioreactor directly, or voice there concerns to the community liaison committee which regularly meet to discuss various operations. Each complaint was investigated and details were formally recorded on the complaints register and Hippo Station, and followed up in accordance with the pollution complaints procedure, both of which are part of VES' National Integrated Management System.

With the development of the leachate treatment system in the future Veolia will continues with open communications with the local community. Improved communications with local residents will occur by placing articles in the local paper to keep locals informed with site activities.

13.0 POLLUTION STUDIES AND REDUCTION PROGRAMS

In reference to the conditions outlined in the Pollution Studies and Reduction Programs for the Woodlawn Bioreactor EPL 11436, the following provides an update for the reporting period.

- U1 – Barrier System for the Adits/Portals.
  - U1.1 - Submission changed to 31st July 2008

- U2 – Groundwater Monitoring.
  - U2.1 – Complete – May 2006
  - U2.2 - Submission date changed to 1st December 2008
  - U2.3 – Complete – May 2006

- U3 – Calibration of Water Balance to ED3.
  - U3.1 – Complete – May 2006

- U4 – Trial of Alternate Daily Cover.
  - Completed – October 2005

- U5 – Trial of Alternate Daily Cover #2 – Water Treatment Plant Sludge.
  - Complete – October 2006

- U6 – Rectification Works – Leachate Contamination of Stormwater Dam 2.
  - Complete – August 2006

- U7 – Acid Mine Drainage and Leachate Mixture Management Works.
  - Submission Date changed to 31st December 2007

14.0 LIMITATIONS

Earth2Water Pty Ltd has prepared this report for Veolia and in accordance to the standard terms and conditions of the consulting profession. This report is prepared with regard to Veolia's brief and agreed scope of work. The methodology adopted and sources of information used by E2W are outlined in this report.

E2W has made no independent verification of the monitoring or technical information provided by the client. E2W assumes no responsibility for any inaccuracies or omissions in the data.

This report was prepared by E2W from August 2007 to January 2008 and is based on the information reviewed at the time of preparation. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

The precision with which site conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of surface water and groundwater and some aspects of the contaminants in the environment are complex. Our professional interpretation and conclusions of the data and technical information are based upon experience and review of available reports.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this report, E2W should be notified of any such findings and be provided with an opportunity to review our assessment.

TABLES

Table 1A: Summary Statistics for Groundwater Wells (MW;s & Void, ED3)

		MW1		MW3		MW4		MW5		MW6		MW7		MB1		MB4		MB6		ED3B	
		Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill
PH	Min		6.45		3		5.78		6.3		5.4		6.57	6.21	6.22	5.32	4.9	5.16	5.31	6.17	6.3
	Max		7.56		4.42		7.59		7.67		6.87		7.25	6.21	7.61	5.32	6.98	5.16	6.84	7.73	7.25
	Ave		7.06		3.74		6.54		7.09		6.08		6.96	6.21	7.01	5.32	5.77	5.16	5.95	6.85	6.78
	StdD		0.34		0.46		0.61		0.38		0.41		0.21		0.34		0.67		0.54	0.27	0.33
EC (uS/cm)	Min		1500		4010		1038		3680		3560		1197	1806	280	1220	404	1210	490	685	4230
	Max		2218		11380		1960		9530		12900		12220	1806	1558	1790	1581	2980	3460	8870	9000
	Ave		1929.09		8623.36		1576.30		5779.25		10093.82		4659.63	1806.00	893.58	1527.03	1121.50	2053.76	2351.17	7673.19	7174.73
	StdD		235.57		2658.22		286.31		1914.80		2522.41		3212.51		380.52	171.51	466.88	490.87	1298.26	1084.69	1282.39
SWL (m, toc)	Min		48.34		13.86		97.9		1.48		2		4.57	0	27.33	0	11.47	0	9.15	0	2.43
	Max		49.45		30.1		102.95		3.91		4.69		17.71	30.6	30.01	11.57	12.06	13.24	12.03	3.64	3.96
	Ave		49.05		27.58		101.97		2.68		4.13		6.56	28.03	28.71	9.61	11.72	10.73	10.32	2.16	3.05
	StdD		0.30		4.74		1.21		0.59		0.70		3.70	5.24	0.91	2.85	0.16	3.39	1.02	1.01	0.46
Sulphate (mg/L)	Min		592		1360		144		40		52		381	152	136	178	150	215	300	0	471
	Max		1030		21300		1590		340		3300		8550	1130	498	515	309	490	967	992	930
	Ave		707.67		9830.00		824.14		170.56		610.53		3106.09	302.00	276.63	213.11	205.10	327.43	473.45	658.03	727.27
	StdD		137.71		6883.73		300.68		75.34		761.09		2338.14	197.41	153.42	52.60	40.79	75.96	184.03	147.44	109.89
Ammonia (mg/L)	Min		0.6		0.16		0.01		0.04		0.2		0.02	0.21	0.05	0	0.01	0	0.024	0.02	0.04
	Max		3.1		5.2		0.3		0.35		0.68		0.6	1.75	1.2	0.76	0.8	0.23	0.65	0.25	0.189
	Ave		1.38		1.48		0.15		0.18		0.42		0.21	0.98	0.31	0.11	0.16	0.07	0.24	0.12	0.07
	StdD		0.67		1.61		0.09		0.11		0.17		0.21	1.09	0.50	0.26	0.28	0.08	0.23	0.09	0.04
Iron (mg/L)	Min		0.09		73		0.89		0.22		0.07		0.05	0.01	0.1	0	0.05	0	0.04	0	0.2
	Max		6.54		767		30		15		23.5		290	1.79	4.9	0.6	2.7	1.1	1.2	4.4	3.8
	Ave		1.92		423.00		6.78		4.98		3.39		74.73	0.16	1.56	0.12	1.42	0.16	0.39	0.34	1.76
	StdD		2.53		274.15		10.62		3.96		7.09		111.24	0.34	1.95	0.16	1.08	0.24	0.41	0.74	1.45
Zinc (mg/L)	Min		0.005		140		0.029		0.04		0.073		1.3	0.01	0.128	0.46	0.723	0.096	0.2	0	0.019
	Max		2.1		3310		2.7		0.333		4.58		1060	1.04	0.92	2.3	1.1	11.1	6.84	1.5	0.705
	Ave		0.41		1855.38		1.05		0.14		0.54		173.08	0.29	0.39	0.82	0.86	5.08	5.26	0.37	0.11
	StdD		0.68		922.71		0.93		0.11		1.22		348.86	0.26	0.29	0.29	0.12	1.60	2.03	0.28	0.22

Note 1: MW2 was replaced by MW7.
Note 2: Wells were installed in 2003

Table 1B: Woodlawn Groundwater Level Data (m btoc) - 2007

(MB wells)

	MB1 Date	MB1 Depth to Water	MB2 Date	MB2 Depth to Water	MB3 Date	MB3 Depth to Water	MB4 Date	MB4 Depth to Water	MB5 Date	MB5 Depth to Water	MB6 Date	MB6 Depth to Water	MB7 Date	MB7 Depth to Water	MB8 Date	MB8 Depth to Water
		m		m		m		m		m		m		m		m
	6/12/1996	0.00	6/12/1996	0.00	6/12/1996	0.00	6/12/1996	0.00	6/12/1996	0.00	6/12/1996	0.00	6/12/1996	0.00	8/12/2004	4.05
	17/06/1997	0.00	17/06/1997	0.00	17/06/1997	0.00	17/06/1997	0.00	17/06/1997	0.09	17/06/1997	0.00	17/06/1997	0.00	6/09/2004	5.15
	7/08/1997	30.33	7/08/1997	1.65	7/08/1997	0.54	7/08/1997	10.14	7/08/1997	2.74	7/08/1997	11.99	7/08/1997	2.51	22/06/2004	5.45
	11/11/1997	29.60	11/11/1997	1.57	11/11/1997	0.39	11/11/1997	10.12	11/11/1997	2.53	11/11/1997	11.84	11/11/1997	2.14	18/03/2004	5.03
	26/03/1998	26.74	26/03/1998	2.07	26/03/1998	0.64	26/03/1998	10.29	26/03/1998	2.84	26/03/1998	12.54	26/03/1998	3.08	26/11/2003	3.51
	9/06/1998	25.95	9/06/1998	2.07	9/06/1998	0.68	9/06/1998	10.52	9/06/1998	3.02	9/06/1998	12.48	9/06/1998	3.39	3/09/2003	3.62
	9/06/1998	0.00	7/09/1998	1.35	7/09/1998	0.33	7/09/1998	10.43	7/09/1998	2.74	7/09/1998	10.35	7/09/1998	1.82	23/06/2003	3.92
	7/09/1998	26.76	1/12/1998	1.61	1/12/1998	0.15	1/12/1998	10.05	1/12/1998	2.67	1/12/1998	10.42	1/12/1998	2.07	18/03/2003	4.25
	1/12/1998	27.90	1/03/1999	1.81	1/03/1999	0.27	1/03/1999	10.01	1/03/1999	2.81	1/03/1999	11.51	1/03/1999	2.76	4/12/2002	4.64
	1/03/1999	28.20	4/06/1999	1.92	4/06/1999	0.41	4/06/1999	10.08	4/06/1999	3.08	4/06/1999	11.63	4/06/1999	2.94	19/09/2002	3.46
	4/06/1999	28.10	10/09/1999	1.62	10/09/1999	0.53	10/09/1999	10.21	10/09/1999	3.19	10/09/1999	12.24	10/09/1999	2.55	17/06/2002	3.44
	10/09/1999	28.48	3/12/1999	1.84	3/12/1999	0.57	3/12/1999	10.02	3/12/1999	3.12	3/12/1999	11.70	3/12/1999	2.39	6/03/2002	4.34
	3/12/1999	29.04	6/03/2000	2.07	6/03/2000	0.67	6/03/2000	9.91	6/03/2000	3.17	6/03/2000	11.69	6/03/2000	2.80	10/01/2002	4.34
	6/03/2000	28.77	2/06/2000	2.09	2/06/2000	0.76	2/06/2000	9.99	2/06/2000	3.31	2/06/2000	12.11	2/06/2000	2.93	10/01/2002	
	2/06/2000	29.05	4/09/2000	2.05	4/09/2000	0.85	4/09/2000	10.15	4/09/2000	3.45	4/09/2000	12.60	4/09/2000	2.65	10/09/2001	2.87
	4/09/2000	29.13	5/12/2000	1.89	5/12/2000	0.86	5/12/2000	9.61	5/12/2000	3.12	5/12/2000	12.05	5/12/2000	2.18	8/06/2001	4.52
	5/12/2000	29.60	2/03/2001	2.09	2/03/2001	0.89	2/03/2001	9.74	2/03/2001	3.23	2/03/2001	12.04	2/03/2001	2.64	8/06/2001	0.00
	2/03/2001	29.13	8/05/2001	2.34	8/05/2001	0.95	8/06/2001	9.89	8/05/2001	3.51	8/06/2001	12.68	8/05/2001	3.14	2/03/2001	3.70
	8/06/2001	29.73	8/06/2001	0.00	8/06/2001	0.00	8/06/2001	0.00	8/06/2001	0.00	8/06/2001	0.00	8/06/2001	0.00	5/12/2000	2.96
	8/06/2001	0.00	10/09/2001	2.23	10/09/2001	1.03	21/08/2001	10.19	10/09/2001	3.79	21/08/2001	13.05	10/09/2001	2.94	4/09/2000	3.34
	21/08/2001	29.61	10/01/2002	2.45	10/01/2002	1.13	21/08/2001	10.19	10/01/2002	3.86	21/08/2001	13.05	10/01/2002	3.09	2/06/2000	3.85
	21/08/2001	29.61	6/03/2002	2.45	6/03/2002	1.13	21/08/2001	10.19	6/03/2002	3.86	10/09/2001		6/03/2002	3.08	6/03/2000	4.37
	10/09/2001		17/06/2002	2.14	17/06/2002	1.13	21/08/2001	10.79	17/06/2002	3.82	10/09/2001	13.24	17/06/2002	3.00	3/12/1999	3.23
	10/09/2001	30.10	19/09/2002	2.42	19/09/2002	1.13	10/09/2001		19/09/2002	4.38	10/01/2002	12.81	19/09/2002	3.27	10/09/1999	3.15
	10/01/2002	29.31	4/12/2002	2.62	4/12/2002	1.25	10/09/2001	10.31	4/12/2002	4.49	6/03/2002	12.81	4/12/2002	3.48	4/06/1999	4.00
	6/03/2002	29.31	18/03/2003	2.75	18/03/2003	1.34	10/01/2002	10.25	18/03/2003	4.80	7/05/2002		18/03/2003	3.88	1/03/1999	4.54
	7/05/2002		23/06/2003	2.80	23/06/2003	1.35	6/03/2002	10.26	23/06/2003	4.80	9/05/2002	11.58	23/06/2003	3.90	1/12/1998	3.01
	9/05/2002	30.60	3/09/2003	2.65	3/09/2003	1.40	7/05/2002		3/09/2003	4.84	17/06/2002	12.21	3/09/2003	3.67	7/09/1998	2.00
	17/06/2002	29.90	26/11/2003	2.75	26/11/2003	1.46	9/05/2002		26/11/2003	4.89	21/08/2002		26/11/2003	3.56	9/06/1998	4.77
	21/08/2002		18/03/2004	3.04	18/03/2004	1.57	9/05/2002	10.37	18/03/2004	4.83	19/09/2002	10.97	18/03/2004	4.04	26/03/1998	5.34
	19/09/2002	29.85	22/06/2004	3.38	22/06/2004	1.69	17/06/2002	10.26	22/06/2004	5.29	4/12/2002	10.95	22/06/2004	8.67	11/11/1997	3.22
	23/06/2003	28.22	6/09/2004	3.49	6/09/2004	1.74	21/08/2002		6/09/2004	5.55	9/12/2002		6/09/2004	4.78	7/08/1997	3.46
	17/08/2003	29.20	8/12/2004	3.31	8/12/2004	1.84	19/09/2002	10.61	6/12/2004	5.54	18/02/2003	11.10	8/12/2004	4.20	17/06/1997	0.00
	3/11/2003	28.54	21/03/2005	3.4	21/03/2005	1.9	4/12/2002	10.75	21/03/2005	5.66	18/03/2003	11.10	21/03/2005	4.51	6/12/1996	0.00
	18/02/2004	29.86	6/07/2005	3.36	6/07/2005	1.955	9/12/2002		6/07/2005	5.735	23/06/2003	10.52	1/07/2005	4.947	6/12/1996	0.00
	12/05/2004	29.48	8/09/2005	2.155	8/09/2005	1.97	18/02/2003	10.93	15/09/2005	5.7	12/08/2003	10.64	8/09/2005	4.01	21/03/2005	4.28
	16/08/2004	30.08	14/11/2005	3.5	14/11/2005	1.97	18/03/2003	11.00	14/11/2005	5.7	3/11/2003	10.55	14/11/2005	3.675	8/07/2005	3.48
	17/11/2004	29.67	13/03/2006	3.1	13/03/2006	1.79	23/06/2003	11.04	13/03/2006	5.67	18/02/2004		13/03/2006	4.3	8/09/2005	3.28
	3/03/2005	29.44	8/06/2006	2.68	8/06/2006	1.65	12/08/2003	11.06	8/06/2006	5.57	12/05/2004	10.19	8/06/2006	4.69	13/03/2006	3.7
	26/05/2005	28.92	4/09/2006	2.84	4/09/2006	1.8	3/11/2003	11.07	4/09/2006	4.97	18/08/2004	10.69	4/09/2006	4.57	8/06/2006	3.85
	12/08/2005	28.69	13/12/2006	3.5	13/12/2006	2.35	18/02/2004	10.93	30/11/2006	6.38	17/11/2004	10.54	30/11/2006	7.14	4/09/2006	3.54
	16/11/2005	29.95	20/04/2007	3.87	20/04/2007	2.48	12/05/2004	10.90	19/04/2007	6.17	3/03/2005	10.13	19/04/2007	4.73	14/11/2006	3.16
	9/02/2006	29.04	25/06/2007	3.14	28/06/2007	2.39	18/08/2004	11.37	28/06/2007	5.14	28/05/2005	10.17	28/06/2007	4.49	13/12/2006	4.65
	31/05/2006	29.81	22/08/2007	3.45	22/08/2007	2.42	17/11/2004	11.57	16/08/2007	6.03	12/08/2005	9.85	16/08/2007	3.695	20/04/2007	4.37
	15/08/2006	30.01	16/08/2007	3.439			3/03/2005	11.47			16/11/2005	11.50			28/05/2007	4.51
	21/12/2006	27.33					25/05/2005	11.74			9/02/2006	11.56			22/08/2007	3.05
	16/02/2007	27.78					15/08/2005	11.67			31/05/2006	12.03				
	10/04/2007	28.04					16/11/2005	11.63			15/08/2006	10.94				
	28/06/2007	27.93					9/02/2006	11.71			9/01/2007	9.85				
	31/08/2007	28.56					31/05/2006	11.52			16/02/2007	9.59				
	16/08/2007	27.75					15/08/2006	11.6			10/04/2007	9.5				
							21/12/2006	11.8			28/06/2007	9.23				
							16/02/2007	11.85			31/08/2007	9.15				
							10/04/2007	11.878								
							28/06/2007	11.71								
							31/08/2007	12.06								
MINIMUM		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
MAXIMUM		30.60		3.87		2.48		12.06		6.38		13.24		7.14		5.45
AVERAGE		25.46		2.38		1.17		10.11		4.00		10.63		3.32		3.54
STD DEV		8.1306		0.9123		0.7043		2.6408		1.5557		2.9756		1.4192		1.3274

	MB10 Date	MB10 Depth to Water	MB11 Date	MB11 Depth to Water	MB12 Date	MB12 Depth to Water	MB13 Date	MB13 Depth to Water	MB14 Date	MB14 Depth to Water	MB15 Date	MB15 Depth to Water	MB16 Date	MB16 Depth to Water	MB17 Date	MB17 Depth to Water
		m		m		m		m		m		m		m		m
	6/12/1996	0.00	7/08/1997	0.25	7/09/1997	0.63	7/08/1997	2.25	7/08/1997	5.00	7/08/1997	0.00	7/08/1997	2.85	7/08/1997	4.07
	17/06/1997	0.00	11/11/1997	0.37	11/11/1997	0.55	11/11/1997	2.32	11/11/1997	5.76	11/11/1997	0.00	11/11/1997	2.72	11/11/1997	3.35
	7/08/1997	0.70	3/12/1997	0.57	27/11/1997	0.00	27/11/1997	0.00	26/03/1998	6.63	26/03/1998	0.00	26/03/1998	2.73	26/03/1998	4.04
	11/11/1997	0.60	5/02/1998	0.73	3/12/1997	0.76	25/03/1998	3.05	9/06/1998	6.87	9/06/1998	0.00	9/06/1998	2.69	9/06/1998	4.02
	3/12/1997	0.78	5/03/1998	0.85	5/02/1998	0.94	9/06/1998	2.75	7/09/1998	5.48	7/09/1998	0.00	7/09/1998	2.46	7/09/1998	3.48
	5/02/1998	1.00	26/03/1998	1.00	5/03/1998	1.05	7/09/1998	1.72	1/12/1998	6.32	1/12/1998	0.00	1/12/1998	2.41	1/12/1998	3.39
	5/03/1998	1.16	9/06/1998	0.73	26/03/1998	1.15	1/12/1998	2.19	1/03/1999	6.76	1/03/1999	0.00	1/03/1999	2.53	1/03/1999	3.78
	26/03/1998	1.25	11/07/1998	0.65	11/05/1998	1.00	1/02/1999	2.57	4/06/1999	7.01	4/06/1999	0.00	4/05/1999	2.55	4/05/1999	3.85
	11/05/1998	1.20	10/08/1998	0.03	9/06/1998	1.04	4/05/1999	2.39	10/09/1999	7.04	10/09/1999	0.00	10/09/1999	2.51	10/09/1999	3.61
	9/06/1998	1.31	7/09/1998	0.00	11/07/1998	0.92	10/09/1999	2.24	3/12/1999	7.06	3/12/1999	0.00	3/12/1999	2.50	3/12/1999	3.77
	11/07/1998	1.22	5/10/1998	0.22	10/08/1998	0.09	3/12/1999	2.38	6/03/2000	7.30	6/03/2000	0.00	6/03/2000	2.55	6/03/2000	3.63
	10/08/1998	0.00	6/11/1998	0.47	7/09/1998	0.00	6/03/2000	2.73	2/06/2000	7.44	2/06/2000	0.00	2/06/2000	2.54	2/06/2000	3.84
	7/09/1998	0.80	1/12/1998	0.60	5/10/1998	0.20	2/06/2000	2.45	4/09/2000	7.45	4/09/2000	0.00	4/09/2000	2.53	4/09/2000	3.56
	5/10/1998	0.00	3/02/1999	0.87	5/10/1998	0.20	4/09/2000	2.29	5/12/2000	7.42	5/12/2000	0.00	5/12/2000	2.49	5/12/2000	3.57
	6/11/1998	0.87	1/03/1999	0.97	6/11/1998	0.52	5/12/2000	2.20	2/03/2001	7.62	2/03/2001	0.00	2/03/2001	2.40	2/03/2001	3.46
	1/12/1998	0.85	4/06/1999	0.92	1/12/1998	0.72	2/03/2001	2.65	8/05/2001	0.00	8/05/2001	0.00	8/05/2001	2.49	8/05/2001	3.67
	3/02/1999	1.03	10/09/1999	0.88	3/02/1999	1.03	8/05/2001	0.00	8/06/2001	7.85	8/06/2001	0.00	8/06/2001	0.00	8/06/2001	0.00
	1/03/1999	1.06	3/12/1999	1.10	1/03/1999	1.12	8/05/2001	2.84	10/09/2001	7.86	10/09/2001	0.00	10/09/2001	2.47	10/09/2001	3.60
	4/06/1999	1.24	6/03/2000	1.37	4/06/1999	1.17	10/09/2001	2.38	10/01/2002	8.04	10/01/2002	0.00	10/01/2002	2.47	10/01/2002	3.90
	10/09/1999	1.18	2/06/2000	1.23	10/09/1999	1.10	10/01/2002	2.92	6/03/2002	8.04	6/03/2002	0.00	6/03/2002	2.47	6/03/2002	3.90
	3/12/1999	1.15	4/09/2000	1.04	3/12/1999	1.25	6/03/2002	2.92	17/06/2002	7.91	17/06/2002	0.00	17/06/2002	2.43	17/06/2002	3.81
	6/03/2000	1.33	5/12/2000	1.13	6/03/2000	1.52	17/06/2002	2.54	19/09/2002	8.26	19/09/2002	0.00	19/09/2002	2.57	19/09/2002	3.77
	2/06/2000	1.36	2/03/2001	1.49	2/06/2000	1.48	19/09/2002	2.50	4/12/2002	8.51	4/12/2002	0.00	4/12/2002	2.61	4/12/2002	4.08
	4/09/2000	1.64	8/05/2001	1.59	4/09/2000	1.33	4/12/2002	3.15	18/03/2003	8.77	18/03/2003	0.00	18/03/2003	2.54	18/03/2003	3.84
	5/12/2000	1.20	8/05/2001	0.00	5/12/2000	1.34	18/03/2003	3.20	23/06/2003	8.92	23/06/2003	0.00	23/06/2003	2.60	23/06/2003	4.02
	2/03/2001	1.36	10/09/2001	1.26	2/03/2001	1.66	23/06/2003	2.98	3/09/2003	8.52	3/09/2003	0.00	3/09/2003	2.54	3/09/2003	3.92
	8/05/2001	1.67	10/01/2002	1.83	8/05/2001	1.78	3/09/2003	2.72	26/11/2003	5.91	26/11/2003	0.00	26/11/2003	2.56	26/11/2003	3.95
	8/05/2001	0.00	6/03/2002	1.80	8/05/2001	0.00	26/11/2003	2.68	18/03/2004	9.22	18/03/2004	0.00	18/03/2004	2.59	18/03/2004	4.11
	10/09/2001	1.82	17/06/2002	1.26	10/09/2001	1.55	18/03/2004	3.59	22/06/2004	9.58	22/06/2004	0.38	22/06/2004	2.66	22/06/2004	4.45
	10/01/2002	1.77	19/09/2002	1.52	10/01/2002	1.91	22/06/2004	3.95	6/09/2004	9.71	6/09/2004	0.48	6/09/2004	2.66	6/09/2004	4.46
	6/03/2002	1.77	4/12/2002	1.90	6/03/2002	1.91	6/09/2004	3.78	8/12/2004	9.60	8/12/2004	0	8/12/2004	2.59	8/12/2004	4.11
	17/06/2002	1.51	18/03/2003	1.91	17/06/2002	1.49	8/12/2004	3.17	6/07/2005	9.67	21/03/2005	0	21/03/2005	2.58	21/03/2005	4.17
	19/09/2002	1.60	23/06/2003	1.94	19/09/2002	1.83	1/07/2005	3.32	8/09/2005	9.61	8/07/2005	0	8/07/2005	2.48	8/07/2005	3.973
	4/12/2002	2.05	3/09/2003	1.77	4/12/2002	2.10	8/09/2005	2.6	14/11/2005	8.57	15/09/2005	0	15/09/2005	2.48	15/09/2005	3.98
	18/03/2003	2.25	26/11/2003	1.83	18/03/2003	2.27	14/11/2005	2.42	13/03/2006	9.4	14/11/2005	0	14/11/2005	2.5	14/11/2005	3.96
	23/06/2003	2.30	18/03/2004	2.14	23/06/2003	2.34	13/03/2006	3.04	8/06/2006	9.52	13/03/2006	0	13/03/2006	2.61	13/03/2006	4.2
	3/09/2003	2.36	22/06/2004	2.27	3/09/2003	2.15	8/06/2006	2.67	4/09/2006	9.05	8/06/2006	0	8/06/2006	2.49	8/06/2006	4.08
	26/11/2003	2.40	6/09/2004	2.25	26/11/2003	2.21	4/09/2006	2.92	30/11/2006	9.82	4/09/2006	0	4/09/2006	2.53	4/09/2006	4.35
	18/03/2004	2.67	8/12/2004	2.17	18/03/2004	3.46	20/12/2006	3.23	19/04/2007	10.17	13/12/2006	0	30/11/2006	2.61	30/11/2006	5.39
	22/06/2004	3.19	21/03/2005	2.56	22/06/2004	2.68	19/04/2007	3.24	28/05/2007	9.12	19/04/2007	0	19/04/2007	2.54	19/04/2007	4.21
	5/09/2004	3.36	6/07/2005	2.085	6/09/2004	2.69	28/05/2007	2.41	4/09/2007	9.78	28/06/2007	0	28/06/2007	2.57	28/06/2007	4.29
	8/12/2004	3.16	8/09/2005	1.69	8/12/2004	2.58	4/09/2007	2.46			16/08/2007	2.245	4/09/2007	2.51	16/08/2007	4.145
	6/07/2005	3.705	14/11/2005	2.06	21/03/2005	2.66										
	8/09/2005	3.41	13/03/2006	1.85	6/07/2005	2.65										
	14/11/2005	3.73	8/06/2006	2.03	8/09/2005	2.73										
	13/03/2006	3.71	4/09/2006	1.93	14/11/2005	2.75										
	8/06/2006	3.68	30/11/2006	2.1	13/03/2006	2.5										
	4/09/2006	3.73	19/04/2007	2.21	8/06/2006	2.64										
	30/11/2006	3.91	28/06/2007	1.1	4/09/2006	2.5										
	20/04/2007	4.11	4/09/2007	1.5	30/11/2006	3.7										
	25/06/2007	3.98			19/04/2007	2.66										
	15/08/2007	3.85			28/06/2007	2.65										
					16/08/2007	2.078										
MINIMUM		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
MAXIMUM		4.11		2.56		3.70		3.95		10.17		2.25		2.85		5.39
AVERAGE		1.85		1.32		1.59		2.62		7.97		0.07		2.49		3.87
STD DEV		1.2212		0.6893		0.916		0.7475		1.7866		0.3556		0.4037		0.6989

Table 2: Summary Statistics for Surface Water (Site Discharges)

		105		115		SPRING2		WM201(Plant)	
		Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill
PH	**Min**	6.24	5.78	6.2	5.51	4.16	4.40	6.04	5.33
	Max	7.16	7.91	8.26	7.90	6.65	7.20	7.61	7.60
	Ave	6.89	7.02	7.67	6.93	5.59	5.93	6.89	6.60
	StdD	0.44	0.54	0.41	0.61	1.07	0.69	0.66	0.74
EC (uS/cm)	**Min**	1210	593	1629	410	1386	494	455	288
	Max	4370	2330	1629	2680	3020	10160	1474	1497
	Ave	2622	1433	1629	921	2088	1490	1005	774
	StdD	1322	570		595	702	2408	488	396
Sulphate (mg/L)	**Min**	14	32	36	40	152	31	54	78
	Max	550	264	726	350	3180	548	232	256
	Ave	159	143	226	139	1301	305	122	169
	StdD	112	62	135	87	811	140	57	62
Ammonia (mg/L)	**Min**	0.00	0.02	0.00	0.02	0.24	0.52	0.01	0.04
	Max	0.70	0.84	0.07	0.93	8.21	4.15	1.41	0.44
	Ave	0.14	0.23	0.04	0.24	4.77	1.94	0.20	0.13
	StdD	0.20	0.25	0.04	0.26	2.85	1.16	0.41	0.17
Iron (mg/L)	**Min**	0.09	0.11	0.11	0.04	0.47	0.33	0.30	0.50
	Max	3.80	2.00	0.11	12.60	2.60	6.24	1.20	2.75
	Ave	1.01	0.58	0.11	3.21	1.88	2.16	0.77	1.43
	StdD	1.31	0.50		4.32	0.67	1.49	0.33	0.98
Zinc (mg/L)	**Min**	0.02	0.06	0.06	0.05	4.88	3.10	0.40	1.76
	Max	1.76	2.02	0.13	0.98	140.00	50.60	12.40	10.00
	Ave	0.77	0.65	0.09	0.37	92.55	22.65	3.19	4.06
	StdD	0.69	0.49	0.05	0.33	45.22	11.27	3.81	3.09

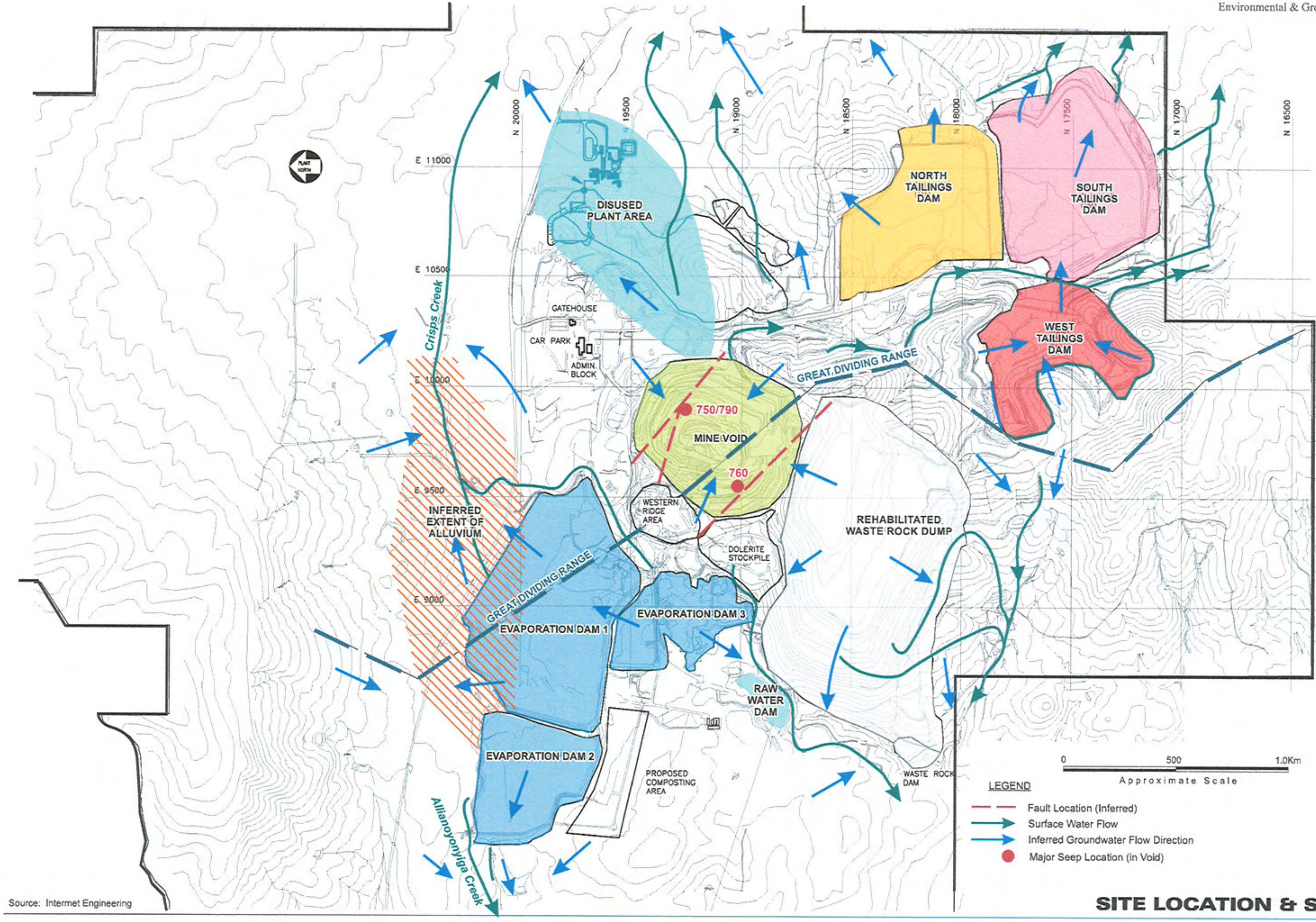
Table 3: Summary Statistics for Surface Water (Dams, Site Operations and Creeks)

		WM202(ED3S)		WM203(ED3N)		WM200(wl)		WRDAM		Pond 1		Pond 2		Pond 3		Leachate Dam	
		Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill	Mine	Landfill
PH	Min	2.31	2.38	2.68	2.49	6.28	5.20	2.80	2.85	NA	5.13	2.76	2.57	2.85	2.58	NA	5900.00
	Max	2.69	4.91	2.83	4.70	7.65	7.46	3.81	3.62		5.86	4.81	4.90	2.90	4.93		17000.00
	Ave	2.53	3.71	2.76	3.69	6.97	6.51	3.08	3.07		5.49	3.48	3.93	2.88	3.71		11625.00
	StdD	0.20	0.70	0.11	0.62	0.97	0.78	0.13	0.31		0.32	1.15	0.77	0.04	0.69		4103.92
EC (uS/cm)	Min	10380	4840	12750	2500	1976	1110	1707	19362		561	4700	3460	4230	3220		21000
	Max	19180	12580	17200	18940	2930	17400	27800	25460		6800	6960	12900	6040	45003		25000
	Ave	14560	9057	14975	9733	2453	3432	16910	22622		3510	5673	9121	5135	13085		22714
	StdD	4416	2483	3147	5192	675	5255	4273	2608		3133	1162	3511	1280	14493		1496
Sulphate (mg/L)	Min	708	3490	744	785	124	529	2700	32000		1400	2050	1840	2110	2699		9000
	Max	55300	15200	80000	24200	407	1050	44800	32000		2800	16100	15000	15400	17000		15000
	Ave	18346	9696	31884	12032	194	667	21874	32000		2100	8502	8626	8755	6551		12317
	StdD	8735	3617	23870	5499	73	156	6529			990	6267	4067	9397	4403		2425
Ammonia (mg/L)	Min	1.02	2.58	1.23	1.40	0.01	0.06	NA	NA	NA	82.00	0.11	0.70	0.01	1.01		910.00
	Max	16.30	130.00	25.60	150.00	0.13	0.25				150.00	1.38	603.00	6.90	230.00		1200.00
	Ave	6.39	42.00	13.95	66.90	0.06	0.13				116.00	0.72	186.54	2.75	48.03		1040.00
	StdD	5.09	36.87	7.75	55.78	0.04	0.07				48.08	0.48	196.92	3.66	65.37		150.33
Iron (mg/L)	Min	103.00	180.00	100.00	2.56	0.03	0.06	48.10	180.00		40.00	45.10	139.00	27.20	86.30		180.00
	Max	258.00	540.00	288.00	552.00	0.03	6.51	460.00	180.00		100.00	366.00	2600.00	204.00	1500.00		1400.00
	Ave	187.75	321.82	197.00	307.61	0.03	1.54	181.45	180.00		70.00	188.03	899.94	115.60	419.10		611.67
	StdD	79.00	116.15	94.14	223.33		2.46	77.30			42.43	163.29	671.60	125.02	457.60		459.76
Zinc (mg/L)	Min	442.00	120.00	476.00	53.20	0.27	5.02	497.90	3700.00		56.00	21.10	130.00	650.00	310.00		290.00
	Max	3860	1770	8340	3570	4.19	38.00	7650	3700		87	1380	1600	2300	1200		900
	Ave	2266.40	1013.88	4082.00	1354.86	1.63	23.08	3831.15	3700.00		71.50	843.53	669.06	1475.00	562.92		608.33
	StdD	1267.87	555.43	3972.34	946.99	2.22	11.38	1308			21.92	579.46	388.44	1166.73	257.09		208.56

Table 4: Summary Statistics for Intermodal Facility- Crisps Creek

Parameter		110		130		150	
		Mine	Landfill	Mine	Landfill	Mine	Landfill
PH	Min	6.28	5.82	6.29	6.16	3.89	5.75
	Max	8.20	7.90	7.88	7.74	8.53	7.80
	Ave	7.51	6.95	7.002	7.0935	7.50	7.09
	StdD	0.30	0.53	0.61	0.41	0.77	0.57
EC (uS/cm)	Min	261	190	395	151	186	454
	Max	3100	2330	626	970	1850	1285
	Ave	1237.78	996.05	516.67	590.09	951.45	987.47
	StdD	590.67	511.35	77.30	176.34	371.57	239.80
Sulphate (mg/L)	Min	20	23	11	10	16.40	40
	Max	440	220	70	148	140	127
	Ave	116.89	96.55	43.00	39.32	78.41	87.37
	StdD	61.71	51.19	26.99	31.59	34.52	19.76
Ammonia (mg/L)	Min	0.00	0.01	0	0.01	0.00	0.02
	Max	0.56	0.82	0.1	0.129	0.20	0.84
	Ave	0.21	0.12	0.06	0.04	0.06	0.15
	StdD	0.24	0.18	0.05	0.03	0.07	0.20
Iron (mg/L)	Min	0.00	0.30	0.8	0.08	0.00	0.10
	Max	1.70	11.00	1.7	4.34	1.10	3.13
	Ave	0.21	2.12	1.27	0.81	0.23	0.82
	StdD	0.28	2.65	0.45	0.97	0.29	0.70
Zinc (mg/L)	Min	0.00	0.04	0.02	0.004	0.00	0.01
	Max	6.80	1.40	0.22	0.109	1.14	6.69
	Ave	0.69	0.31	0.10	0.03	0.10	0.49
	StdD	0.87	0.37	0.11	0.03	0.19	1.48

FIGURES



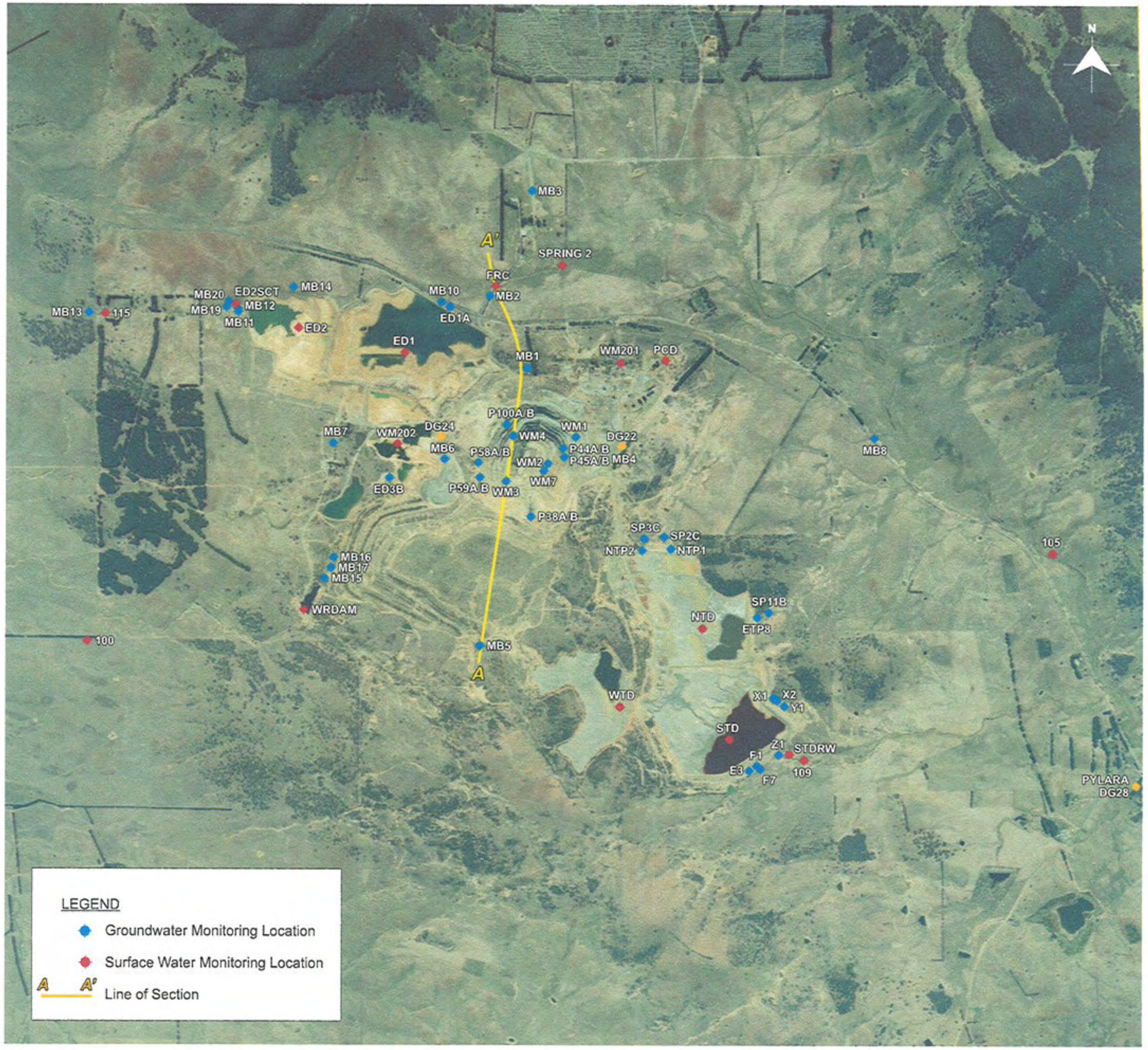
Source: Intermet Engineering

Date: 21 October 2007
Reference: E2W_083_01.cdr

SITE LOCATION & SYSTEMS

VEOLIA ENVIRONMENTAL SERVICES - WOODLAWN BIOREACTOR

Figure 1



0 500 1000m
Approximate Scale

Source: Kells Land Development Solutions

SITE LAYOUT & MONITORING LOCATIONS

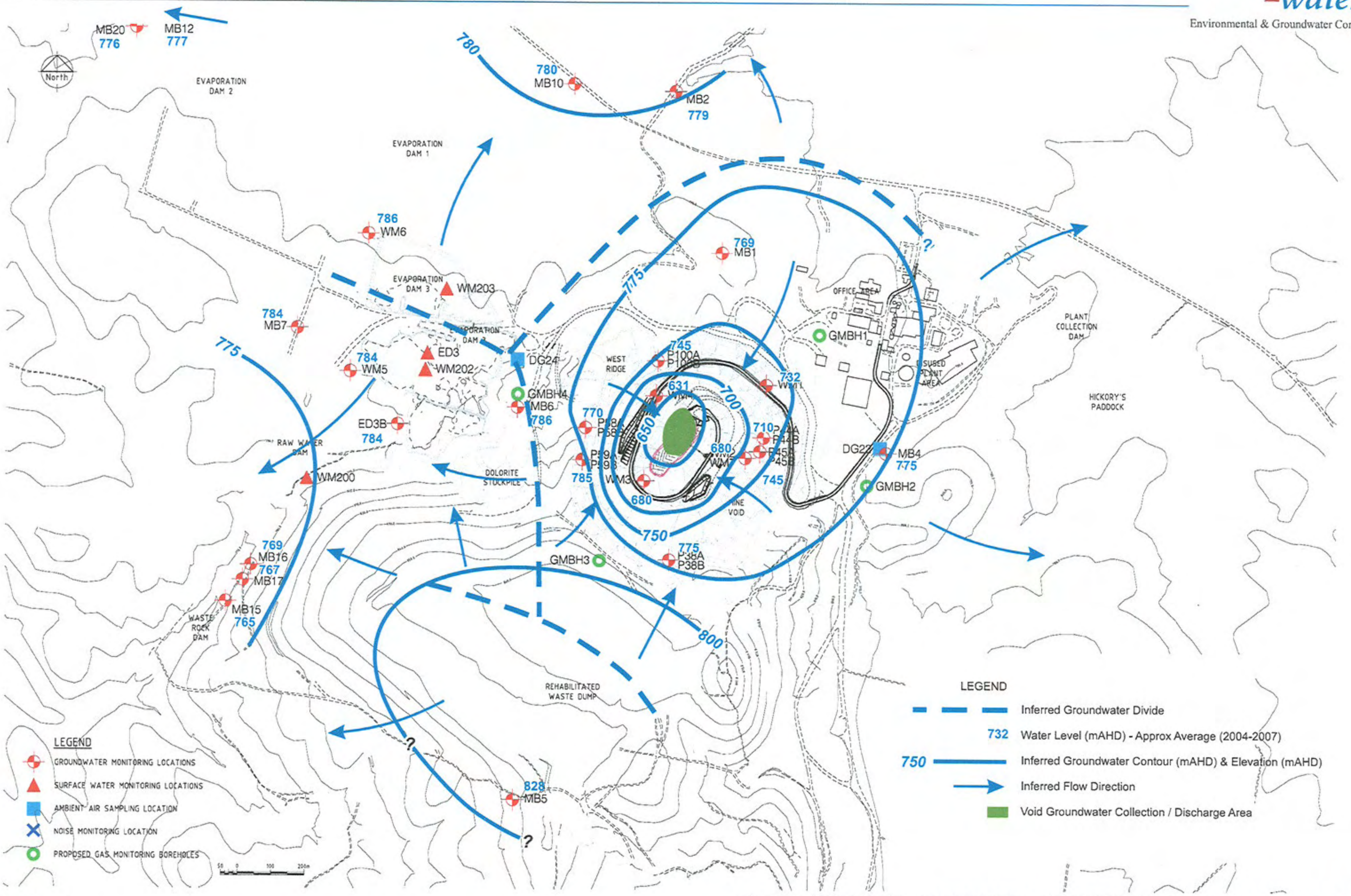
WOODLAWN BIOREACTOR - MONITORING REPORT

Date: *27 November 2007*

Reference: *E2W_083A_02.cdr*

Figure 2

earth2water Pty Ltd
Environmental & Groundwater Consulting



Source: Maunsell

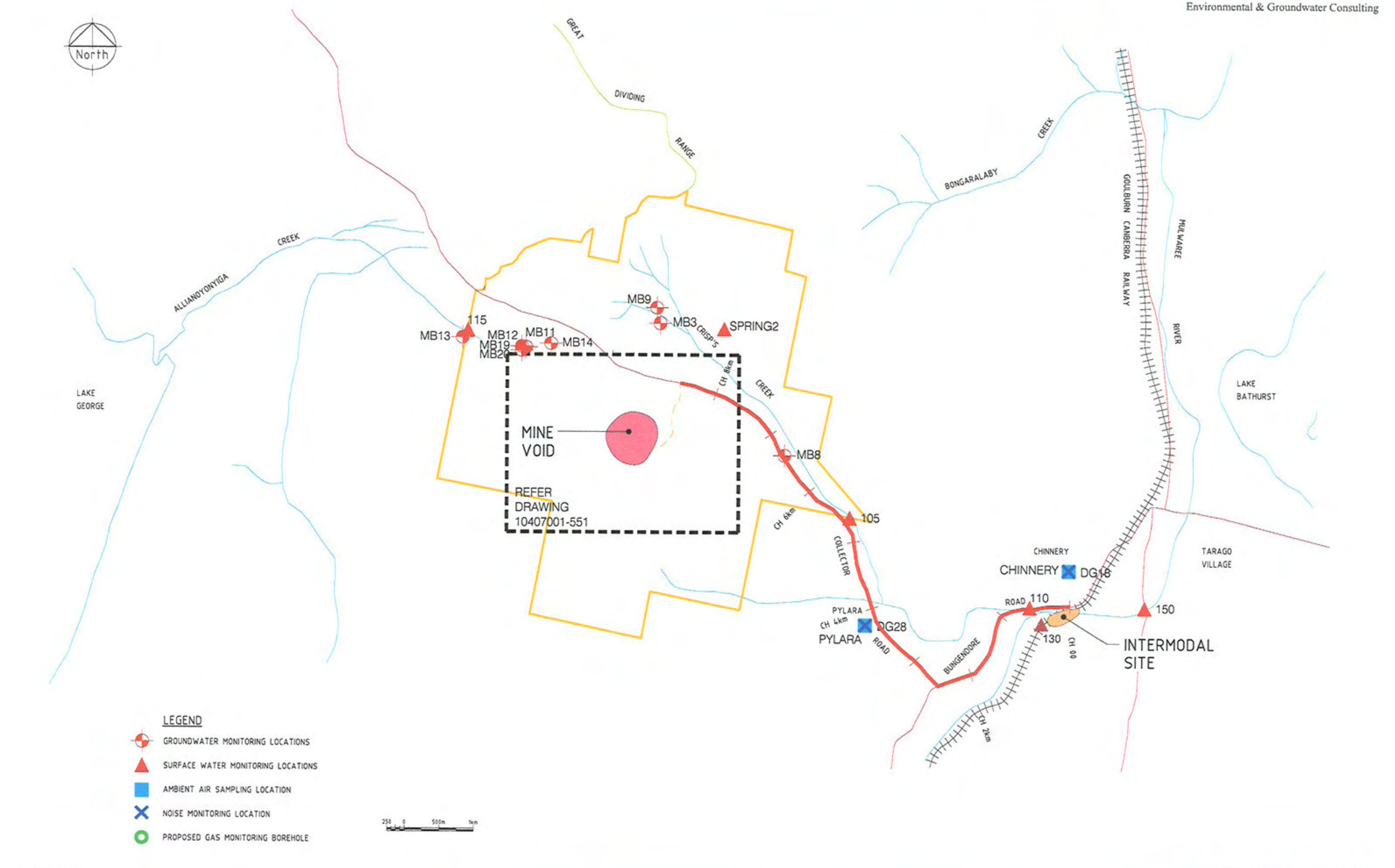
SITE LAYOUT & INFERRED GROUNDWATER FLOW REGIME

WOODLAWN BIOREACTOR - MONITORING REPORT

Figure 3A

Date: *2 December 2007*

Reference: *E2W_083a_03.cdr*



Source: Maunsell

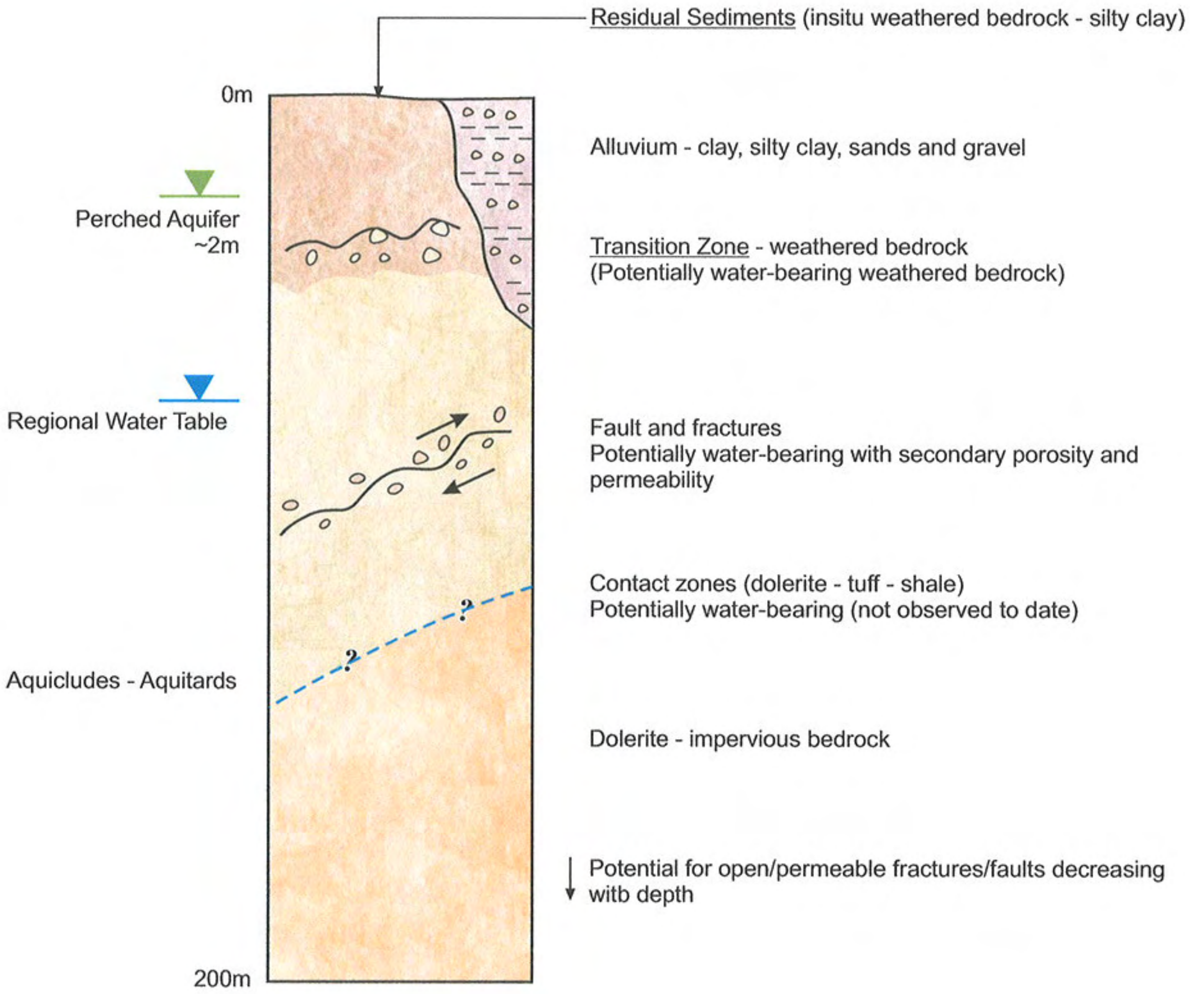
EPA LOCATIONS

VEOLIA ENVIRONMENTAL SERVICES - WOODLAWN BIOREACTOR

Figure 3B

Date: *21 October 2007*

Reference: *E2W_083_11.cdr*



SUMMARY OF AQUIFER UNITS AT BIOREACTOR SITE

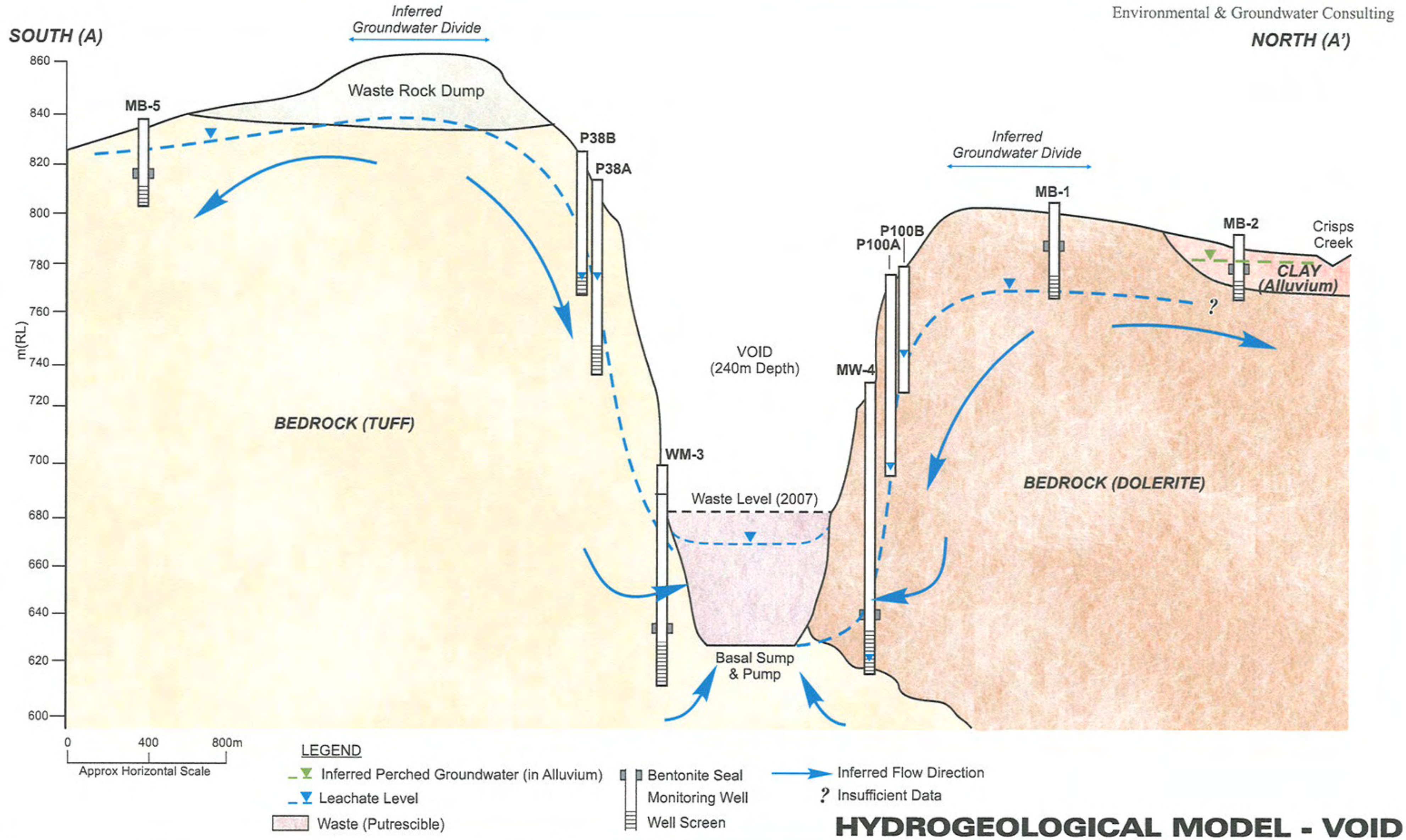
VEOLIA ENVIRONMENTAL SERVICES - WOODLAWN BIOREACTOR

Date: *16 October 2007*

Reference: *E2W_083_03.cdr*

Figure 4

earth2water Pty Ltd
Environmental & Groundwater Consulting



HYDROGEOLOGICAL MODEL - VOID

VEOLIA ENVIRONMENTAL SERVICES - WOODLAWN BIOREACTOR

Figure 5

Date: *14 October 2007*

Reference: *E2W_083_04.cdr*

APPENDIX A

Appendix A: Woodlawn Monitoring Locations (EPA and Mine)

SITE CODE	Description	Required by	EASTING	NORTHING	RL (top of casing)	DEPTH (from top of casing) m	CATEGORY
PYLARA	High Volume Air Sampling Location	EPA	13520.00	7160.00			Air
DG18	Dust Gauge #18 - Radially North of IMF 500m - Chinnery's	EPA	16240.00	8510.00			Dust
DG22	Dust Gauge #22 - Radially East of Mine Void 150m	EPA	10320.000	9270.000			Dust
DG24	Dust Gauge #24 - Radially West of Mine Void 150m	EPA	9200.000	9320.000			Dust
DG28	Dust Gauge #28 - Pylara West of Homestead	EPA	13520.00	7160.00			Dust
E3	South Tailings Dam Piezometer - Southern wall	Mine	11280.00	7320.00	774.52	19.38	Groundwater
ED3B	Evaporation Dam 3 Piezometer	EPA	8882.70	9062.40	786.80	5.90	Groundwater
ETP8	North Tailings Dam Piezometer - Eastern wall	Mine	11180.00	8210.00	776.47	9.17	Groundwater
F1	South Tailings Dam Piezometer - Southern wall	Mine	11300.00	7340.00	774.49	23.28	Groundwater
F7	South Tailings Dam Piezometer - Southern wall	Mine	11300.00	7350.00	773.25	13.90	Groundwater
MB1	1 Monitoring Bore	EPA	9735.00	9752.10	797.51	32.20	Groundwater
MB2	2 Monitoring Bore	EPA	9502.90	10201.80	781.86	13.20	Groundwater
MB3	3 Monitoring Bore	EPA	9762.30	10850.50	793.20	25.80	Groundwater
MB4	4 Monitoring Bore	EPA	10333.50	9263.20	786.50	25.80	Groundwater
MB5	5 Monitoring Bore	EPA	9443.70	8025.20	833.98	25.80	Groundwater
MB6	6 Monitoring Bore	EPA	9224.90	9181.90	796.21	25.80	Groundwater
MB7	7 Monitoring Bore	EPA	8532.40	9283.10	789.07	29.00	Groundwater
MB8	8 Monitoring Bore	EPA	11896.10	9322.20	752.57	25.90	Groundwater
MB10	10 Monitoring Bore	EPA	9200.90	10163.90	783.80	20.80	Groundwater
MB11	11 Monitoring Bore	EPA	7930.30	10126.50	778.97	5.30	Groundwater
MB12	12 Monitoring Bore	EPA	7930.30	10129.30	779.95	13.20	Groundwater
MB13	13 Monitoring Bore	EPA	7004.70	10089.90	748.66	13.20	Groundwater
MB14	14 Monitoring Bore	EPA	8273.80	10251.60	792.37	12.50	Groundwater
MB15	15 Monitoring Bore	EPA	8482.70	8438.10	764.86	23.70	Groundwater
MB16	16 Monitoring Bore	EPA	8535.60	8560.40	771.39	7.30	Groundwater
MB17	17 Monitoring Bore	EPA	8520.10	8511.20	771.07	15.40	Groundwater
MB19	19 Monitoring Bore	EPA	7870.00	10130.00	777.52	12.00	Groundwater
MB20	20 Monitoring Bore	EPA			778.02		Groundwater
NTP1	North Tailings Dam Piezometer - Northern wall	Mine	10620.00	8620.00	787.87	9.44	Groundwater
NTP2	North Tailings Dam Piezometer - Eastern wall	Mine	10465.00	8620.00	789.42	10.85	Groundwater
P100A	Pit Piezometer P100 shallow	EPA	9610.00	9400.00	776.43	41.00	Groundwater
P100B	Pit Piezometer P100 deep	EPA	9610.00	9400.00	776.43	78.00	Groundwater
P38A	Pit Piezometer P38 shallow	EPA	9760.00	8820.00	815.31	39.70	Groundwater
P38B	Pit Piezometer P38 deep	EPA	9760.00	8820.00	815.31	76.50	Groundwater
P44A	Pit Piezometer 44 shallow	EPA	9965.00	9237.00	731.05	40.50	Groundwater
P44B	Pit Piezometer 44 deep	EPA	9965.00	9237.00	731.05	73.00	Groundwater
P45A	Pit Piezometer 45 shallow	EPA	9962.00	9194.00	731.16	40.45	Groundwater
P45B	Pit Piezometer 45 deep	EPA	9962.00	9194.00	731.11	78.00	Groundwater
P58A	Pit Piezometer 58 shallow	EPA	9436.36	9162.22	807.39	42.00	Groundwater
P58B	Pit Piezometer 58 deep	EPA	9436.36	9162.22	807.39	75.00	Groundwater
P59A	Pit Piezometer 59 shallow	EPA	9445.60	9066.20	804.70	34.00	Groundwater
P59B	Pit Piezometer 59 deep	EPA	9445.60	9066.20	804.70	77.00	Groundwater

Appendix A: Woodlawn Monitoring Locations (EPA and Mine)

SITE CODE	Description	Required by	EASTING	NORTHING	RL (top of casing)	DEPTH (from top of casing) m	CATEGORY
SP11B	North Tailings Dam Piezometer - Eastern wall	Mine	11210.00	8220.00	774.24	15.37	Groundwater
SP2C	North Tailings Dam Piezometer - Northern wall	Mine	10595.00	8695.00	786.87	21.28	Groundwater
SP3C	North Tailings Dam Piezometer - Eastern wall	Mine	10455.00	8670.00	788.93	11.97	Groundwater
WM1	1 Monitoring Well	EPA	4690.90	7081.57	781.27	115.00	Groundwater
WM3	3 Monitoring Well	EPA	4211.97	6891.54	707.62	85.00	Groundwater
WM4	4 Monitoring Well	EPA	4310.77	7161.86	733.92	108.00	Groundwater
WM5	5 Monitoring Well	EPA	3378.57	7152.83	786.73	6.00	Groundwater
WM6	6 Monitoring Well	EPA	3400.82	7469.32	790.34	6.00	Groundwater
WM7	7 Monitoring Well	EPA	4459.56	6913.17	686.94		Groundwater
X1	South Tailings Dam Piezometer - Eastern wall	Mine	11300.00	7690.00	781.51	7.95	Groundwater
X2	South Tailings Dam Piezometer - Eastern wall	Mine	11303.70	7683.70	780.90	7.96	Groundwater
Y1	South Tailings Dam Piezometer - Eastern wall	Mine	11315.00	7660.00	776.98	7.03	Groundwater
Z1	South Tailings Dam Piezometer - Southern wall	Mine	11350.00	7360.00	769.52	20.72	Groundwater
WM201	Woodlawn Front Gate	Mine	10310.00	9790.00			Surface Water
100	Woodlawn/Willeroo Boundary South	Mine	7000.00	8040.00			Surface Water
105	Crisp's Creek - Pylara Boundary	EPA	13000.00	8600.00			Surface Water
109	Pylara Boundary-Below South Tailings Dam	Mine	11460.00	7310.00			Surface Water
110	Crisp's Creek - Bridge	EPA	16000.00	8250.00			Surface Water
115	Woodlawn/Willeroo Boundary North	EPA	7100.00	10090.00			Surface Water
130	Creek between bridges	EPA					Surface Water
150	Mulwarree River at Braidwood Road Crossing	EPA	17570.00	8690.00			Surface Water
ED1	Evaporation Dam 1	Mine	8970.00	9850.00	788.50		Surface Water
ED2	Evaporation Dam 2	Mine	8310.00	10000.00	788.80		Surface Water
ED2SCT	ED2 Seepage Collection Trench Overflow Pipe	Mine	7920.00	10130.00			Surface Water
FRC	Crisp's Creek - Farm Road Culvert	Mine	9540.00	10260.00			Surface Water
NTD	North Tailings Dam	Mine	10830.00	8130.00			Surface Water
PCD	Plant Collection Dam	Mine	10600.00	9800.00			Surface Water
Pond 1	Pond 1 (In Void)	EPA			670.00		Surface Water
Pond 2	Pond 2 (In Void)	EPA					Surface Water
Pond 3	Pond 3 (In Void)	EPA					Surface Water
SPRING2	Crisp's Creek - Pond 2 Outflow	EPA	9950.00	10390.00			Surface Water
STD	South Tailings Dam	Mine	11000.00	7440.00			Surface Water
STDRW	South Tailings Dam Return Water	Mine	11370.00	7350.00			Surface Water
WM202	Evaporation Dam 3 South	EPA	8930.00	9280.00	790.37		Surface Water
WM203	Evaporation Dam 3 North	EPA	8930.00	9280.00	790.03		Surface Water
WRDAM	Waste Rock Dam	Mine	8350.00	8240.00	760.50		Surface Water
WTD	West Tailings Dam	Mine	10320.00	7640.00			Surface Water
IMF FF	IMF First Flush	EPA					Surface Water

Appendix A: Woodlawn Bioreactor Monitoring Annual Check List

YEAR **2006-2007**

EPL - 11436

Monitoring Point	Site	Paramaters	Frequency	
1	115	Quality	Quarterly	
2	Spring 2	Quality	Quarterly	
3	105	Quality	Quarterly	
4	WM200	Quality	Quarterly	
5	WM201	Quality	Quarterly	
6	WM202	Quality	Quarterly	
7	WM203	Quality	Quarterly	
8	Ponds 2 & 3	Quality	Quarterly	
9	Groundwater	Quality	Quarterly	See Below for details
10	Leachate Dam	Quality	Quarterly	
11	Groundwater	Levels	Quarterly	See Below for details
12	Subsurface Gas	Methane	Quarterly	
13	Surface Gas	Methane	Quarterly	
14	Flare	Temp/flow	Continuous	
15	Meterological	licence	Continuous	
16	Pylara Dust	HVS & Fall	Continuous	
17	Gas Power Stn	Gas Quality	Quarterly	
18	ED3 Volume	ML	Weekly	
19	Void inputs	Volume/quality	Quarterly	
20	Dust DG22	Dust Fall	Continuous	
21	Dust DG24	Dust Fall	Continuous	
Extra	Points 1 to 10	Pesticides	Once	

EPL - 11455

1	110	Quality	6 times year
2	150	Quality	6 times year
3	First Flush	Quality	6 times year
4	DG18Chinnery	Dust Fall	Continuous

Monitoring Point 9 (Water Quality)
WM1
WM3
WM4
WM5
WM6
WM7
MB1
MB4
MB6
ED3B

Monitoring Point 11 (Water Levels)	
MB1	WM1
MB2	WM3
MB3	WM4
MB4	WM5
MB5	WM6
MB6	WM7
MB7	
MB8	
MB10	
MB11	
MB12	
MB13	
MB14	
MB15	
MB16	
MB17	
ED3B	

APPENDIX B

Appendix B: Woodlawn Monitoring Locations Details

SITE CODE	Location Description	Required by	RL (top of casing)	Date Installed	DEPTH (from top of casing) m	Geology	Well Screen Interval (mbgl)	Bentonite Seal (mbgl)	Notes
ED3B	Evaporation Dam 3 Piezometer	EPA	786.800		5.900				GW- no log
MB1	1 Monitoring Bore	EPA	797.510		32.200	Bedrock Dolerite = 0 - 32m	26 - 32 m	18 - 19 m	GW
MB10	10 Monitoring Bore	EPA	783.800		20.800	Clay (Brown) = 0 -1m, Clay (Grey) = 1 - 1.8m, Gravel = 1.8 - 3.2m, Sand (Gravel) = 3.2 - 12.2m, Hard Silicious Band = 12.2 - 12.6m, Gravel = 12.6 - 19.8m, Dolerite = 19.8 - 20.8m	19 - 20.8 m	12.6 - 13 m	GW
MB11	11 Monitoring Bore	EPA	778.970		5.300	Clay = 0 - 1.2m, Dolerite = 1.2 - 3.3m, Shale = 3.3 - 5.3m	2.3 - 5.3 m	0.5 - 1.2 m	GW
MB12	12 Monitoring Bore	EPA	779.950		13.200	Dolerite Floater = 0 - 0.5m, Dolerite/Shale/Acid Vocanic = 0.5 - 13.2m	10.3 - 13.2 m	8.6 - 9.4 m	GW
MB13	13 Monitoring Bore	EPA	748.660		13.200	Silty Sand = 0 - 0.8m, Clay = 0.8 - 1.8m, Sandy Clay = 1.8 - 3m, Volcanic (Foliated) = 3 - 9m, Dolerite = 9 - 13.2m	10.3 - 13.2 m	6.8 - 7.4 m	GW
MB14	14 Monitoring Bore	EPA	792.370		12.500	Clay = 0 - 1.2m, Dolerite = 1.2 - 12.5m, Fracture = 8.1m	9.5 - 12.5 m	5.2 - 5.8 m	GW
MB15	15 Monitoring Bore	EPA	764.860		23.700	Fill = 0 - 0.4m, Rhyolite/Volcanic = 0.4 - 23.7m (Becoming softer)	16.4 - 23.7 m	7.2 - 7.4 m	GW
MB16	16 Monitoring Bore	EPA	771.390		7.300	Fill = 0 - 0.8m, Clayey Gravel/Gravelly Clay = 0.8 - 4m, Rhyolite = 4 - 7.3m	3.2 - 6.2 m	2 - 2.7 m	GW
MB17	17 Monitoring Bore	EPA	771.070		15.400	Fill = 0 - 0.4m, Sandy Clay = 0.4 - 2.4m, Volcanics = 2.4 - 6.4m, Tuff = 6.4 - 8m, Volcanics = 8 - 15.4m	9.3 - 15.4 m	8.4 - 9 m	GW
MB2	2 Monitoring Bore	EPA	781.860		13.200	Clay = 0 - 9m, Dolerite = 9 - 13m	7.2 - 13.2 m	5.2 - 6 m	GW
MB3	3 Monitoring Bore	EPA	793.200		25.800	Fill = 0 - 0.2m, Clay = 0.2 - 3.5m, Siltstone = 3.5 - 6m, Clay = 6 - 18.5m, Gravel = 18.5 - 25.8m	20 - 25.8 m	14 - 16 m	GW
MB4	4 Monitoring Bore	EPA	786.500		25.800	Fill = 0 - 2.5m, Shale (Grey to Red) = 2.5 - 25.8	19.8 - 25.8 m	14 - 16 m	GW
MB5	5 Monitoring Bore	EPA	833.980		25.800	Top Soil = 0 - 0.1m, Tuff = 0.1 - 1.5m, Tuff (With weathered zones x2) = 1.5 - 25.8m	19.8 - 25.8m	16 - 17 m	GW
MB6	6 Monitoring Bore	EPA	796.210		25.800	Fill (Dolerite & Shale) = 0 - 2.5m, Shale = 2.5 - 11m, Clay = 11 - 11.5m, Shale (Siltstone) = 11.5 - 19m, Shale = 19 - 25.8m	19.8 - 25.8 m	13.2 - 15 m	GW
MB7	7 Monitoring Bore	EPA	789.070		29.000	Clay = 0 - 2m, Shale = 2 - 25m, Tuff = 25 - 29m	25 - 29 m	22 - 23 m	GW
MB8	8 Monitoring Bore	EPA	752.570		25.900	**NO DATA**	NA	NA	GW- no log
WM1	1 Monitoring Well	EPA	781.270	5/06/2003	115.000	Dolerite = 0 - 115m	NA	NA	GW

Appendix B: Woodlawn Monitoring Locations Details

SITE CODE	Location Description	Required by	RL (top of casing)	Date Installed	DEPTH (from top of casing) m	Geology	Well Screen Interval (mbgl)	Bentonite Seal (mbgl)	Notes
WM2	2 Monitoring Well	EPA	686.730	3/06/2003	115.000	Shale = 0 - 2.5m, Tuff/Tuffaceous Sediment = 2.5 - 47m, (FeO2 Coatings on Fractures and Joints = 6.0 - 13m, Decrease in Chip Size = to 34m, Increase in Talc content = 35 - 47m), Dolerite = 47 - 48.5m, Tuff/Tuffaceous Sediment = 48.5 - 115m.	NA	NA	GW
WM3	3 Monitoring Well	EPA	707.620	4/06/2003	85.000	Tuff/Tuffaceous Sediment (Brown) = 0 - 2m, Tuff/Tuffaceous Sediment (Light Grey) = 2 - 8m, Tuff = 8 - 49m, Tuff/Tuffaceous Sediment (Mid/Light Grey), Tuff (Mid Grey) = 59 - 68, Tuff/Tuffaceous Sediment (Light Cream) = 68 - 85m	NA	NA	GW
WM4	4 Monitoring Well	EPA	733.920	5/06/2003	108.000	Unkown = 0 - 60m, Dolerite (Dark grey green) = 60 - 62m, Tuff/Tuffaceous Sediment = 62 - 71m, Dolerite (Olive Green) = 71 - 84m, Tuff = 84 - 102m, Dolerite = 102 - 108m	NA	NA	GW
WM5	5 Monitoring Well	EPA	786.730	7/06/2003	6.000	Clay = 0 - 1m, Crystal Tuff = 1 - 6m	NA	NA	GW- no log
WM6	6 Monitoring Well	EPA	790.340	7/06/2003	6.000	Clay = 0 - 2m, Tuff = 2 - 4m, Yellow Brown Silicified Volcanics = 4 - 6m	NA	NA	GW- no log
WM7	7 Monitoring Well	EPA	686.730			NO DATA	NA	NA	GW- no log

APPENDIX C

VEOLIA ENVIRONMENTAL SERVICES

WOODLAWN BIOREACTOR

Woodlawn EPL 11436

C2 – Details of Non-Compliance with Licence

Licence condition number not complied with
M2.1 Requirement to monitor concentration of pollutants specified. He licensee must use the sampling method, units of measure, and sample at the frequency specified.
Summary of particulars of the non-compliance
Monitoring Point 1 - 7 due to a change in sampling parameters as a result of the review midway through reporting period, the following pollutants were removed from the program – Alkalinity, Arsenic, Bicarbonate, Cadmium, Calcium, Carbonate, Chloride, Chromium, Copper, Fluoride, iron, Lead, Magnesium, Manganese, Nitrate + Nitrite, Total Nitrogen, Oil & Grease, Organochlorine pesticides, Organophosphate pesticides, Phosphate, Sodium, Sulphate, Total Kjeldahl, Total Phenolics and Zinc. **Monitoring Point 1, 2, 3** did not meet the sampling frequency for Total Organic Carbon during the reporting period. **Monitoring Point 4** did not meet the sampling frequency for Total Dissolved Solids during the reporting period. **Monitoring Point 5** did not meet the sampling frequency for pH, Conductivity, Ammonia, Total Organic Carbon, Biological Oxygen Demand, Total Dissolved Solids and Potassium **Monitoring Point 9** due to a change in sampling frequency midway through reporting period the following pollutants were removed from the monitoring program – BOD, Iron, Total Nitrogen, Oil & Grease and Total Kjeldahl Nitrogen. With the addition of the following sampled pollutants - Redox Potential, Aluminium, Barium, Chromium (hexavalent), Cobalt, Mercury, Benzene, Toluene, Ethyl benzene, Xylene, Total Petroleum Hydrocarbons and Polycyclic Aromatic Hydrocarbons. **Monitoring Point 9** the following pollutants did not meet the sampling frequency for 1 (WM6) of the 10 locations: Total Dissolved Solids, pH, Conductivity, Standing Water Level, Ammonia, Calcium, magnesium, Potassium, Sodium, Chloride, Sulphate, Alkalinity and Total Organic Carbon. **Monitoring Point 10** due to a change in sampling frequency midway through reporting period the following pollutants were removed from the monitoring program – BOD, Iron, Total Nitrogen, Oil & Grease and Total Kjeldahl Nitrogen. With the addition of the following pollutants - Redox Potential, Aluminium, Barium, Chromium (hexavalent), Cobalt, Mercury, Benzene, Toluene, Ethyl benzene, Xylene, Total Petroleum Hydrocarbons and Polycyclic Aromatic Hydrocarbons. Chlorine was not analysed for during the reporting period.

Monitoring Point 11 did not meet the requirements for sample frequency in 1 of the 29 locations. **Monitoring Point 16**. The HVS ceased operations as per advice from the EPA during the 2005/2006 reporting period
If required, further details on particulars of non-compliance
N/A
Date(s) when non-compliance occurred, if applicable
Reporting period
If relevant, precise location where the non-compliance occurred
Woodlawn Bioreactor site.
If applicable, registration number of any vehicle or the chassis number of any mobile plant involved in the non-compliance
NA
Cause of non-compliance
A review of the monitoring schedule of the EPL was undertaken by the EPA, and resulted in a change in sampling frequency and sample pollutants. This was outlined in a meeting held with the EPA in March 2007; advice was given to follow the draft licence for the rest of the reporting period. Due to damage of WM6 caused by earthwork activities the sampling frequency 1 of the 10 locations in Monitoring Point 9 was not achieved.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
WM6 is schedule to be repaired in the following reporting period.
Action taken or that will be taken to prevent a recurrence of the non-compliance
Will update all current monitoring schedules and checklist with licence reviewed changes and continue to follow procedures. The monitoring checklist and documentation is filed and stored in a central location at the Woodlawn Bioreactor.

Collex Pty Ltd

Woodlawn Bioreactor

Environmental Monitoring Schedule

JULY 2006

List of Figures

Program	Locations	Parameters	Frequency	Requirement	Notes
METEOROLOGY * EPL – Point 15	Meteorological Station	▪ Wind speed @ 10m ▪ Wind direction @10m ▪ Sigma theta @ 10m ▪ Tempreature @10m ▪ Temperature @ 2m ▪ Solar radiation ▪ rainfall	Continuous	EPA licence, consent	Logged at 15min intervals to provide 1hr average values, must be able to provide instantaneous wind speed an direction to assist in investigation of complaints
WATER QUALITY					
SURFACE WATER					
* EPL – Points 1 to 7	Monitoring Sites: ▪ 115 ▪ Spring 2 ▪ 105 ▪ 201 ▪ WM202 (ED3 S) ▪ WM203 (ED3 N) ▪ WM200 (Raw water Dam)	▪ Alkalinity as CaCO3 ▪ Ammonia as N ▪ Arsenic ▪ BOD ▪ Bicarbonate ▪ Cadmium ▪ Calcium ▪ Carbonate ▪ Chloride ▪ Chromium ▪ Conductivity ▪ Copper ▪ Flouride ▪ Iron ▪ Lead ▪ Magnesium	▪ Quarterly ▪ After rainfall events greater than 25mm ▪ If quarterly monitoring not possible due to lack of flow, monitoring based on rainfall events and creek flow assessment ▪ Special frequency 1 (EPL)	EPA licence	Note that Organochlorine pesticides and Organophosphate pesticides are tested for once per year. Note: WM200 to be sampled twice during rehabilitation of the Western Ridge.

Program	Locations	Parameters	Frequency	Requirement	Notes
		▪ Manganese ▪ Nitrate + nitrite (oxidised nitrogen) ▪ Oil and grease ▪ Organochlorine pesticides ▪ Organophosphate pesticides ▪ Phosphorous (dissolved reactive) ▪ Potassium ▪ Sodium ▪ Sulfate ▪ Total dissolved solids ▪ Total kjeldahl nitrogen ▪ Total nitrogen ▪ Total organic carbon ▪ Total phenolics ▪ Zinc ▪ pH			
* EPL – Point 8	▪ Pond 2 ▪ Pond 3	▪ As above	Quarterly	EPA licence	Storage ponds within the bioreactor Note that Organochlorine pesticides and Organophosphate pesticides are tested for once per year.
	▪ Farm Road Culvert ▪ Site 100 ▪ Site 109	▪ pH ▪ Conductiviry	Quarterly	Mine	
	▪ ED1 ▪ ED2 ▪ Waste Rock Dam	▪ pH ▪ Conductivity	Six monthly	Mine	

Program	Locations	Parameters	Frequency	Requirement	Notes
	▪ Sth Tailings Dam ▪ Nth tailings Dam ▪ Plant Collection Dam ▪ ED2 SCT ▪ STD Return Water				
INTERMODAL FACILITY * **EPL – POINT 1 TO 3**	110 (IMF) 150 (IMF) 130 (IMF) Outlet from IMF Stormwater Pond	▪ Ammonia ▪ Biological Oxygen Demand (BOD_5) ▪ Conductivity ▪ Copper ▪ Flow ▪ Iron ▪ Lead ▪ Oil and grease ▪ Phosphorous ▪ Sulfate ▪ Total Dissolved Solids (TDS) ▪ Total Kjeldahl Nitrogen ▪ Total Organic Carbon (TOC) ▪ Total Suspended Solids (TSS) ▪ Zinc ▪ pH	Bi-monthly	EPA licence 130 added by Collex for extra upstream data	In the case of no flow at these points sampling may need to be based on rainfall events – the EPL requires six samples per year.
* **EPL – POINT 19**	Water inputs into mine void (not including recirculated leachate or rainfall)	▪ Alkalinity (as calcium carbonate) ▪ Ammonia ▪ Arsenic ▪ Biological Oxygen Demand (BOD)	Quarterly And if source changes Raw water input to be recorded weekly	EPA licence Several parameters added as part of BPMP	Total input volume is measured by flow meter on Raw Water dam plus calculation of rainwater and groundwater inflow, calculated monthly.

Program	Locations	Parameters	Frequency	Requirement	Notes
	Testing point for water input is **WM200** (Raw Water Dam) If other inputs are used eg IMF first flush water, they will need to be tested for these parameters.	▪ Bicarbonate ▪ Chemical Oxygen Demand (COD) ▪ Cadmium ▪ Calcium ▪ Carbonate ▪ Chloride ▪ Chromium ▪ Conductivity ▪ Copper ▪ Flouride ▪ Iron ▪ Lead ▪ Magnesium ▪ Manganese ▪ Nitrate ▪ Nitrite ▪ Oil & Grease ▪ Phosphate ▪ Potassium ▪ Sodium ▪ Sulphate ▪ Sulphide (total) ▪ TDS ▪ Total Kjeldahl nitrogen ▪ Total Nitrogen ▪ Total Organic Carbon (TOC) ▪ Zinc ▪ pH			

Program	Locations	Parameters	Frequency	Requirement	Notes
WATER LEVELS IN DAMS * EPL – Point 18	ED3 North ED3 South Waste Rock Dam ED2 ED1 Nth Tailings Dam Sth Tailings Dam Raw Water Dam	Level	Monthly (except ED3: weekly) Note consent condition 132: "the monitoring of ED3 will initially be at **weekly** intervals and will be reviewed 12 months after commencement of landfilling operations"	ED3 in EPA licence Others for Mine Site	To be record on Key Indicators Checklist
PUMP READINGS	PP06 (in pit) PP07 (in pit) PP08 (in pit) Bore Field Booster 2 – meter Woodlawn Dam (Raw Water Dam) Pump & flowmeter Plant Collection Dam Sth Tailings Return Water	Pump hours/readings	Monthly	EPA licence and Mine Site	To be record on Key Indicators Checklist

Program	Locations	Parameters	Frequency	Requirement	Notes
GROUNDWATER					
Sampling ' **EPL – Point 9**	▪ MB1 ▪ MB4 ▪ MB6 ▪ ED3B ▪ WM1 ▪ WM3 ▪ WM4 ▪ WM5 ▪ WM6 ▪ WM7 WM2 replaced by WM7	▪ Alkalinity as CaCO3 ▪ Ammonia as N ▪ Arsenic ▪ BOD ▪ Bicarbonate ▪ Cadmium ▪ Calcium ▪ Carbonate ▪ Chloride ▪ Chromium ▪ Conductivity ▪ Copper ▪ Flouride ▪ Iron ▪ Lead ▪ Magnesium ▪ Manganese ▪ Nitrate + nitrite (oxidised nitrogen) ▪ Oil and grease ▪ Organochlorine pesticides ▪ Organophosphate pesticides ▪ Phosphorous (dissolve reactive) ▪ Potassium ▪ Sodium ▪ Sulfate ▪ Total dissolved solids ▪ Total kjeldahl nitrogen ▪ Total nitrogen ▪ Total organic carbon ▪ Total phenolics ▪ Zinc ▪ pH	Quarterly	EPA licence	Note that Organochlorine pesticides and Organophosphate pesticides are tested for once per year. Once WM7 is constructed, Collex may apply to stop monitoring WM2 if screening section of WM7 will achieve same objectives.

Program	Locations	Parameters	Frequency	Requirement	Notes
Levels ' EPL – Point 11	MB1 to MB8, MB 10 to MB 17 inclusive, ED3B, WM1 to WM7 inclusive.	Groundwater level	Quarterly	EPA licence	
' EPL – Point 11	▪ P38 ▪ P44, ▪ P45, ▪ P58, ▪ P59 ▪ P100. (Piezometers)	Groundwater level	Quarterly	EPA licence	
OTHER GROUNDWATER MONITORING	MB 1 -20	▪ pH ▪ Level ▪ conductivity	Quarterly	Mine	Some overlap with EPA requirements – MB 1,4,6 already done, 1-17 level required. Note MB18 is now filled in & MB 9 not monitored.
	▪ NTP1 ▪ NTP2 ▪ SP2C ▪ SP3C ▪ ETP8 ▪ SP11B ▪ E3 ▪ F1 ▪ F7 ▪ X1 ▪ X2 ▪ Y1 ▪ Z1	▪ pH ▪ Level ▪ conductivity	Six monthly	Mine	

Program	Locations	Parameters	Frequency	Requirement	Notes
LEACHATE	Leachate tank	pH and EC	Weekly	BPMP	
	Leachate tank	▪ Alkalinity as CaCO3 ▪ Ammonia as N ▪ Chloride ▪ Sulfate ▪ Sulfide ▪ BOD ▪ COD ▪ Volatile fatty acids	Monthly	BPMP	
* **EPL – Point 10**	Leachate tank	▪ Alkalinity as CaCO3 ▪ Ammonia as N ▪ Arsenic ▪ BOD ▪ Bicarbonate ▪ Cadmium ▪ Calcium ▪ Carbonate ▪ Chloride ▪ Chromium ▪ COD ▪ Conductivity ▪ Copper ▪ Flouride ▪ Iron ▪ Lead ▪ Magnesium ▪ Manganese ▪ Nitrate + nitrite (oxidised nitrogen) ▪ Oil and grease ▪ Organochlorine pesticides ▪ Organophosphate pesticides ▪ Phosphorous (reactive)	Quarterly	EPA licence +BPMP	Note that Organochlorine pesticides and Organophosphate pesticides are tested for once per year. Volatile fatty acids, sulfide, COD and volume are for Bioreactor Performance Monitoring Volume measured by flow meter on leachate tank.

Program	Locations	Parameters	Frequency	Requirement	Notes
		▪ Potassium ▪ Sodium ▪ Sulfate ▪ Sulfide ▪ Total dissolved solids ▪ Total kjeldahl nitrogen ▪ Total nitrogen ▪ Total organic carbon ▪ Total phenolics ▪ Volatile fatty acids ▪ volume ▪ Zinc ▪ pH			

Program	Locations	Parameters	Frequency	Requirement	Notes
LANDFILL GAS					
Subsurface Gas					
EPL – Point 12	GMBH1 GMBH2 GMBH3 GMBH4	▪ CH_4 ▪ CO_2 ▪ O_2 ▪ H_2S	Monthly	EPA Licence/BPMP	Special method 1 – ELP Licence only requires quarterly methane, at locations in and near the mine void as shown in LEMP. Must be sampled before any purging or adding of air.
	Internal to the Bioreactor : At Gas Manifolds	▪ CH_4 ▪ CO_2 ▪ O_2 ▪ H_2S ▪ CO ▪ N balance ▪ Flow ▪ Rel. pressure - mb	Weekly, with review to monthly after initial period	BPMP	Collex to do extra as part of BPMP
	At flare	▪ CH_4 ▪ CO_2 ▪ O_2 ▪ H_2S	Weekly	BPMP	Collex to do extra as part of BPMP

Program	Locations	Parameters	Frequency	Requirement	Notes
Surface gas * **EPL – Point 13**	Locations on the surface of the landfilled waste (grid 30m x 30m)	▪ CH_4 ▪ CO_2 ▪ O_2 ▪ H_2S	Quarterly Weekly for operations	EPA licence BPMP	Special method 2 – EPL Licence only requires quarterly methane, Collex to do extra as part of BPMP Sampling procedure as per NSW EPA Environmental Guidelines: Solid Waste Landfills
	Within buildings located less than 250m from the Bioreactor	CH_4	Quarterly	Collex	
LANDFILL GAS FLARE * **EPL – Point 14**	Emissions from flare unit/s	▪ Temperature ▪ Volumetric flowrate	Continuous	EPA licence	
LANDFILL GAS FIRED POWER STATION * **EPL – Point 17**	Air discharge	▪ C02 ▪ Dry gas density ▪ H2S ▪ Moisture ▪ Nitrogen Oxides ▪ 02 ▪ S02 ▪ Sulphuric Acid mist and/or sulphur trioxide ▪ Temperature ▪ VOCS ▪ Velocity ▪ Volumetric flow rate	Quarterly	EPA licence	

Program	Locations	Parameters	Frequency	Requirement	Notes
		Non- Methanogenic Organic Compounds (NMOC)	Annually	Collex	

Program	Locations	Parameters	Frequency	Requirement	Notes
AMBIENT AIR QUALITY					
Bioreactor * EPL – Point 16	Nearest sensitive receptor to Waste Management Facility (Pylara)	Lead	Every 6 days	EPA licence	Monitoring at Bioreactor points shall be continue for the first twelve months of operation, after which the requirement will be reviewed by EPA.
		PM10	Every 6 days	EPA licence	
		Particulates – Deposited Matter / Direction	Continuous (dust gauge 28)	EPA licence Dust direction added by Collex	
* EPL – Point 20 & 21	Additional Bioreactor dust gauges 150m east and 150m west of mine void	Particulates – Deposited Matter / Direction	Continuous (dust gauge 22 and dust gauge 24)	EPA licence Dust direction added by Collex	
Intermodal Facility * EPL – Point 4	Nearest sensitive receptor to Waste Management Facility (Chinnery)	Particulates – Deposited Matter / Direction	Continuous (dust gauge 18)	EPA licence	Particulates – Deposited Matter: Monitoring at this point shall be for the first twelve months of operation, after which the requirement will be reviewed by EPA.
ODOUR	Odour Monitoring is performance based, and linked to complaints received about odour				

Program	Locations	Parameters	Frequency	Requirement	Notes
NOISE		Attended noise monitoring (Laeq and LA 10 (15min)) week at start of operations, then only if intensity changes or we receive any complaints No unattended monitoring, unless queries over attended results			
Bioreactor	Pylara Night time: (10pm to 7am) 1m from façade of residence Day time : (7am to 10pm) At the residential boundary or 30m from the residence	Laeq and LA 10 (15min)	Attended noise monitoring for 1 week at the commencement of operations	EPA licence, consent	Unattended monitoring or further attended monitoring will only be undertaken if the intensity of operations increase significantly or there are noise complaints 5dB (A) must be added to the measured level if the noise is substantially tonal or impulsive in character
Intermodal	Chinnery Night time: (10pm to 7am) 1m from façade of residence Day time : (7am to 10pm) At the residential boundary or 30m from the residence	Laeq and LA 10 (15min)	Attended noise monitoring for 1 week at the commencement of operation	EPA licence, consent	Unattended monitoring or further attended monitoring will only be undertaken if the intensity of operations increase significantly or there are noise complaints 5dB (A) must be added to the measured level if the noise is substantially tonal or impulsive in character

Program	Locations	Parameters	Frequency	Requirement	Notes
PEST, VERMIN & WEED MANAGEMENT					
	Bioreactor and Intermodal Facility Sites	Presence of vermin and/or noxious weeds	Monthly	Consent condition 152	Regular inspections of the sites by Bioreactor Operations Manager. Appropriate corrective actions as required
	Bioreactor and Intermodal Facility Sites	Presence of vermin and/or noxious weeds	6 monthly	Consent condition 152	Inspection by registered pest controller. Appropriate corrective actions as required.
GEOTECHNICAL STABILITY	Mine void	Visual inspection of pit crest, all berms and toe of slope, and photographic record	Weekly	Consent condition 137 which refers to report by BFP 1998 (updated 2004)	
		Slope monitoring survey	Monthly		Frequency to be reviewed after 12 months
		Survey interpretation and geotechnical monitoring report	Quarterly		

WOODLAWN BIOREACTOR AND MINE SITE MONITORING CALENDAR

JAN	FEB	MAR	APR	MAY	JUN
Print weather station report	Print weather station report	Print weather station report	Print weather station report	Print weather station report	Print weather station report
Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)
Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18
		Surface Waters : *include the annual test for Organochlorine and Organophosphate pesticides Spring 2 105 115 WM201 WM202 WM203 Pond 2 Pond 3 Leachate FRC 100 109		**Surface Waters:** ED1 ED2 WRDAM STD NTD PCD ED2SCT STDRW	**Surface Waters:** Spring 2 105 115 WM201 WM202 WM203 Pond 2 Pond 3 Leachate FRC 100 109
IMF Surface Waters: 110 150 130 first flush		**IMF Surface Waters:** 110 150 130 first flush		**IMF Surface Waters:** 110 150 130 first flush	
	Groundwater: :* include the annual test for Organochlorine and Organophosphate pesticides MB 1 MB 4 MB 6 ED3B WM 1 WM2 WM 3 WM 4 WM 5 WM 6 WM7	**Groundwater: MB #** 2 3 5 7 8 10 11 12 13 14 15 16 17 19 20		**Groundwater:** MB 1 MB 4 MB 6 ED3B WM 1 WM 2 WM 3 WM 4 WM 5 WM6 WM7	**Groundwater: MB #s** 2 3 5 7 8 10 11 12 13 14 15 16 17 19 20
Mine Site Piezos: NTP1 NTP2 SP2C SP3C ETP8 SP11B E3 F1 F7 X1 X2 Y1 Z1	**Pit Piezos:** P38 P44 P45 P58 P59 P100			**Pit Piezos:** P38 P44 P45 P58 P59 P100	

WOODLAWN BIOREACTOR AND MINE SITE MONITORING CALENDAR

JUL	AUG	SEP	OCT	NOV	DEC
Print weather station report	Print weather station report	Print weather station report	Print weather station report	Print weather station report	Print weather station report
Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)	Lead, PM10 every 6 days (Pylara)
Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18	Dust gauge 22, 24, 28, 18
		Surface Waters : Spring 2, 105, 115 WM201, WM202, WM203 Pond 2, Pond 3, Leachate FRC, 100, 109		**Surface Waters:** ED1, ED2, WRDAM STD, NTD, PCD ED2SCT, STDRW	**Surface Waters:** Spring 2, 105, 115 WM201, WM202, WM203 Pond 2, Pond 3, Leachate FRC, 100, 109
IMF Surface Waters: 110, 150 130, first flush		**IMF Surface Waters:** 110, 150 130, first flush		**IMF Surface Waters:** 110, 150 130, first flush	
	Groundwater: MB 1, MB 4, MB 6, ED3B WM1, WM 2, WM 3, WM 4 WM 5, WM 6, WM7	**Groundwater: MB #** 2, 3, 5, 7, 8 10, 11, 12, 13, 14 15, 16, 17, 19, 20		**Groundwater** MB 1, MB 4, MB 6, ED3B WM 1, WM 2, WM 3, WM 4 WM 5, WM 6, WM7	**Groundwater: MB #s** 2, 3, 5, 7, 8 10, 11, 12, 13, 14 15, 16, 17, 19, 20
Mine Site Piezos: NTP1, NTP2, SP2C SP3C, ETP8, SP11B E3, F1, F7 X1, X2, Y1 Z1	**Pit Piezos:** P38, P44, P45 P58, P59, P100			**Pit Piezos:** P38, P44, P45 P58, P59, P100	

WOODLAWN BIOREACTOR AND MINE SITE MONITORING CALENDAR

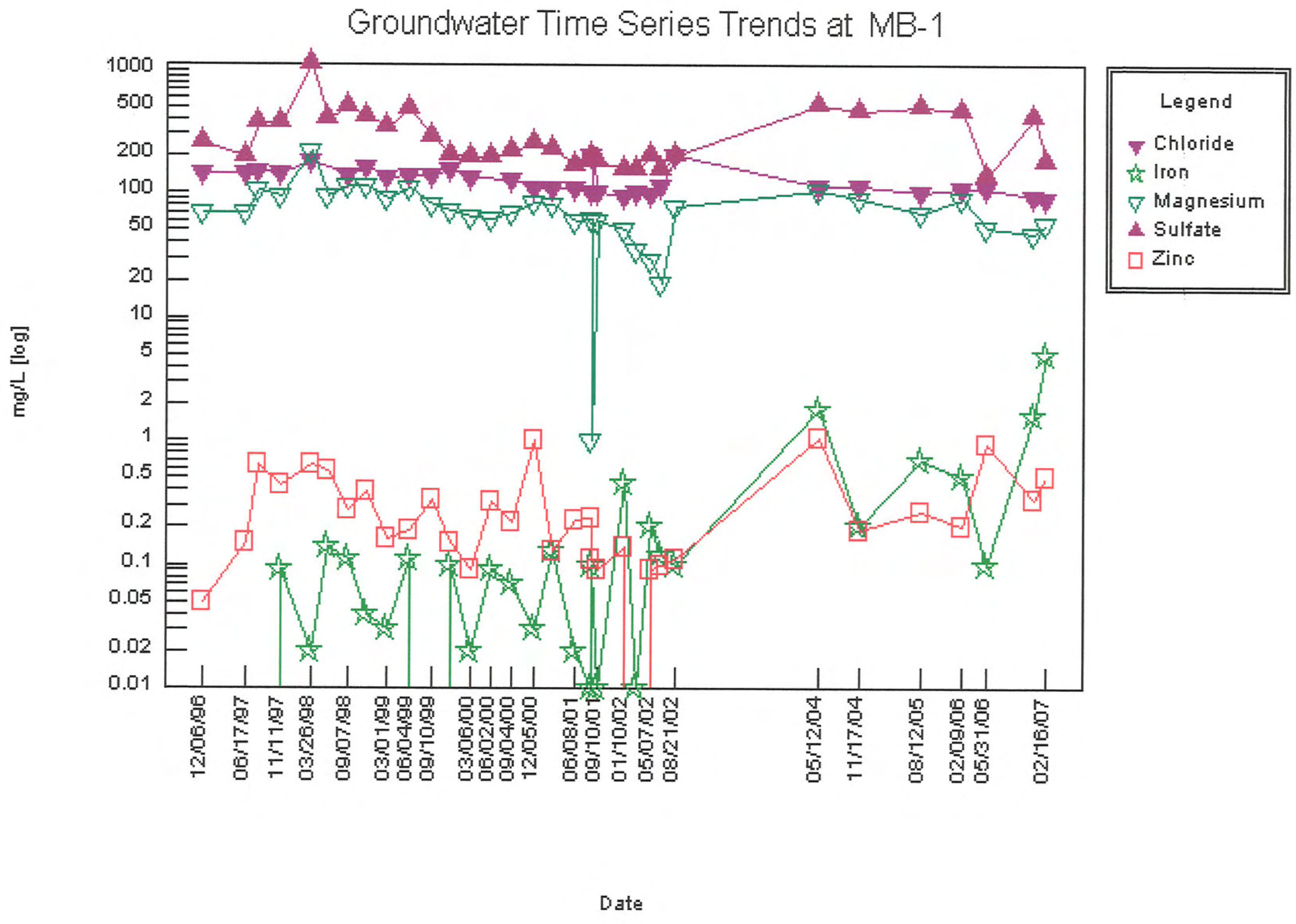
TO be added to the Calendar:

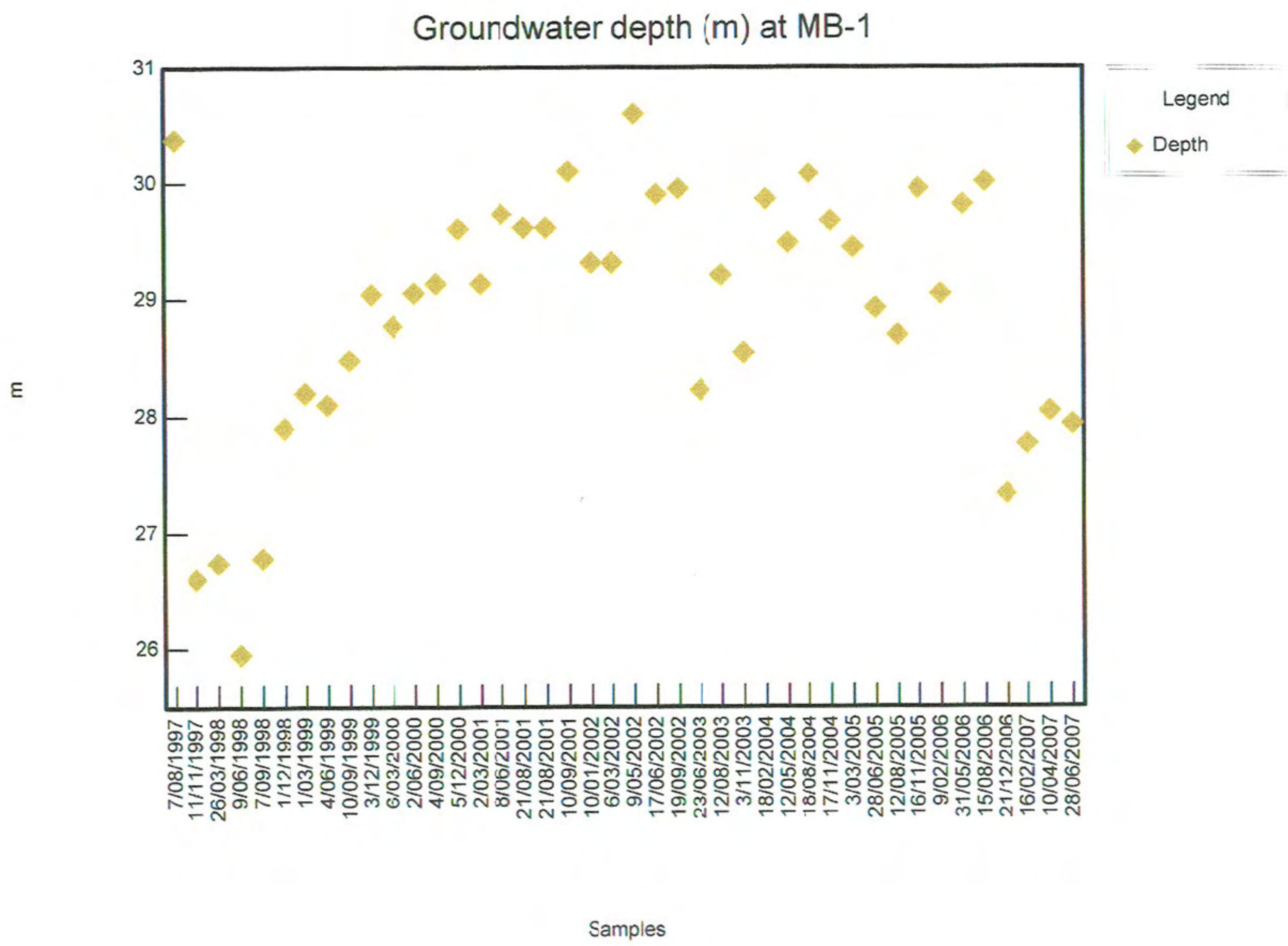
Water input into mine void – quarterly monitoring once water starts being added
Monitoring point will be Raw Water Dam (WM200), or other sources if used for water addition into void

Gas monitoring not included in Calendar.

	Date ___/___/___	Date ___/___/___		Date ___/___/___	Date ___/___/___
Bore field (Booster 2)			**PIT PUMP PP 08**		
Woodlawn Dam Pump			**North Tailings Dam** (top of peg 793.80m RL Kell '01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
Woodlawn Dam Level	___ . ___	___ . ___	**South Tailings Dam** (Top of peg 783.38m RL Kell 01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
Creek flow @ Farm Road Culvert	YES NO	YES NO	**South Tailings Dam Return Water**		
Radiation Shed Security			**Evap Dam 1** (top of peg 787.03m RL Kell '01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
Sewage Treatment System			**Evap Dam 2** (top of peg 786.41m RL Kell '01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
Plant Collection Dam hours			**Evap Dam 3 (N)** (top of peg 790.03m RL Kell '01, lowest peg)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
PIT PUMP PP 06			**Evap Dam 3 (S)** (top of peg 790.37m RL Kell '01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___
PIT PUMP PP 07			**Waste Rock Dam** (top of higher peg 759.55m RL Kell '01)	Peg ___ . ___ = ___ . ___	Peg ___ . ___ = ___ . ___

APPENDIX D


Groundwater Time Series Trends at MB-1
mg/L [log]
1000
500
200
100
50
20
10
5
2
1
0.5
0.2
0.1
0.05
0.02
0.01
12/06/96
06/17/97
11/11/97
03/26/98
09/07/98
03/01/99
06/04/99
09/10/99
03/06/00
06/02/00
09/04/00
12/05/00
06/08/01
09/10/01
01/10/02
05/07/02
08/21/02
05/12/04
11/17/04
08/12/05
02/09/06
05/31/06
02/16/07
Date
Legend
Chloride
Iron
Magnesium
Sulfate
Zinc


Groundwater depth (m) at MB-1
31
30
29
28
27
26
m
Legend
Depth
7/08/1997
11/11/1997
26/03/1998
9/06/1998
7/09/1998
1/12/1998
1/03/1999
4/06/1999
10/09/1999
3/12/1999
6/03/2000
2/06/2000
4/09/2000
5/12/2000
2/03/2001
8/06/2001
21/08/2001
21/08/2001
10/09/2001
10/01/2002
6/03/2002
9/05/2002
17/06/2002
19/09/2002
23/06/2003
12/08/2003
3/11/2003
18/02/2004
12/05/2004
18/08/2004
17/11/2004
3/03/2005
28/06/2005
12/08/2005
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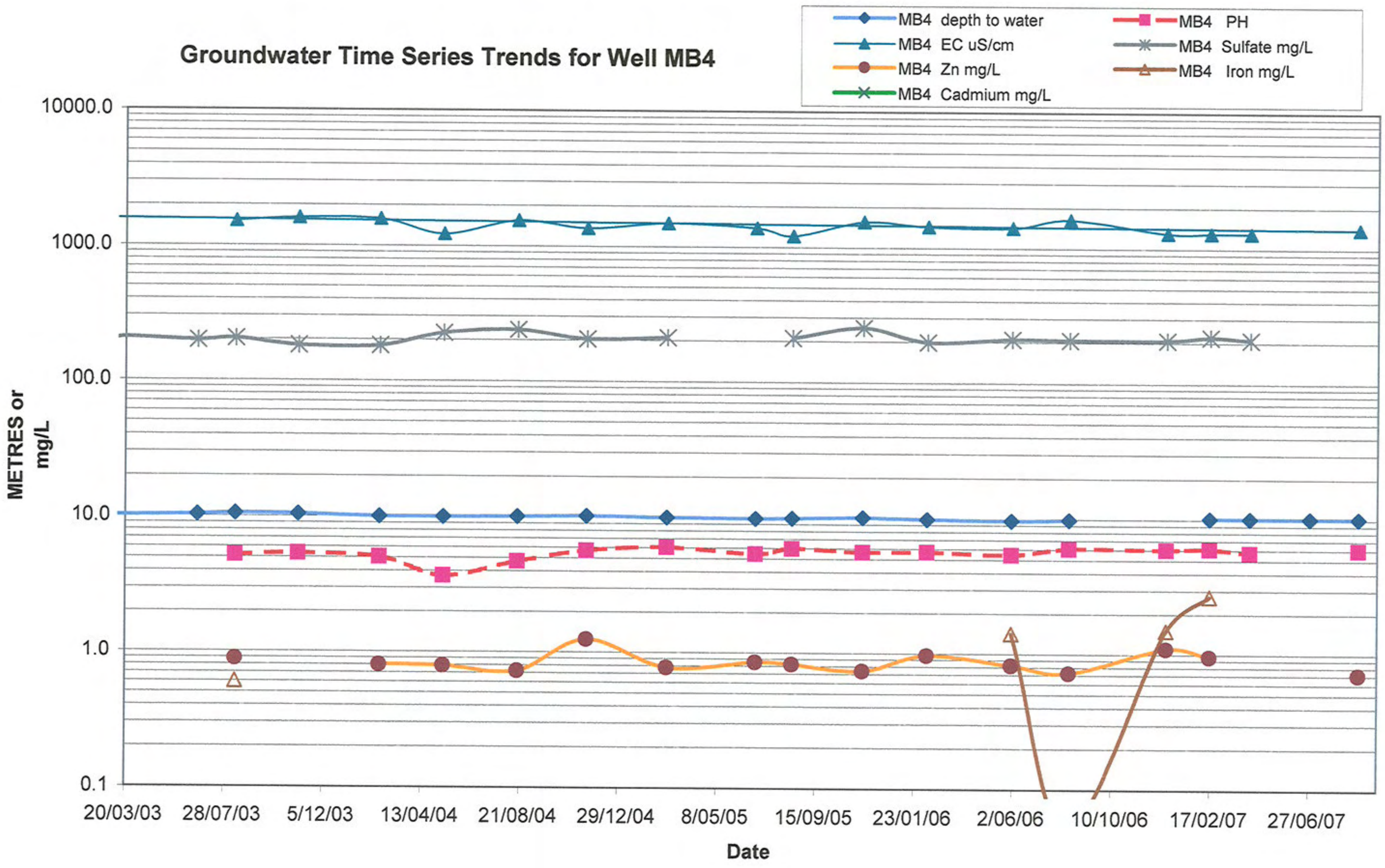
10/04/2007
28/06/2007
Samples



Groundwater Time Series Trends for Well MB4
MB4 depth to water
MB4 EC uS/cm
MB4 Zn mg/L
MB4 Cadmium mg/L
MB4 PH
MB4 Sulfate mg/L
MB4 Iron mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
METRES or mg/L
20/03/03
28/07/03
5/12/03
13/04/04
21/08/04
29/12/04
8/05/05
15/09/05
23/01/06
2/06/06
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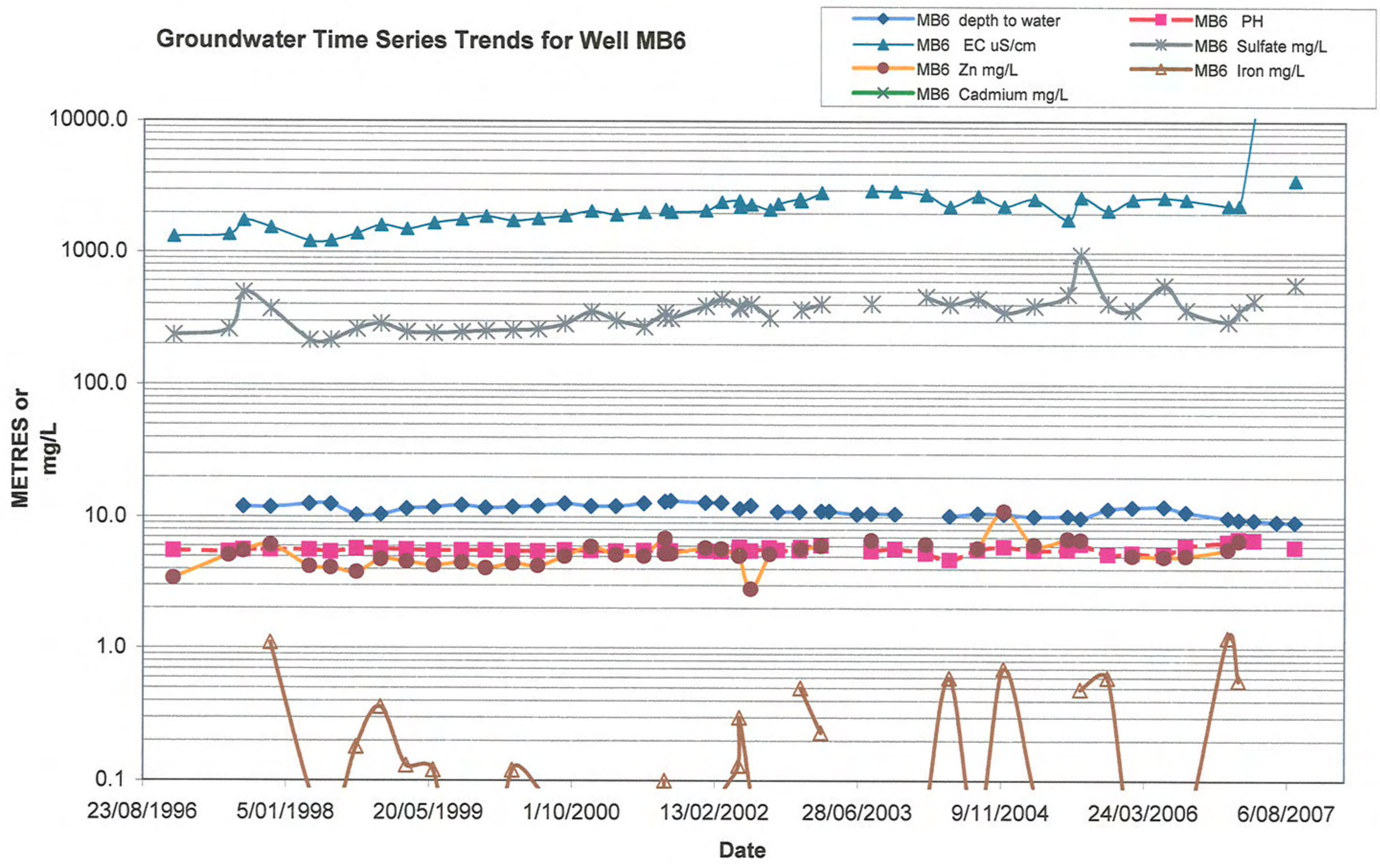
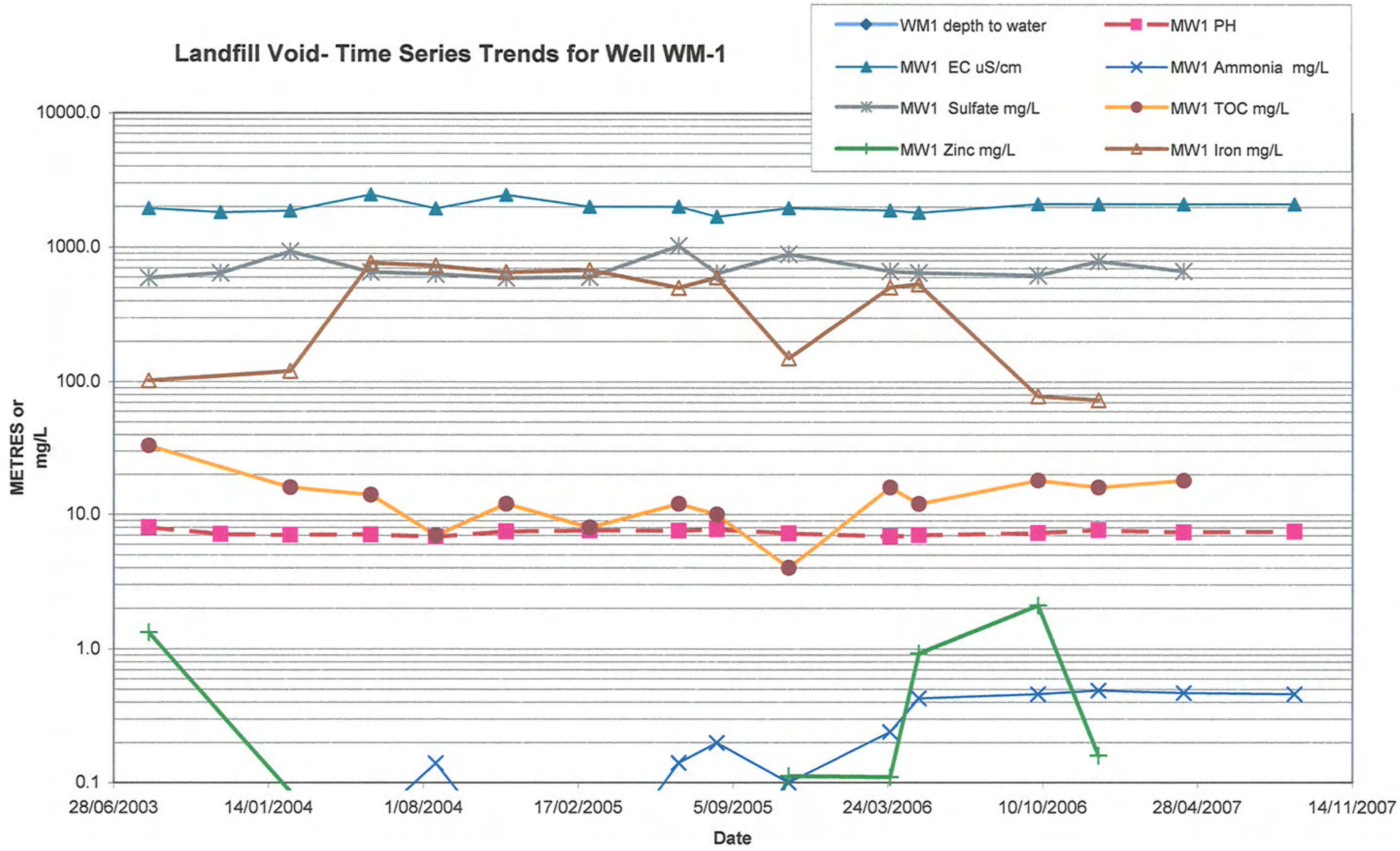
17/02/07
27/06/07
Date



Groundwater Time Series Trends for Well MB6
MB6 depth to water
MB6 EC uS/cm
MB6 Zn mg/L
MB6 Cadmium mg/L
MB6 PH
MB6 Sulfate mg/L
MB6 Iron mg/L
METRES or mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
23/08/1996
5/01/1998
20/05/1999
1/10/2000
13/02/2002
28/06/2003
9/11/2004
24/03/2006
6/08/2007
Date


Landfill Void- Time Series Trends for Well WM-1
WM1 depth to water
MW1 EC uS/cm
MW1 Sulfate mg/L
MW1 Zinc mg/L
MW1 PH
MW1 Ammonia mg/L
MW1 TOC mg/L
MW1 Iron mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
METRES or mg/L
28/06/2003
14/01/2004
1/08/2004
17/02/2005
5/09/2005
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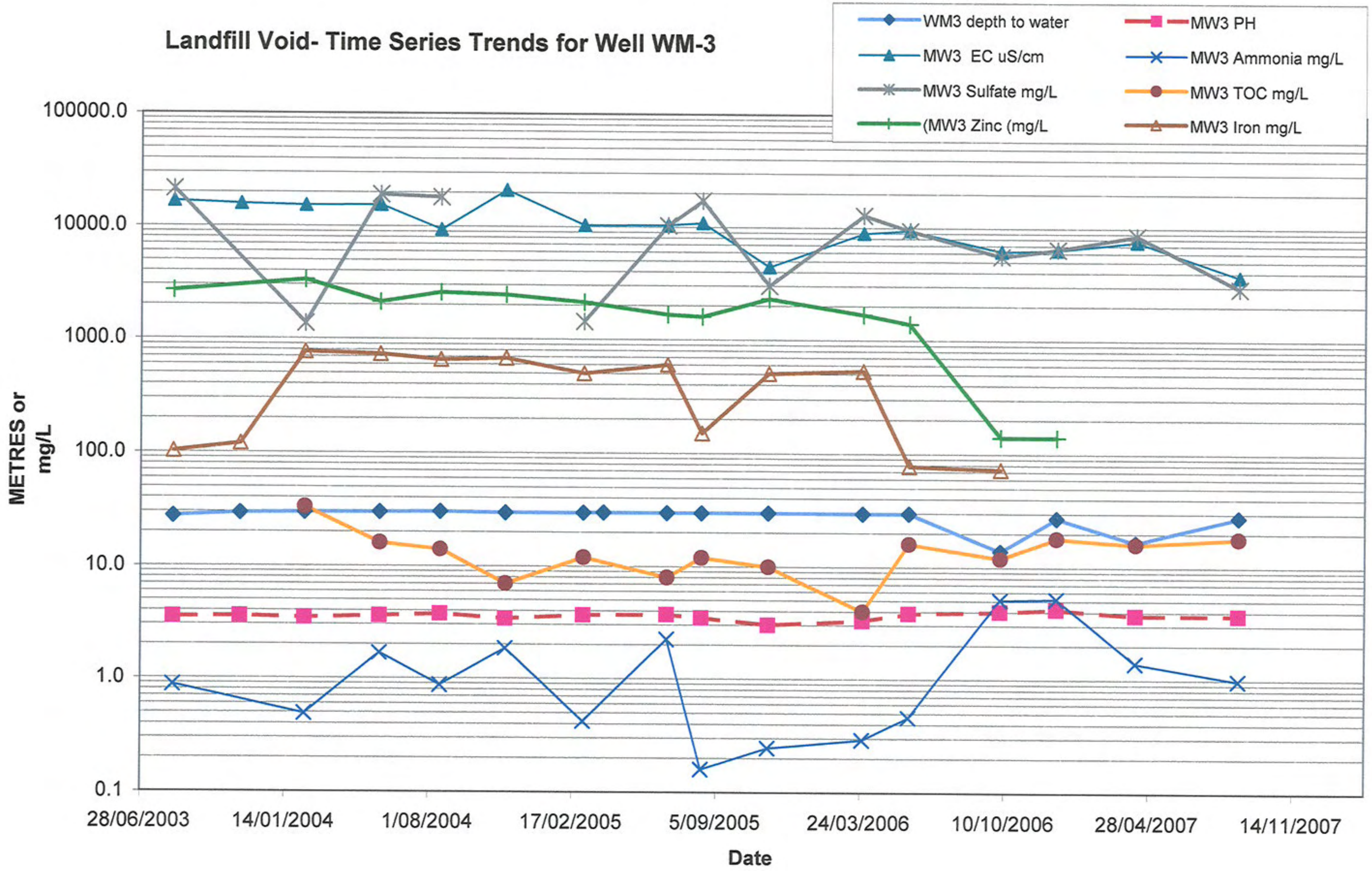
28/04/2007
14/11/2007
Date



Landfill Void- Time Series Trends for Well WM-3
WM3 depth to water
MW3 EC uS/cm
MW3 Sulfate mg/L
(MW3 Zinc (mg/L
MW3 PH
MW3 Ammonia mg/L
MW3 TOC mg/L
MW3 Iron mg/L
100000.0
10000.0
1000.0
100.0
10.0
1.0
0.1
METRES or mg/L
28/06/2003
14/01/2004
1/08/2004
17/02/2005
5/09/2005
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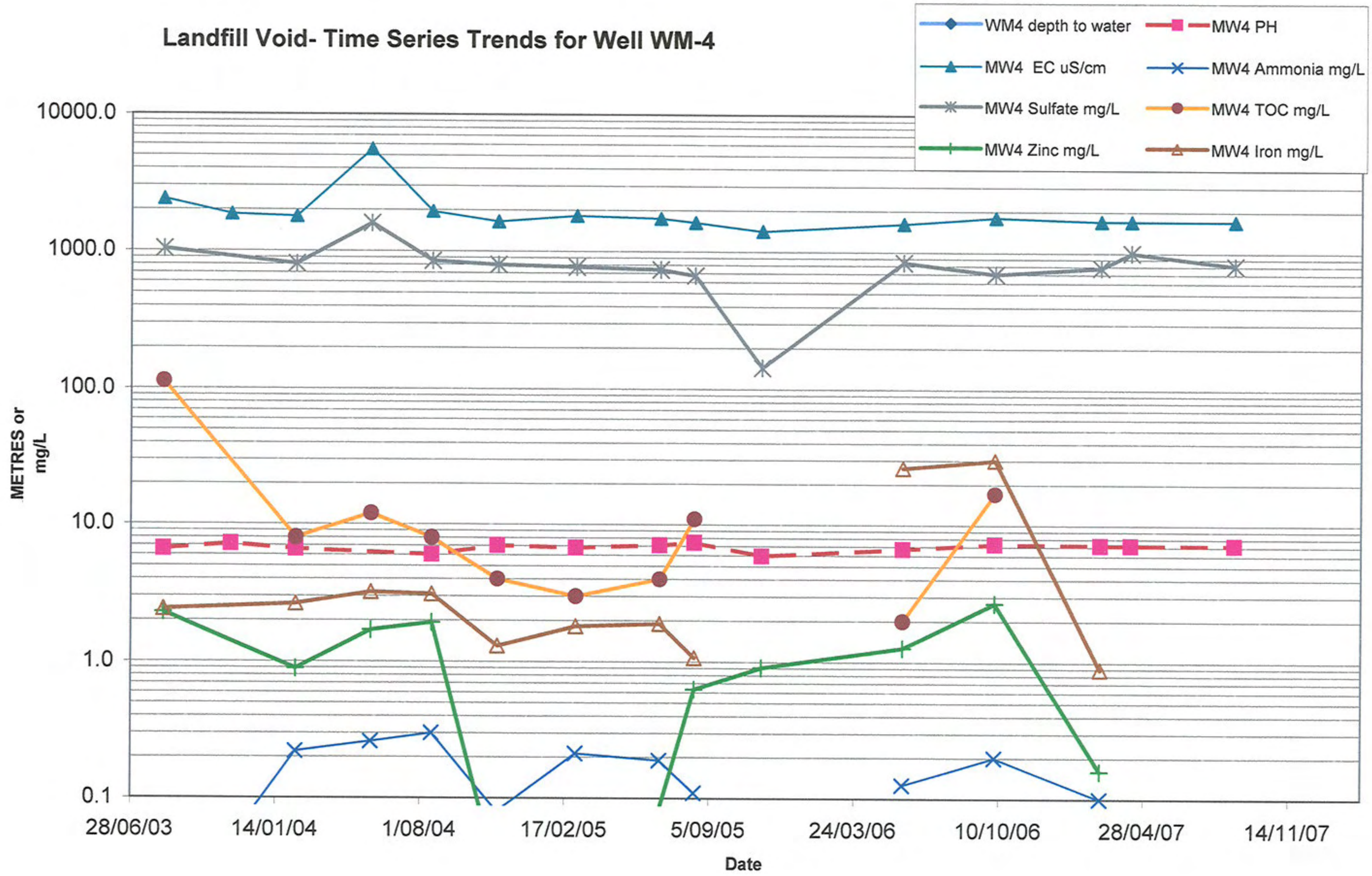
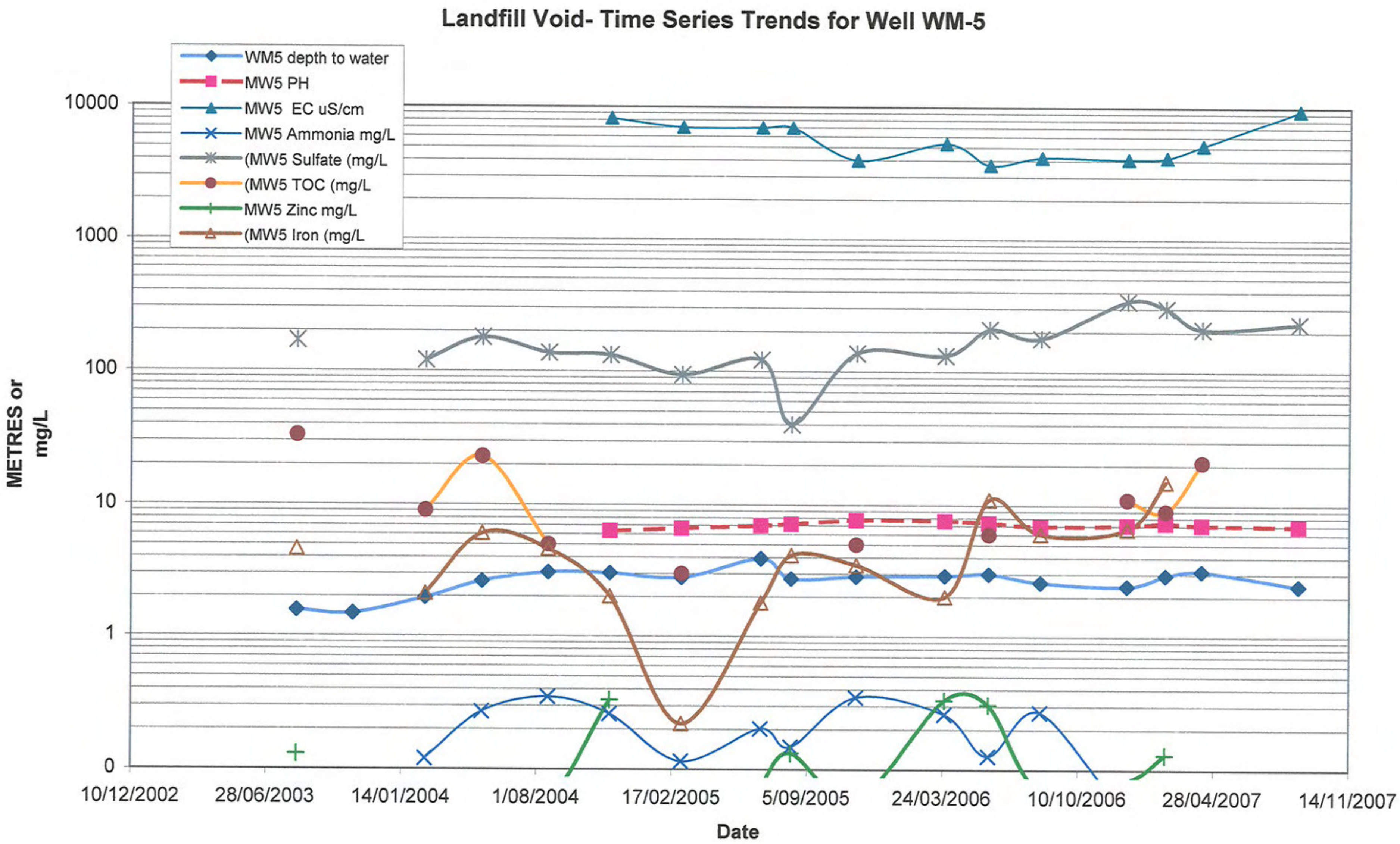
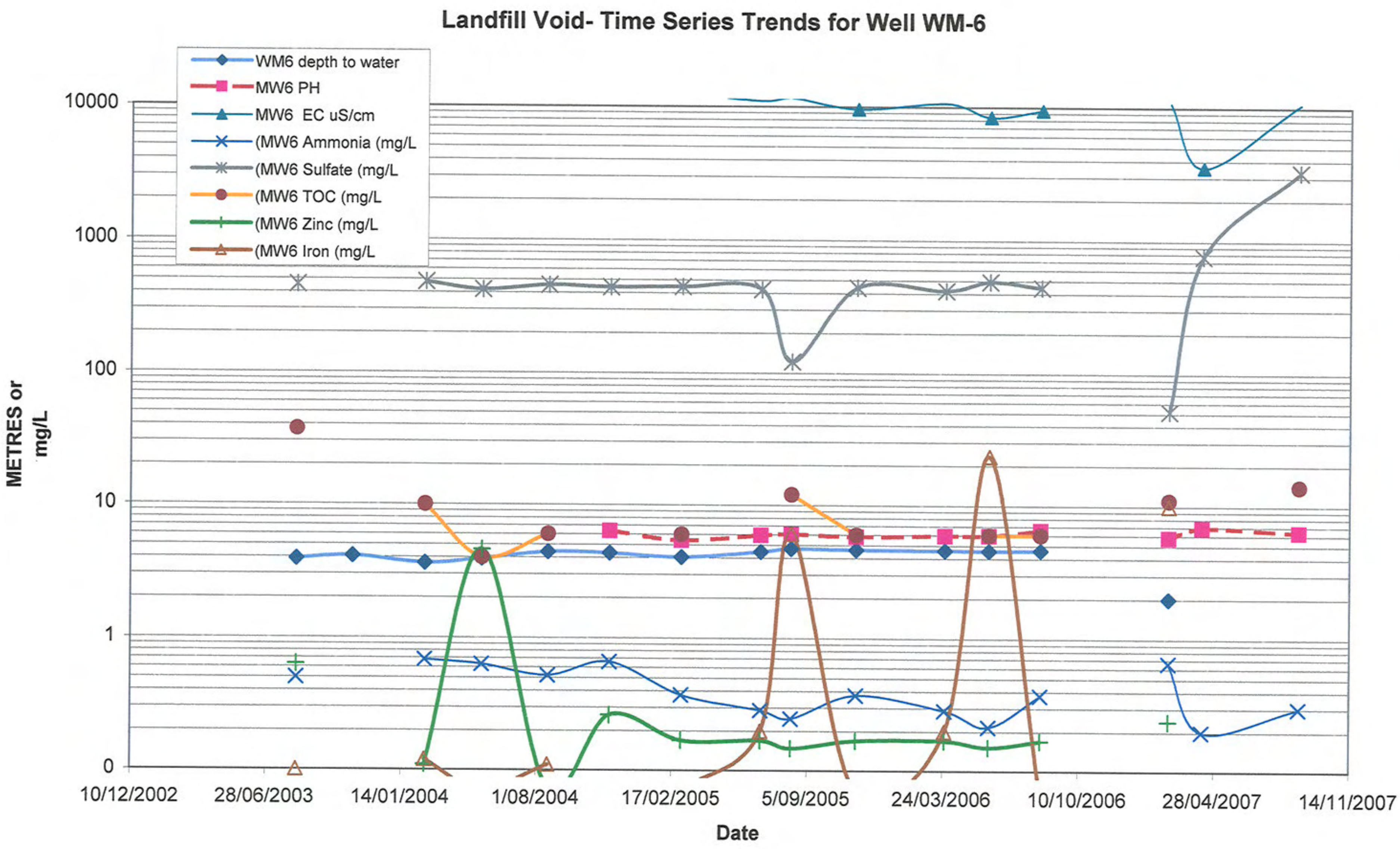
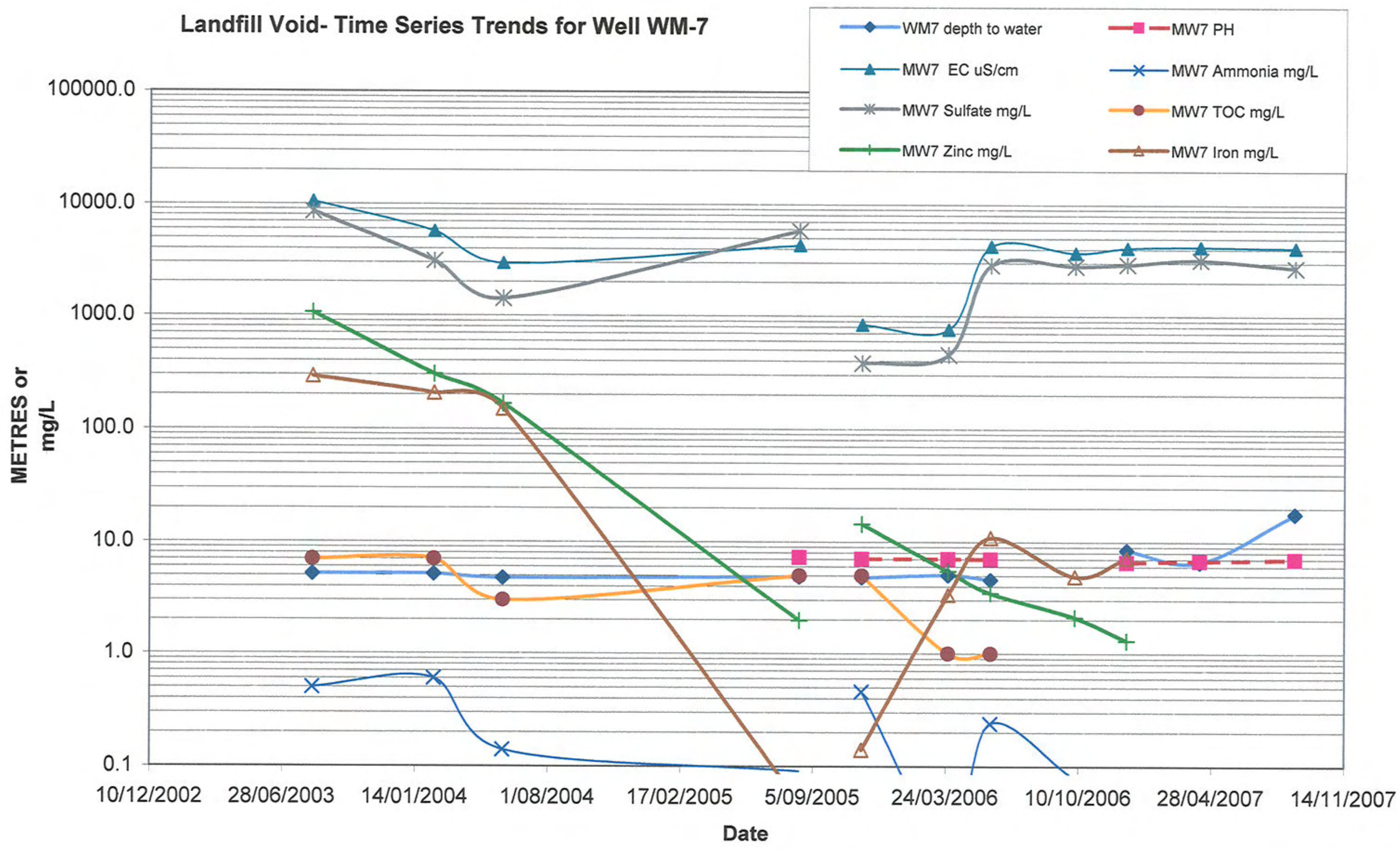
28/04/2007
14/11/2007
Date



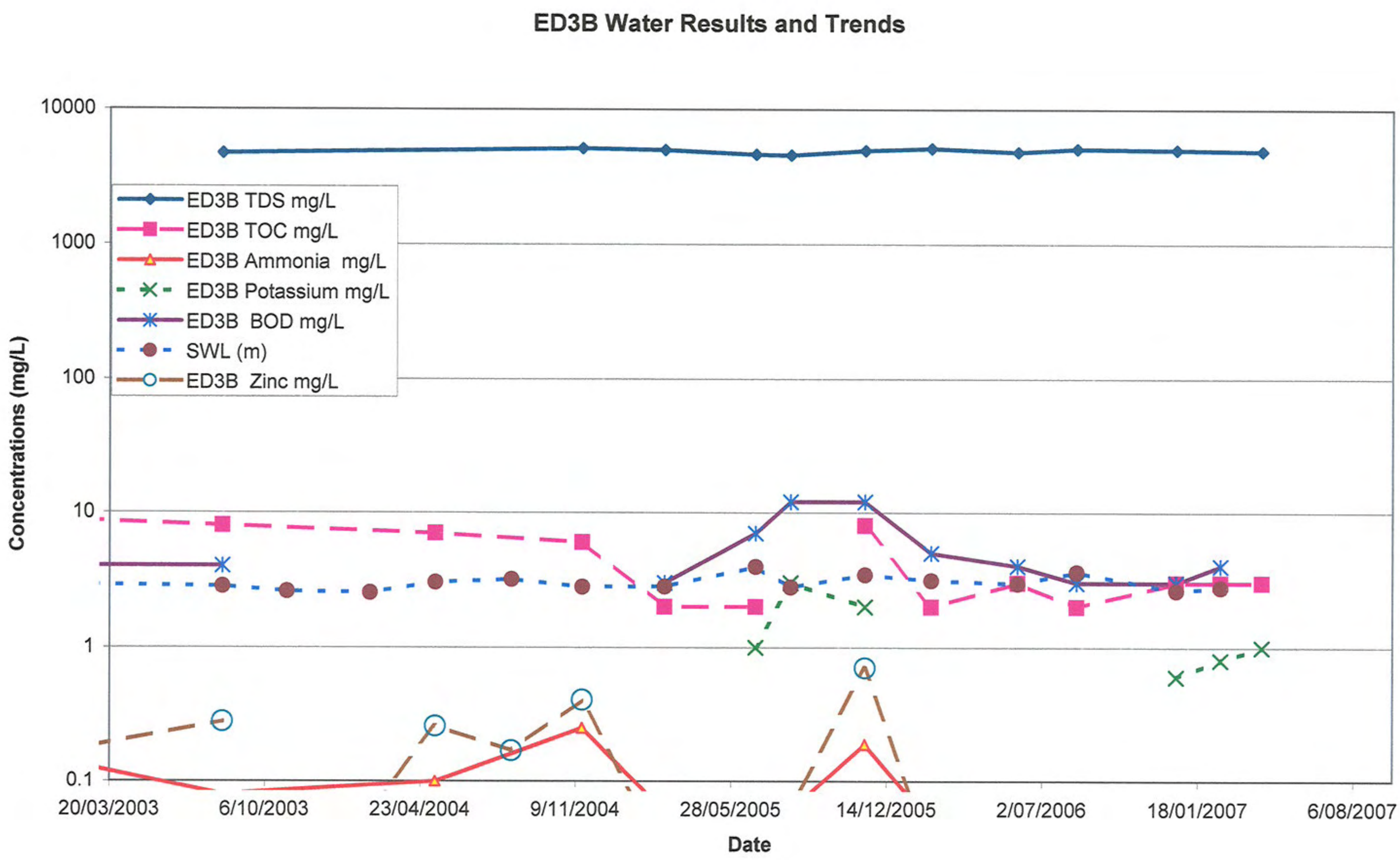
Landfill Void- Time Series Trends for Well WM-4
WM4 depth to water
MW4 PH
MW4 EC uS/cm
MW4 Ammonia mg/L
MW4 Sulfate mg/L
MW4 TOC mg/L
MW4 Zinc mg/L
MW4 Iron mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
METRES or mg/L
28/06/03
14/01/04
1/08/04
17/02/05
5/09/05
24/03/06
10/10/06
28/04/07
14/11/07
Date

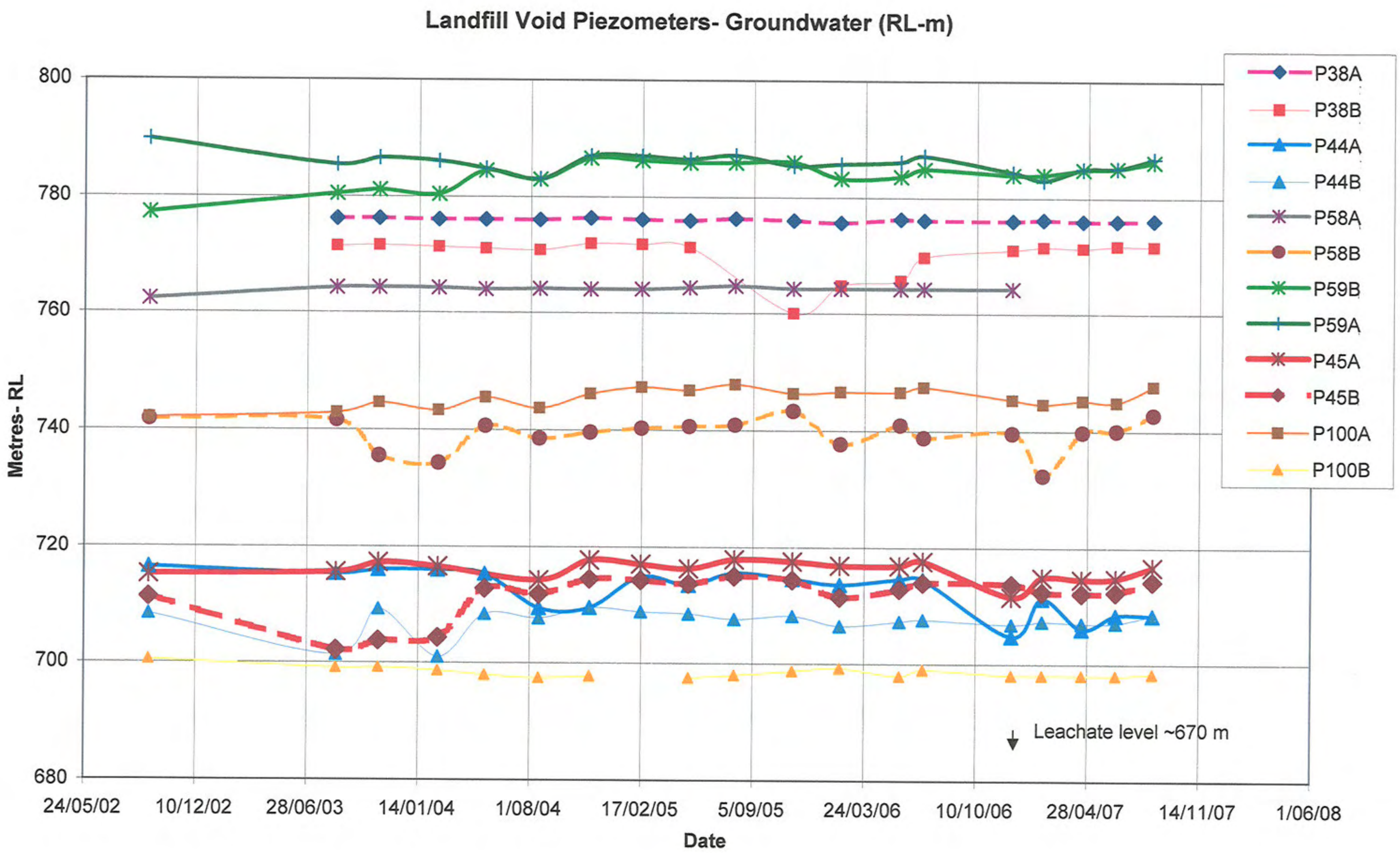

Landfill Void- Time Series Trends for Well WM-5
WM5 depth to water
MW5 PH
MW5 EC uS/cm
MW5 Ammonia mg/L
(MW5 Sulfate (mg/L
(MW5 TOC (mg/L
MW5 Zinc mg/L
(MW5 Iron (mg/L
METRES or mg/L
10000
1000
100
10
1
0
10/12/2002
28/06/2003
14/01/2004
1/08/2004
17/02/2005
5/09/2005
24/03/2006
10/10/2006
28/04/2007
14/11/2007
Date


Landfill Void- Time Series Trends for Well WM-6
WM6 depth to water
MW6 PH
MW6 EC uS/cm
(MW6 Ammonia (mg/L
(MW6 Sulfate (mg/L
(MW6 TOC (mg/L
(MW6 Zinc (mg/L
(MW6 Iron (mg/L
METRES or mg/L
10000
1000
100
10
1
0
10/12/2002
28/06/2003
14/01/2004
1/08/2004
17/02/2005
5/09/2005
24/03/2006
10/10/2006
28/04/2007
14/11/2007
Date

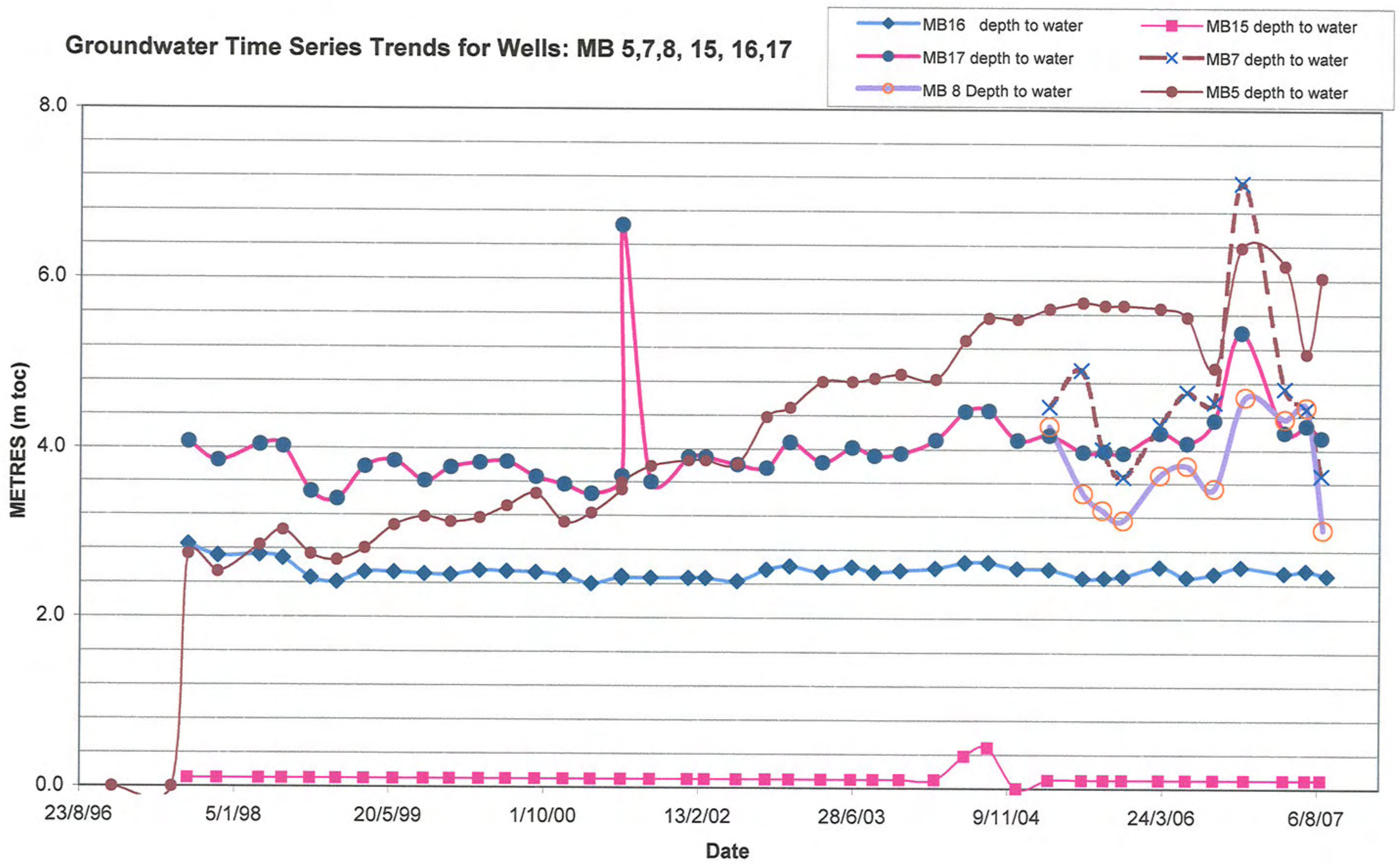


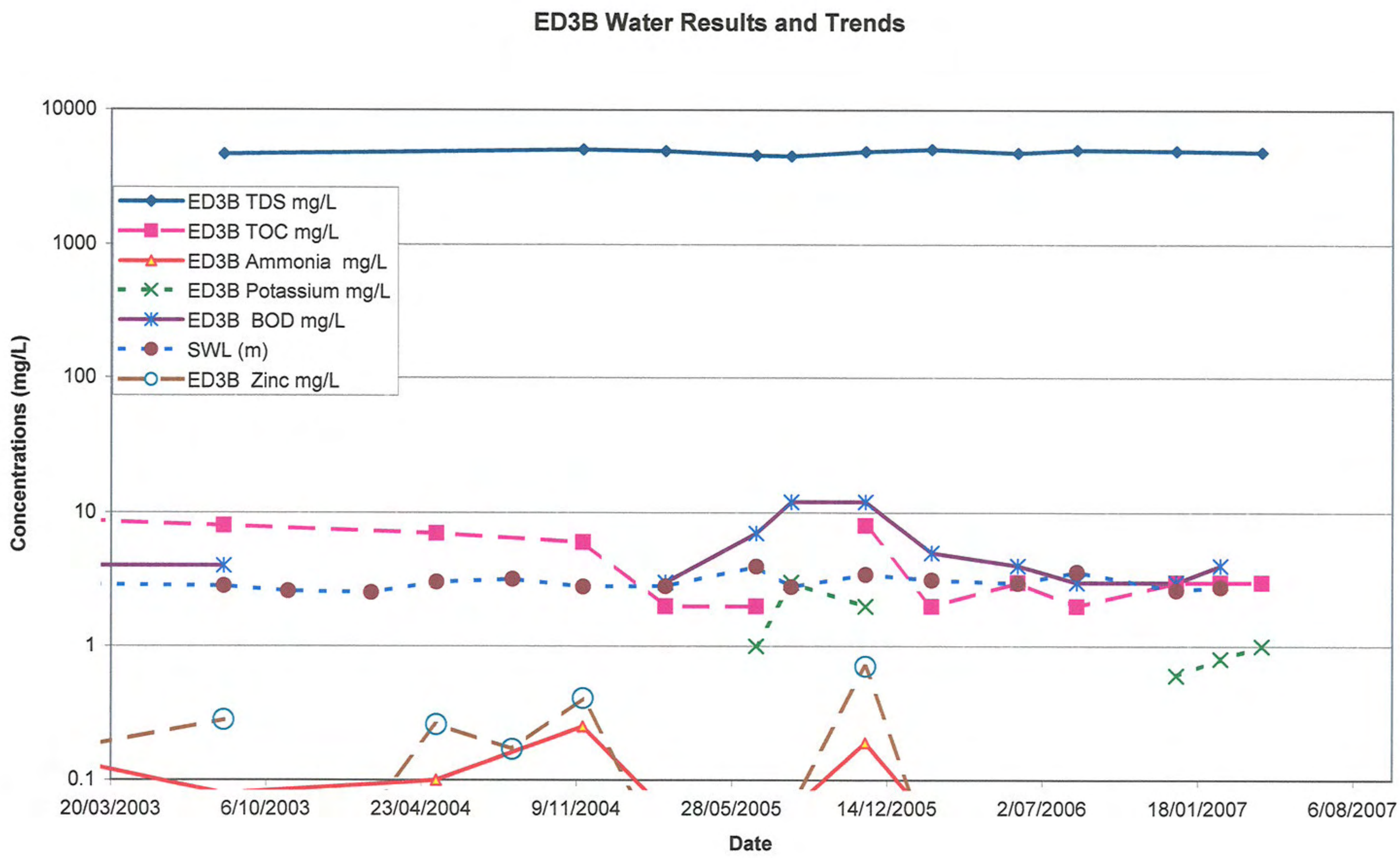
Landfill Void- Time Series Trends for Well WM-7
WM7 depth to water
MW7 EC uS/cm
MW7 Sulfate mg/L
MW7 Zinc mg/L
MW7 PH
MW7 Ammonia mg/L
MW7 TOC mg/L
MW7 Iron mg/L
METRES or mg/L
100000.0
10000.0
1000.0
100.0
10.0
1.0
0.1
10/12/2002
28/06/2003
14/01/2004
1/08/2004
17/02/2005
5/09/2005
24/03/2006
10/10/2006
28/04/2007
14/11/2007
Date

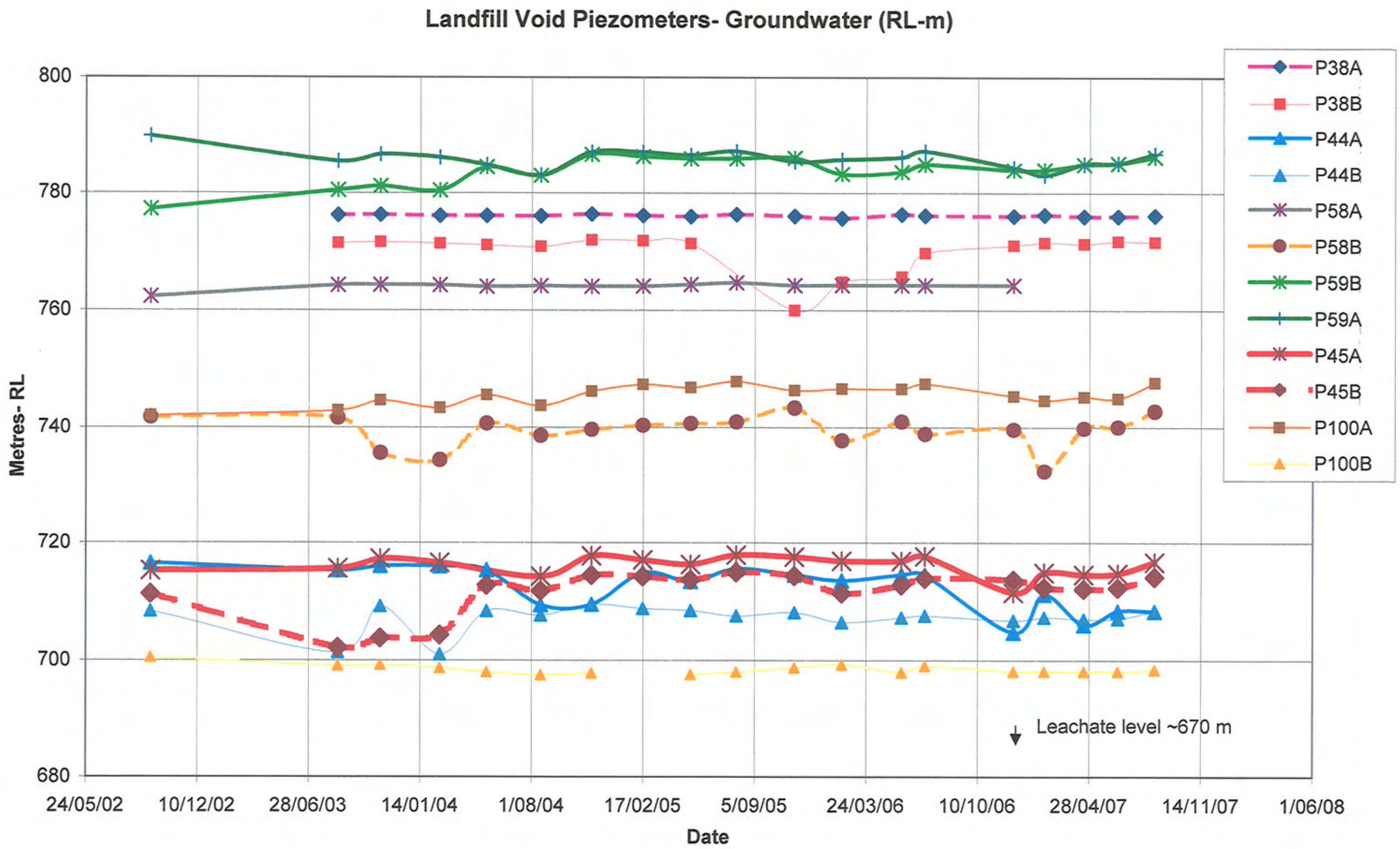

ED3B Water Results and Trends
Concentrations (mg/L)
10000
1000
100
10
1
0.1
ED3B TDS mg/L
ED3B TOC mg/L
ED3B Ammonia mg/L
ED3B Potassium mg/L
ED3B BOD mg/L
SWL (m)
ED3B Zinc mg/L
20/03/2003
6/10/2003
23/04/2004
9/11/2004
28/05/2005
14/12/2005
2/07/2006
18/01/2007
6/08/2007
Date


Landfill Void Piezometers- Groundwater (RL-m)
Metres- RL
800
780
760
740
720
700
680
24/05/02
10/12/02
28/06/03
14/01/04
1/08/04
17/02/05
5/09/05
24/03/06
10/10/06
28/04/07
14/11/07
1/06/08
Date
Leachate level ~670 m
P38A
P38B
P44A
P44B
P58A
P58B
P59B
P59A
P45A
P45B
P100A
P100B

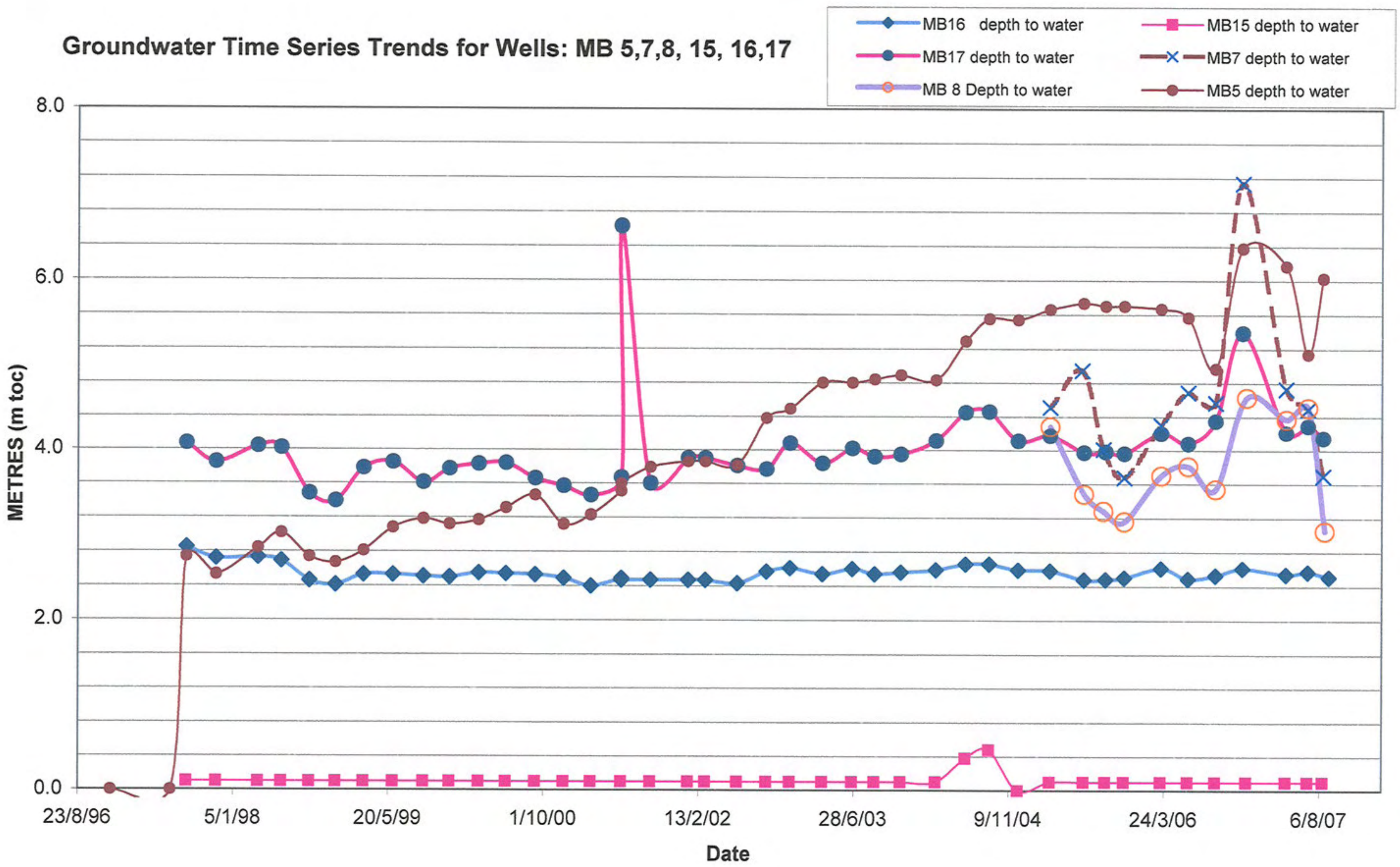
Groundwater Time Series Trends for Wells: MB 5,7,8, 15, 16,17

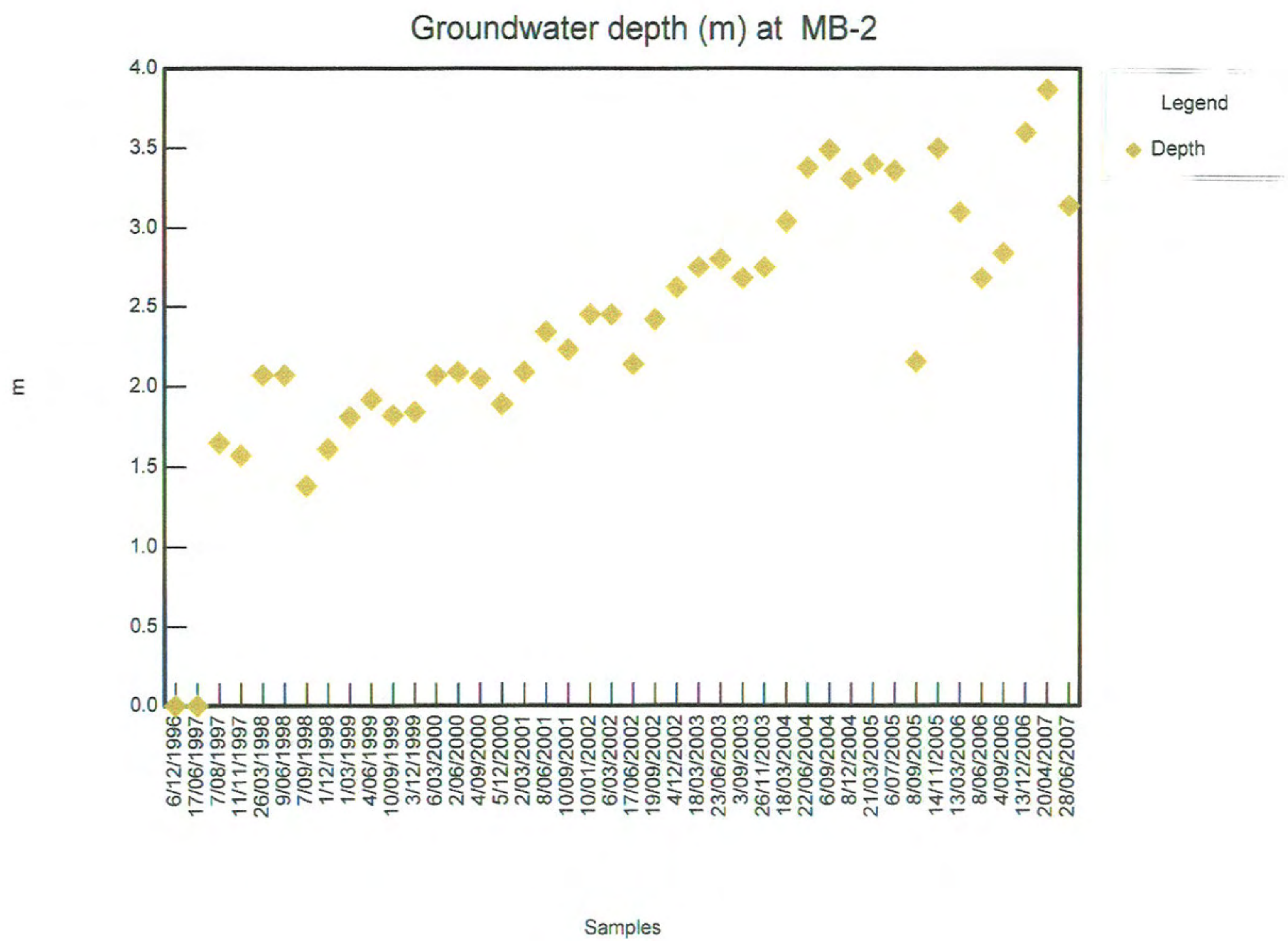



ED3B Water Results and Trends
10000
1000
100
10
1
0.1
Concentrations (mg/L)
ED3B TDS mg/L
ED3B TOC mg/L
ED3B Ammonia mg/L
ED3B Potassium mg/L
ED3B BOD mg/L
SWL (m)
ED3B Zinc mg/L
20/03/2003
6/10/2003
23/04/2004
9/11/2004
28/05/2005
14/12/2005
2/07/2006
18/01/2007
6/08/2007
Date



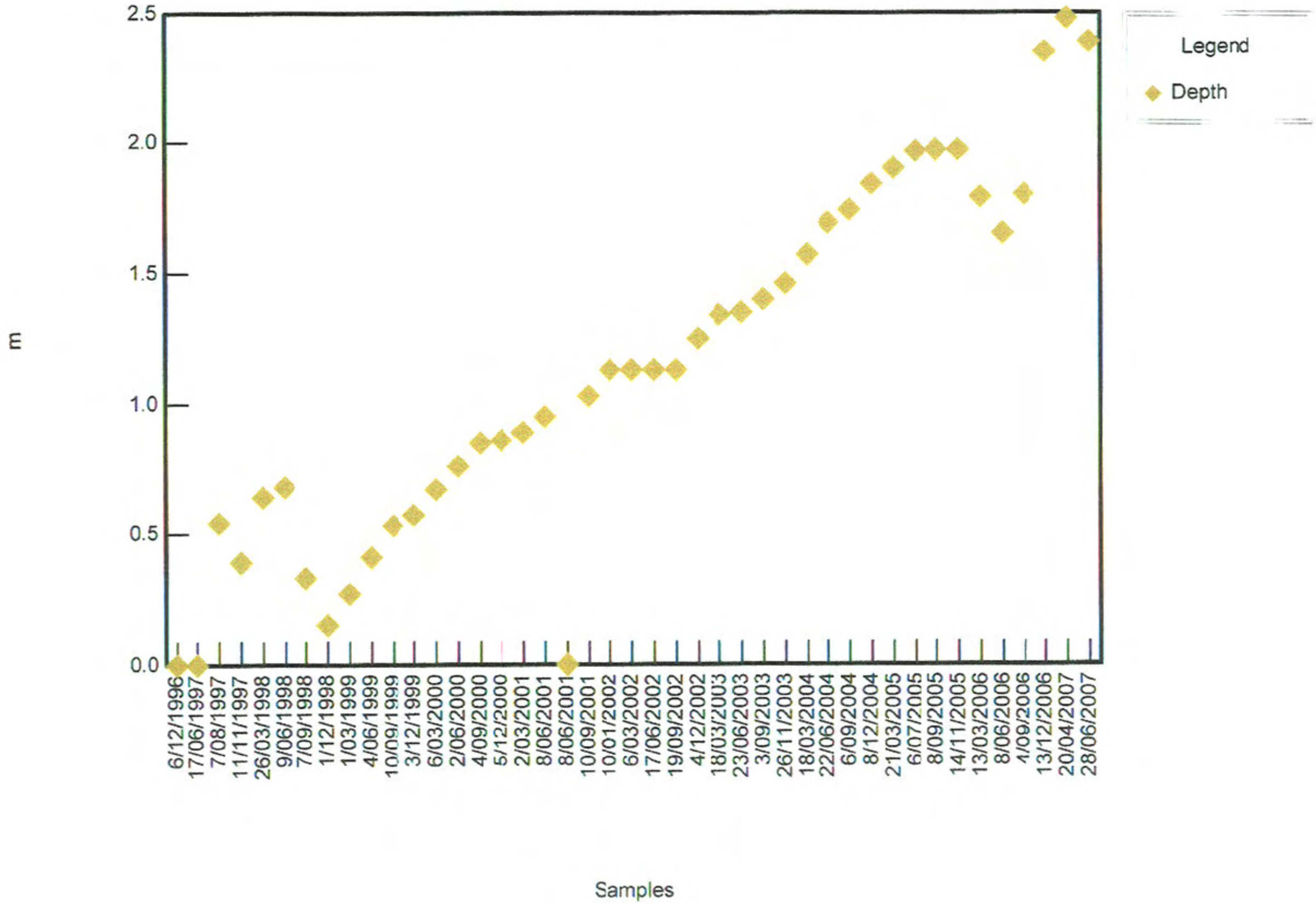
Landfill Void Piezometers- Groundwater (RL-m)
Metres- RL
800
780
760
740
720
700
680
24/05/02
10/12/02
28/06/03
14/01/04
1/08/04
17/02/05
5/09/05
24/03/06
10/10/06
28/04/07
14/11/07
1/06/08
Date
Leachate level ~670 m
P38A
P38B
P44A
P44B
P58A
P58B
P59B
P59A
P45A
P45B
P100A
P100B

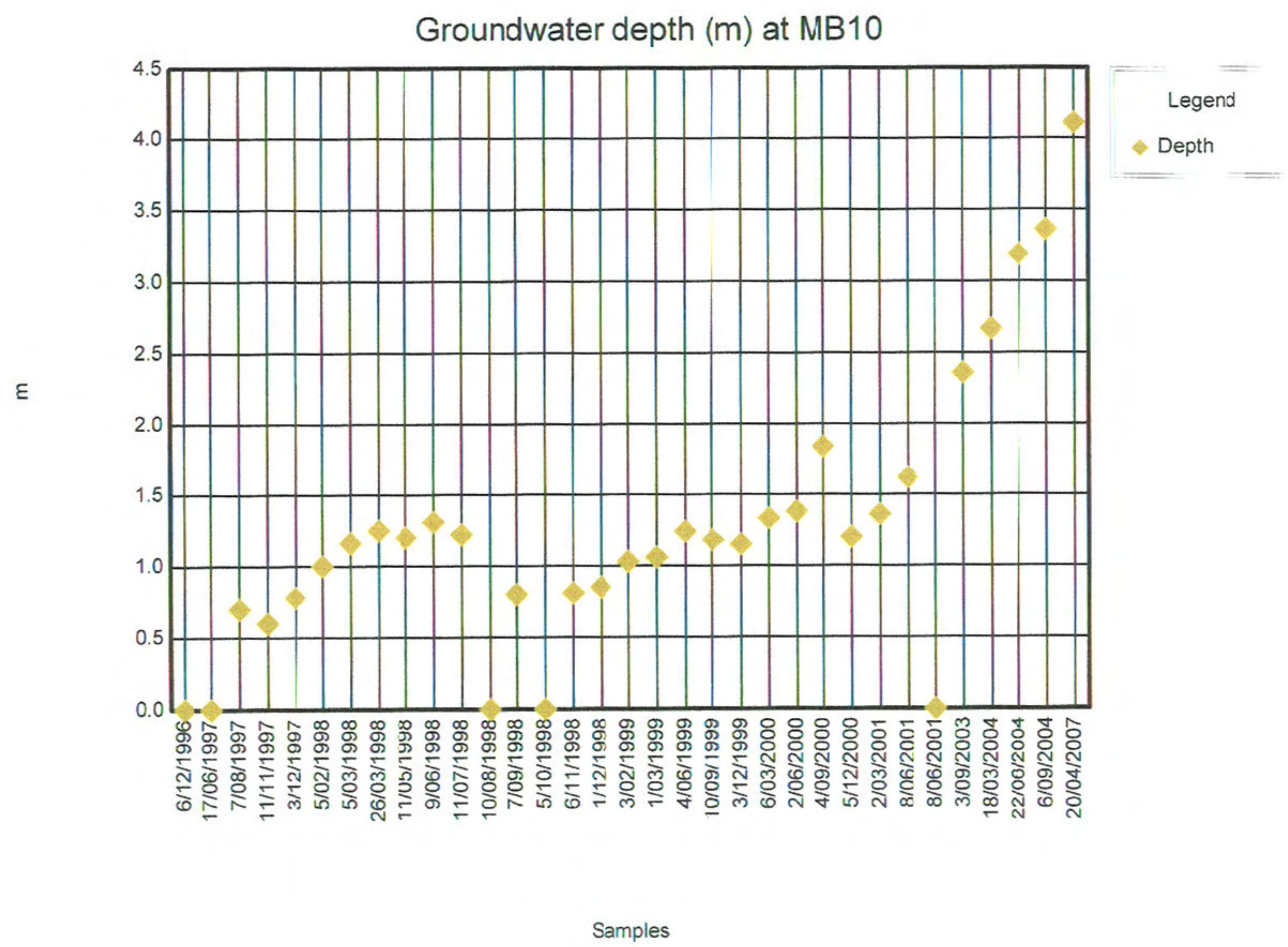

Groundwater Time Series Trends for Wells: MB 5,7,8, 15, 16,17
MB16 depth to water
MB17 depth to water
MB 8 Depth to water
MB15 depth to water
MB7 depth to water
MB5 depth to water
8.0
6.0
4.0
2.0
0.0
METRES (m toc)
23/8/96
5/1/98
20/5/99
1/10/00
13/2/02
28/6/03
9/11/04
24/3/06
6/8/07
Date

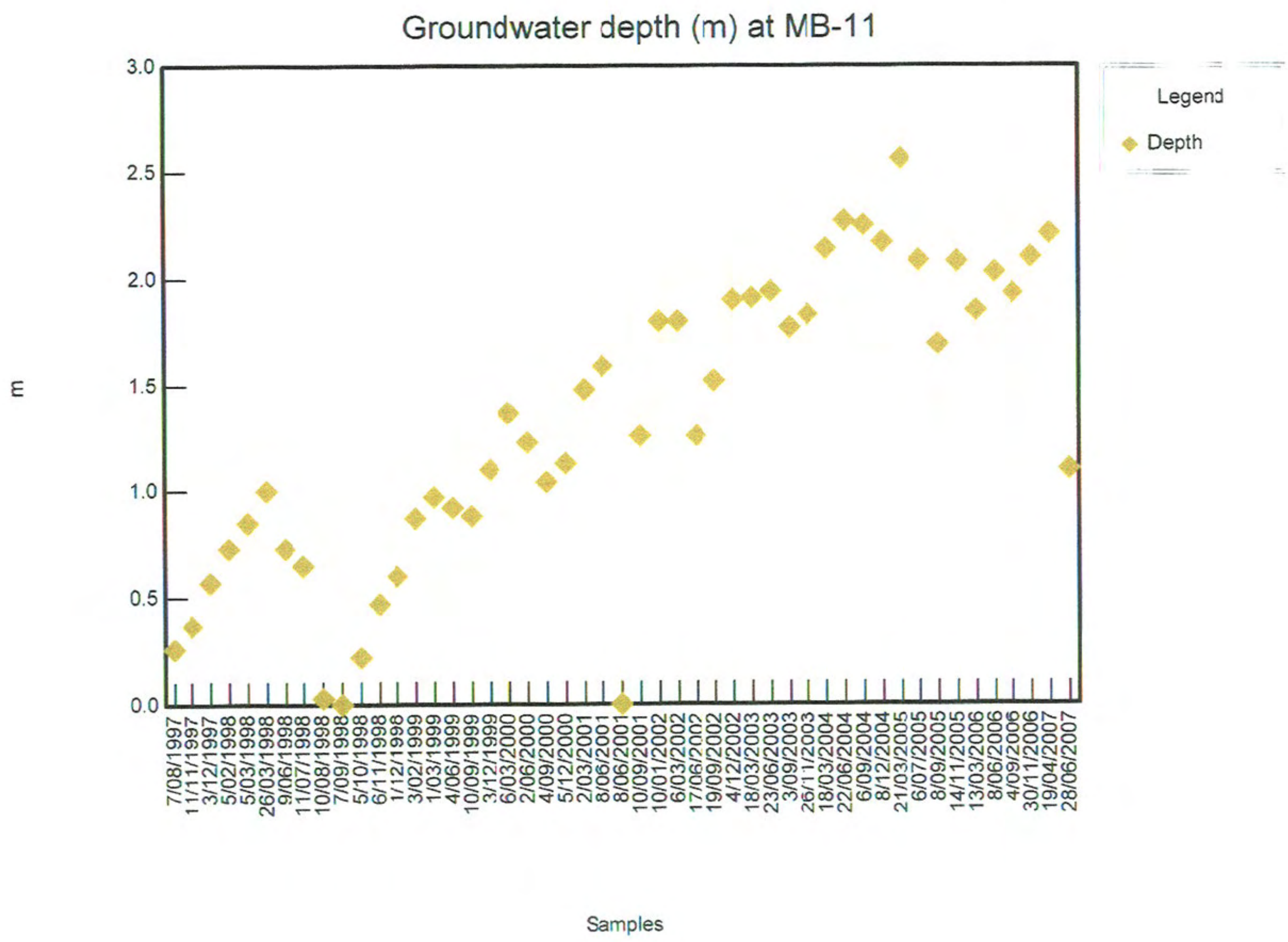


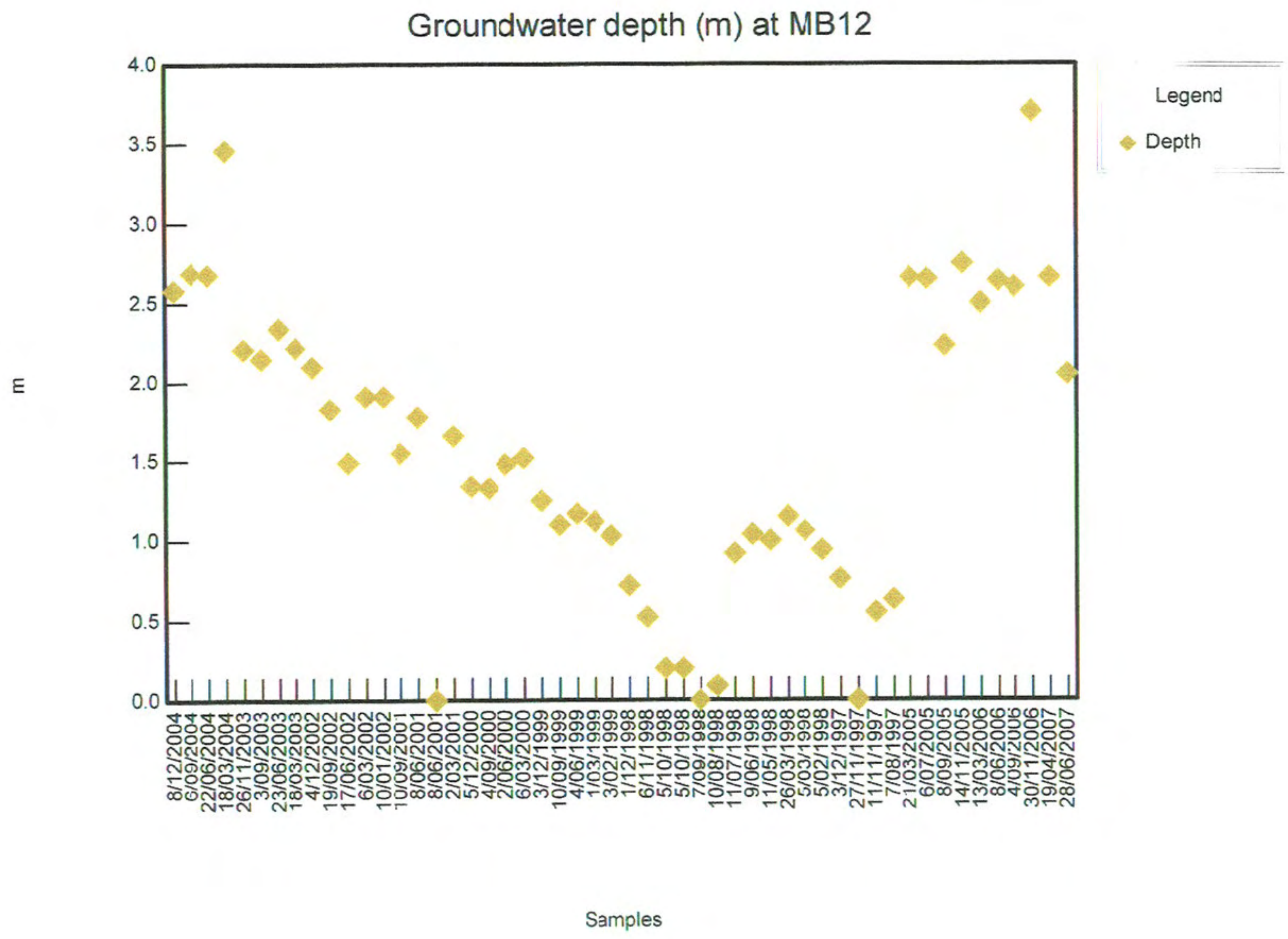
Groundwater depth (m) at MB-2
m
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/12/1996
17/06/1997
7/08/1997
11/11/1997
26/03/1998
9/06/1998
7/09/1998
1/12/1998
1/03/1999
4/06/1999
10/09/1999
3/12/1999
6/03/2000
2/06/2000
4/09/2000
5/12/2000
2/03/2001
8/06/2001
10/09/2001
10/01/2002
6/03/2002
17/06/2002
19/09/2002
4/12/2002
18/03/2003
23/06/2003
3/09/2003
26/11/2003
18/03/2004
22/06/2004
6/09/2004
8/12/2004
21/03/2005
6/07/2005
8/09/2005
14/11/2005
13/03/2006
8/06/2006
4/09/2006
13/12/2006
20/04/2007
28/06/2007
Samples
Legend
Depth

Groundwater depth (m) at MB-3

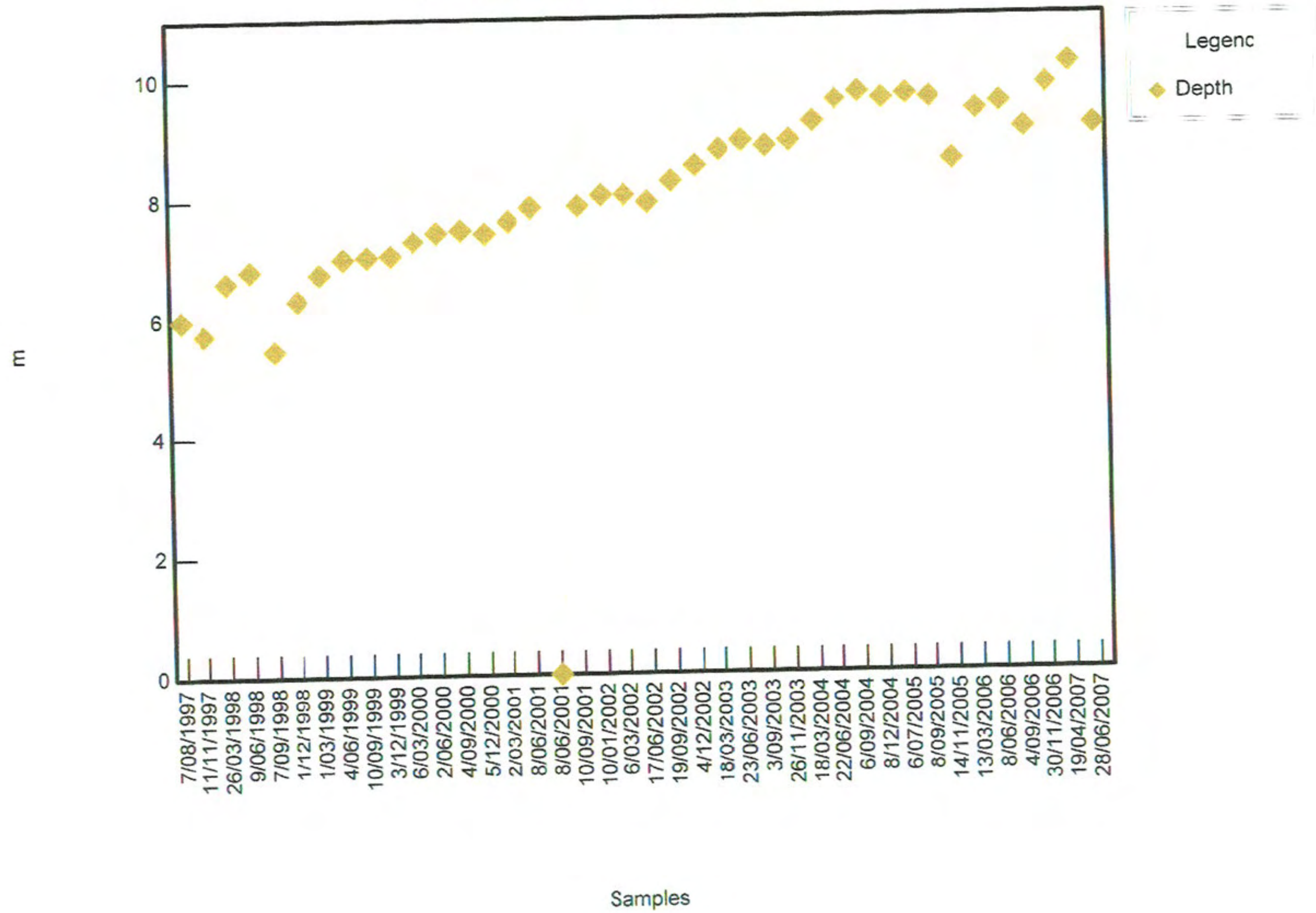



Groundwater depth (m) at MB10
Legend
Depth
m
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
6/12/1996
17/06/1997
7/08/1997
11/11/1997
3/12/1997
5/02/1998
5/03/1998
26/03/1998
11/05/1998
9/06/1998
11/07/1998
10/08/1998
7/09/1998
5/10/1998
6/11/1998
1/12/1998
3/02/1999
1/03/1999
4/06/1999
10/09/1999
3/12/1999
6/03/2000
2/06/2000
4/09/2000
5/12/2000
2/03/2001
8/06/2001
8/06/2001
3/09/2003
18/03/2004
22/06/2004
6/09/2004
20/04/2007
Samples

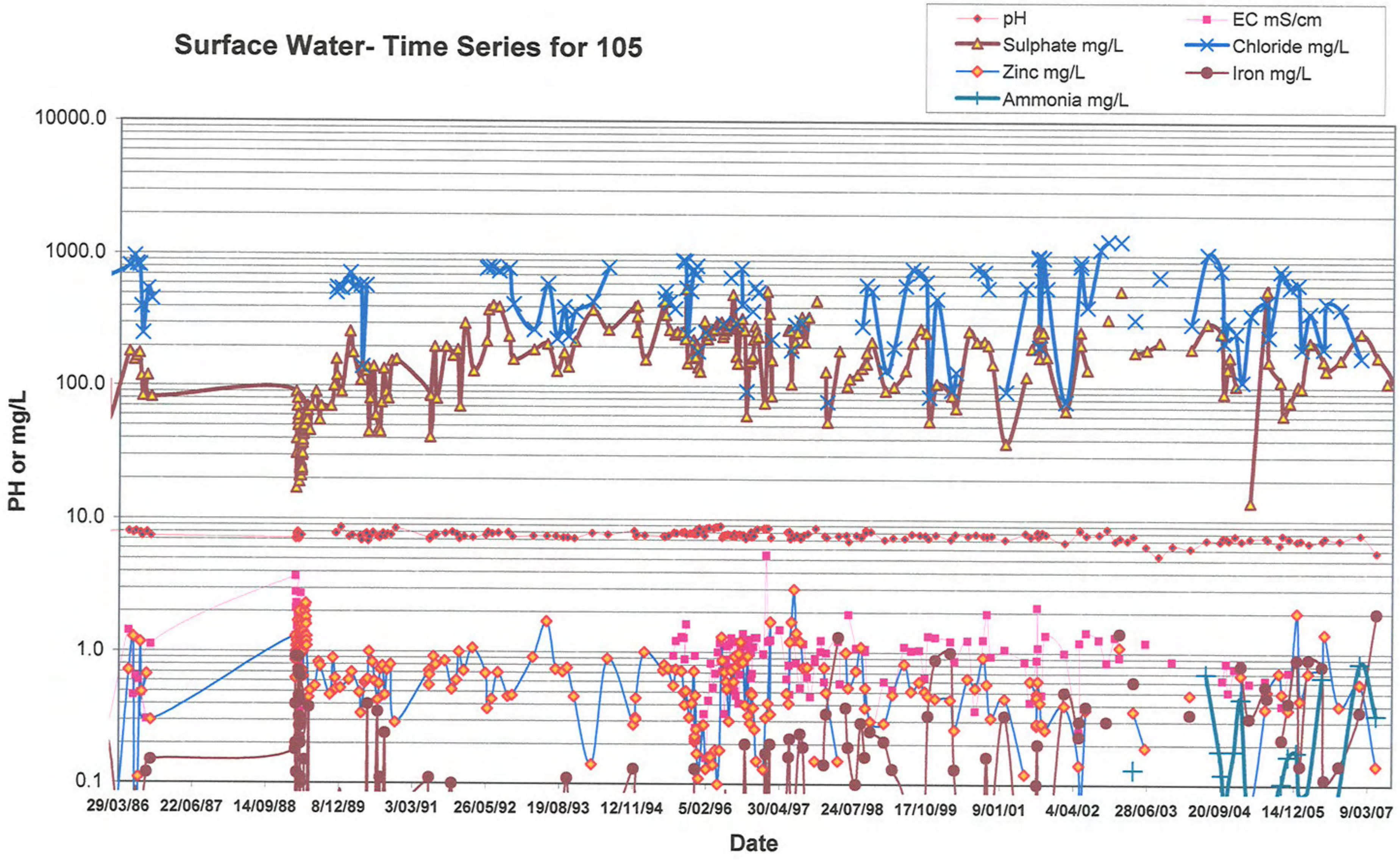

Groundwater depth (m) at MB-11
m
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Legend
Depth
7/08/1997
11/11/1997
3/12/1997
5/02/1998
5/03/1998
26/03/1998
9/06/1998
11/07/1998
10/08/1998
7/09/1998
5/10/1998
6/11/1998
1/12/1998
3/02/1999
1/03/1999
4/06/1999
10/09/1999
3/12/1999
6/03/2000
2/06/2000
4/09/2000
5/12/2000
2/03/2001
8/06/2001
8/06/2001
10/09/2001
10/01/2002
6/03/2002
17/06/2002
19/09/2002
4/12/2002
18/03/2003
23/06/2003
3/09/2003
26/11/2003
18/03/2004
22/06/2004
6/09/2004
8/12/2004
21/03/2005
6/07/2005
8/09/2005
14/11/2005
13/03/2006
8/06/2006
4/09/2006
30/11/2006
19/04/2007
28/06/2007
Samples


Groundwater depth (m) at MB12
m
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Legend
Depth
8/12/2004
6/09/2004
22/06/2004
18/03/2004
26/11/2003
3/09/2003
23/06/2003
18/03/2003
4/12/2002
19/09/2002
17/06/2002
6/03/2002
10/01/2002
10/09/2001
8/06/2001
8/06/2001
2/03/2001
5/12/2000
4/09/2000
2/06/2000
6/03/2000
3/12/1999
10/09/1999
4/06/1999
1/03/1999
3/02/1999
1/12/1998
6/11/1998
5/10/1998
5/10/1998
7/09/1998
10/08/1998
11/07/1998
9/06/1998
11/05/1998
26/03/1998
5/03/1998
5/02/1998
3/12/1997
27/11/1997
11/11/1997
7/08/1997
21/03/2005
6/07/2005
8/09/2005
14/11/2005
13/03/2006
8/06/2006
4/09/2006
30/11/2006
19/04/2007
28/06/2007
Samples

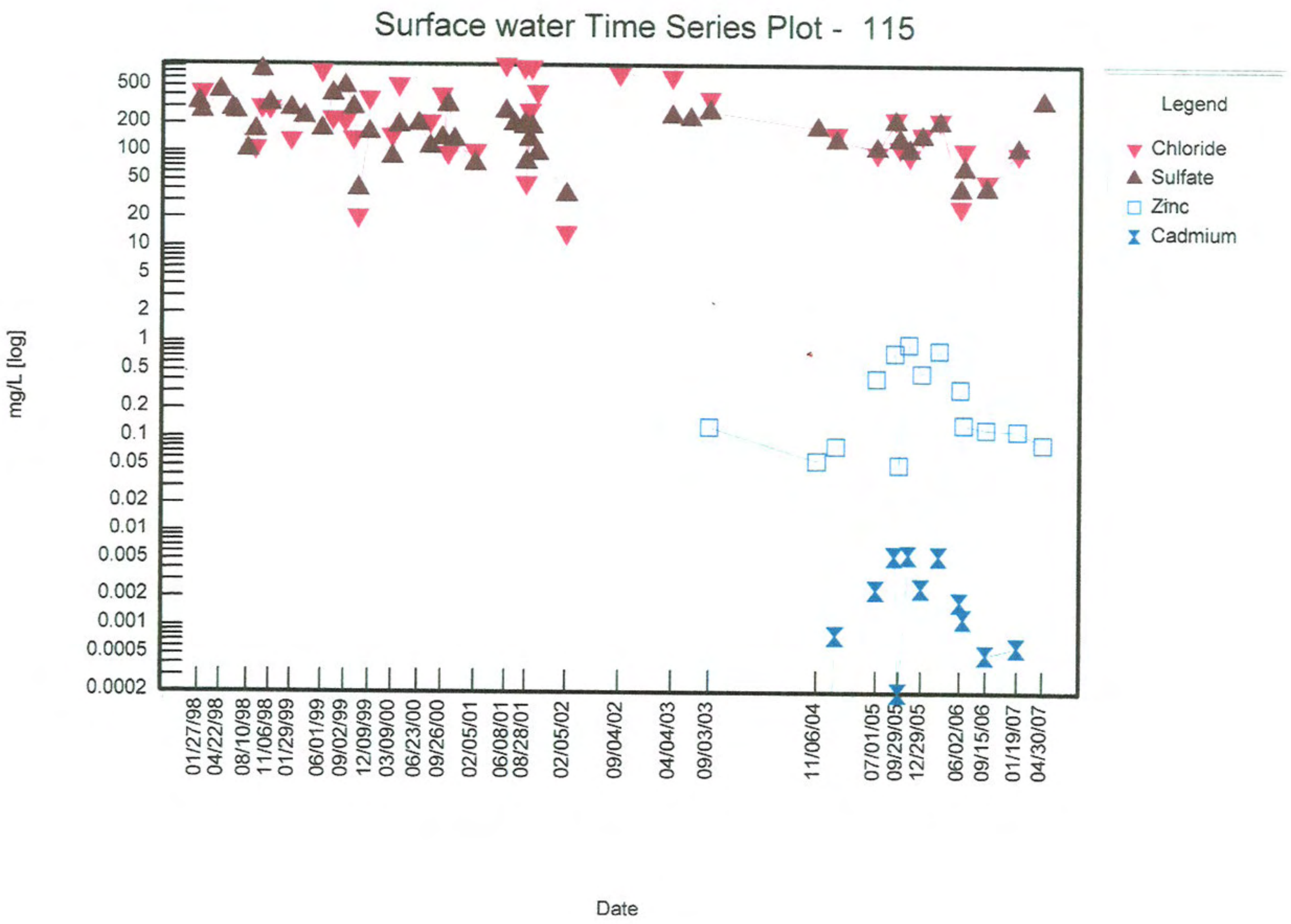
Groundwater depth (m) at MB14

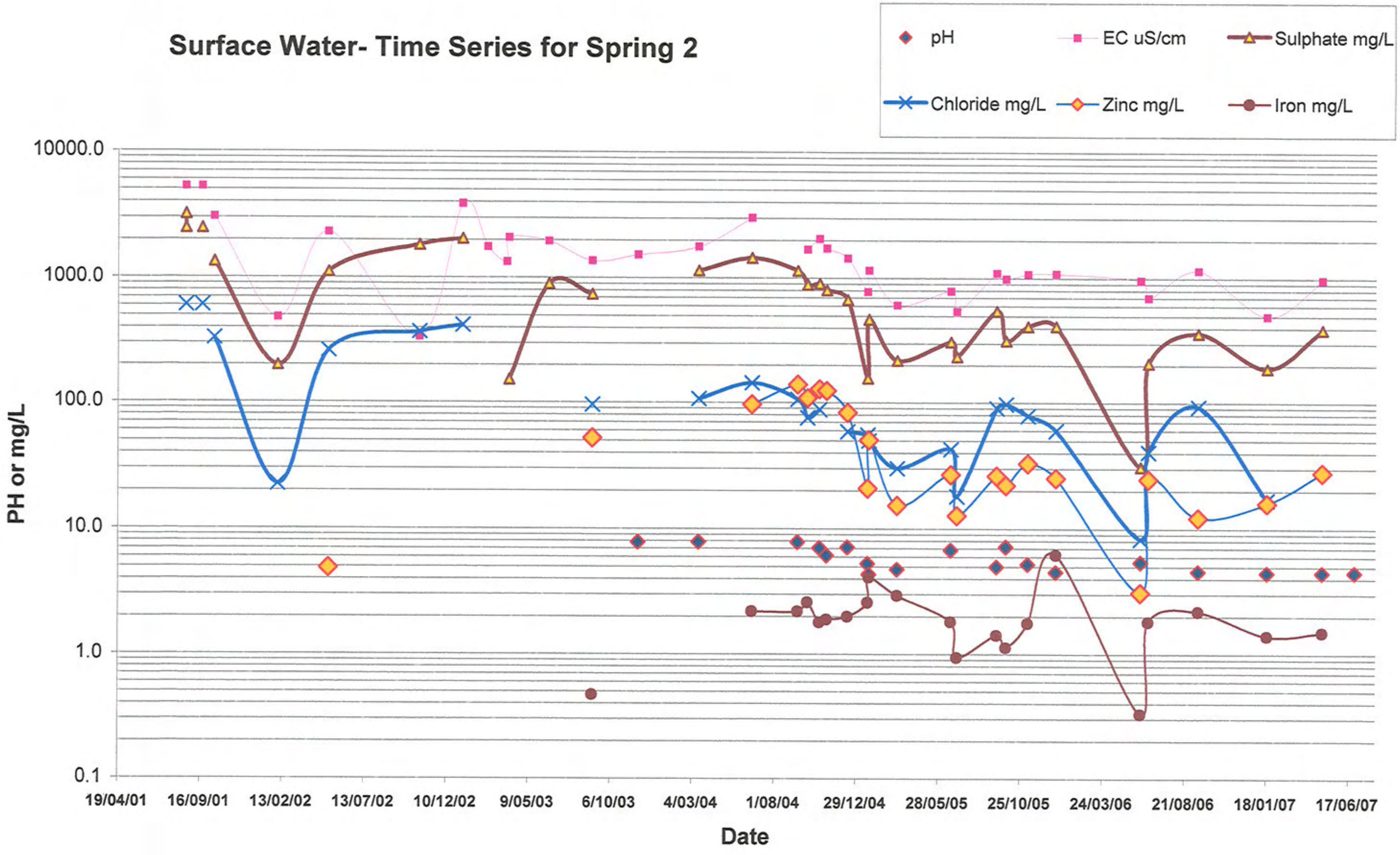


APPENDIX E



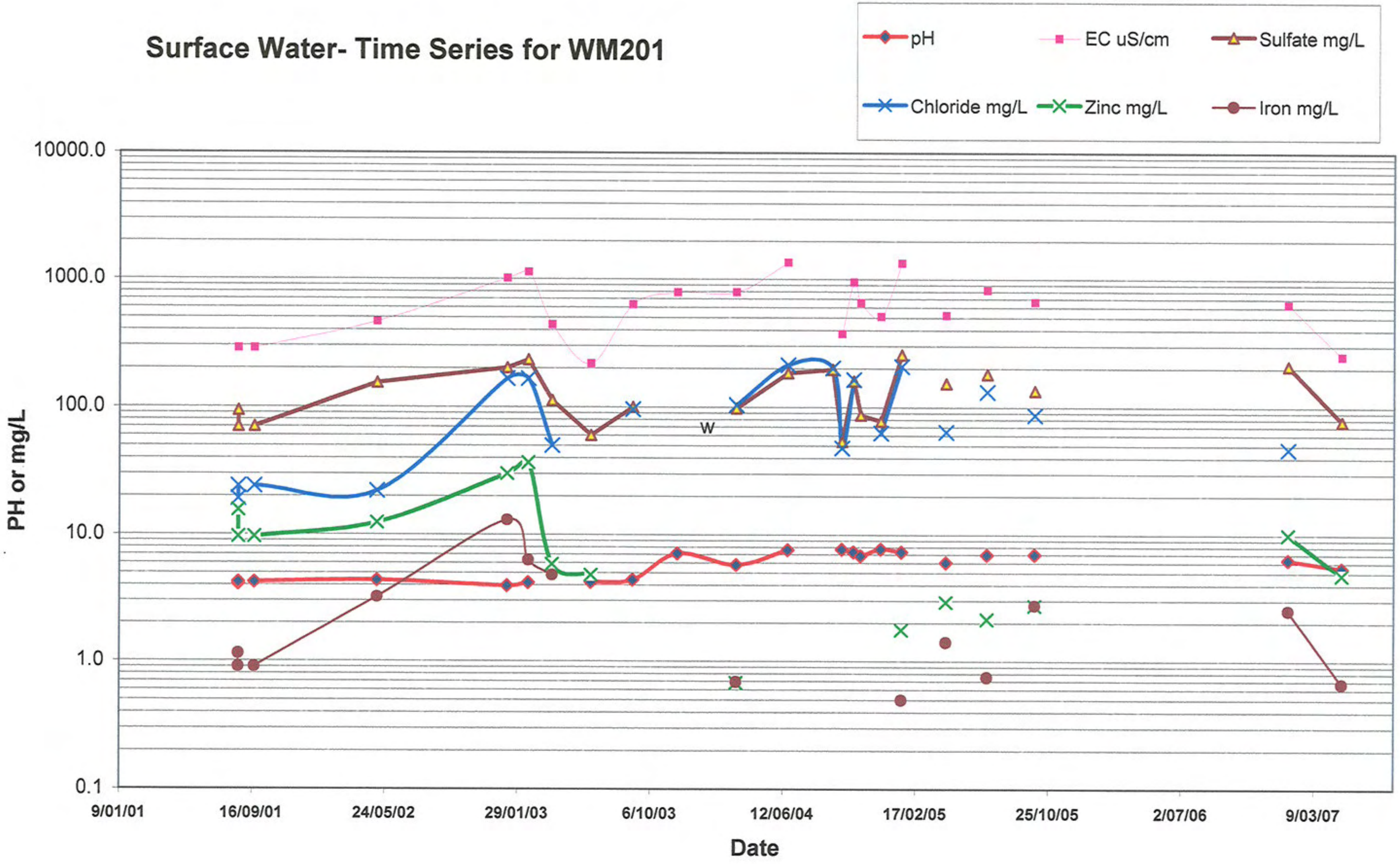
Surface Water- Time Series for 105
pH
EC mS/cm
Sulphate mg/L
Chloride mg/L
Zinc mg/L
Iron mg/L
Ammonia mg/L
PH or mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
29/03/86
22/06/87
14/09/88
8/12/89
3/03/91
26/05/92
19/08/93
12/11/94
5/02/96
30/04/97
24/07/98
17/10/99
9/01/01
4/04/02
28/06/03
20/09/04
14/12/05
9/03/07
Date

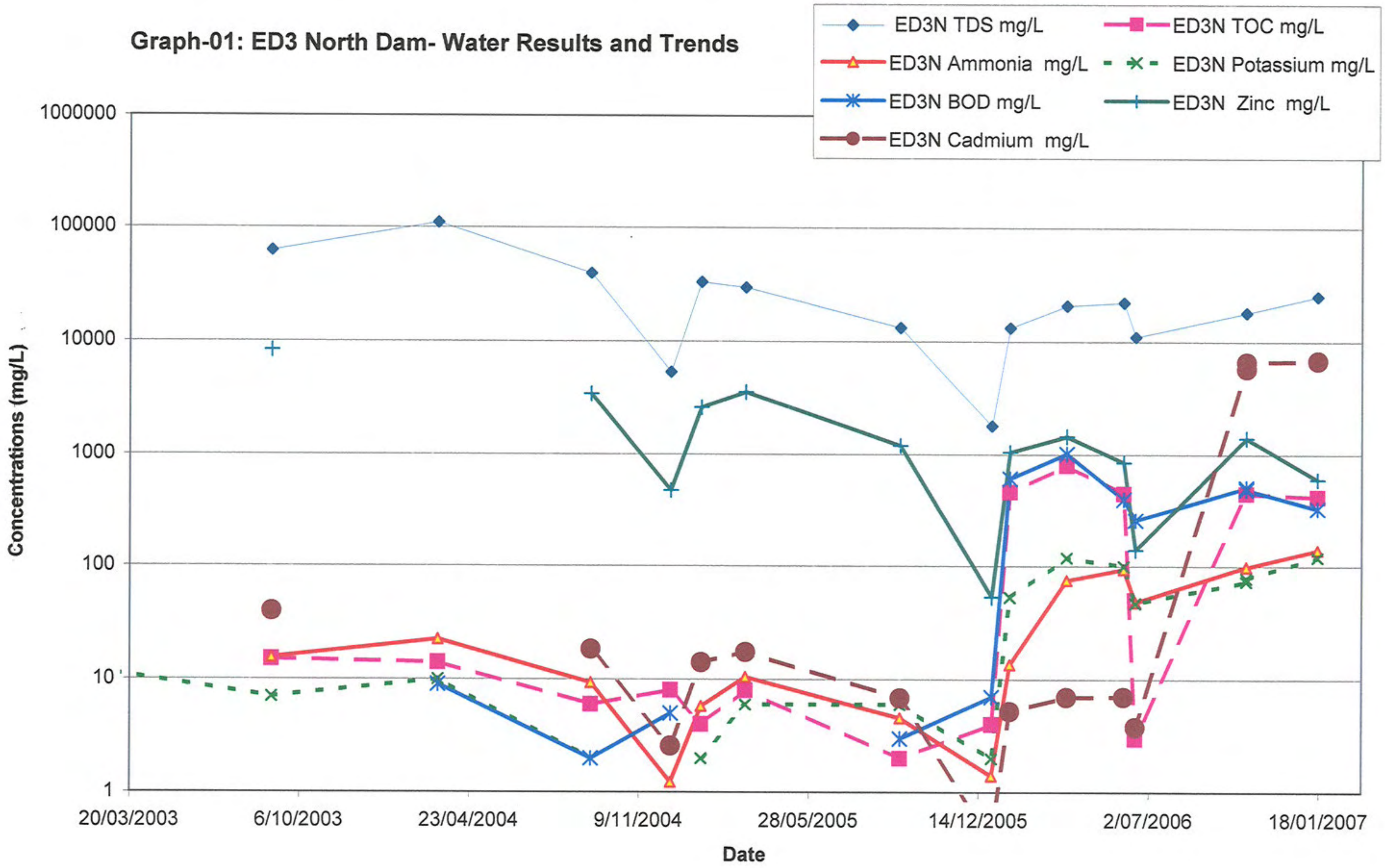

Surface water Time Series Plot - 115
mg/L [log]
500
200
100
50
20
10
5
2
1
0.5
0.2
0.1
0.05
0.02
0.01
0.005
0.002
0.001
0.0005
0.0002
01/27/98
04/22/98
08/10/98
11/06/98
01/29/99
06/01/99
09/02/99
12/09/99
03/09/00
06/23/00
09/26/00
02/05/01
06/08/01
08/28/01
02/05/02
09/04/02
04/04/03
09/03/03
11/06/04
07/01/05
09/29/05
12/29/05
06/02/06
09/15/06
01/19/07
04/30/07
Date
Legend
Chloride
Sulfate
Zinc
Cadmium

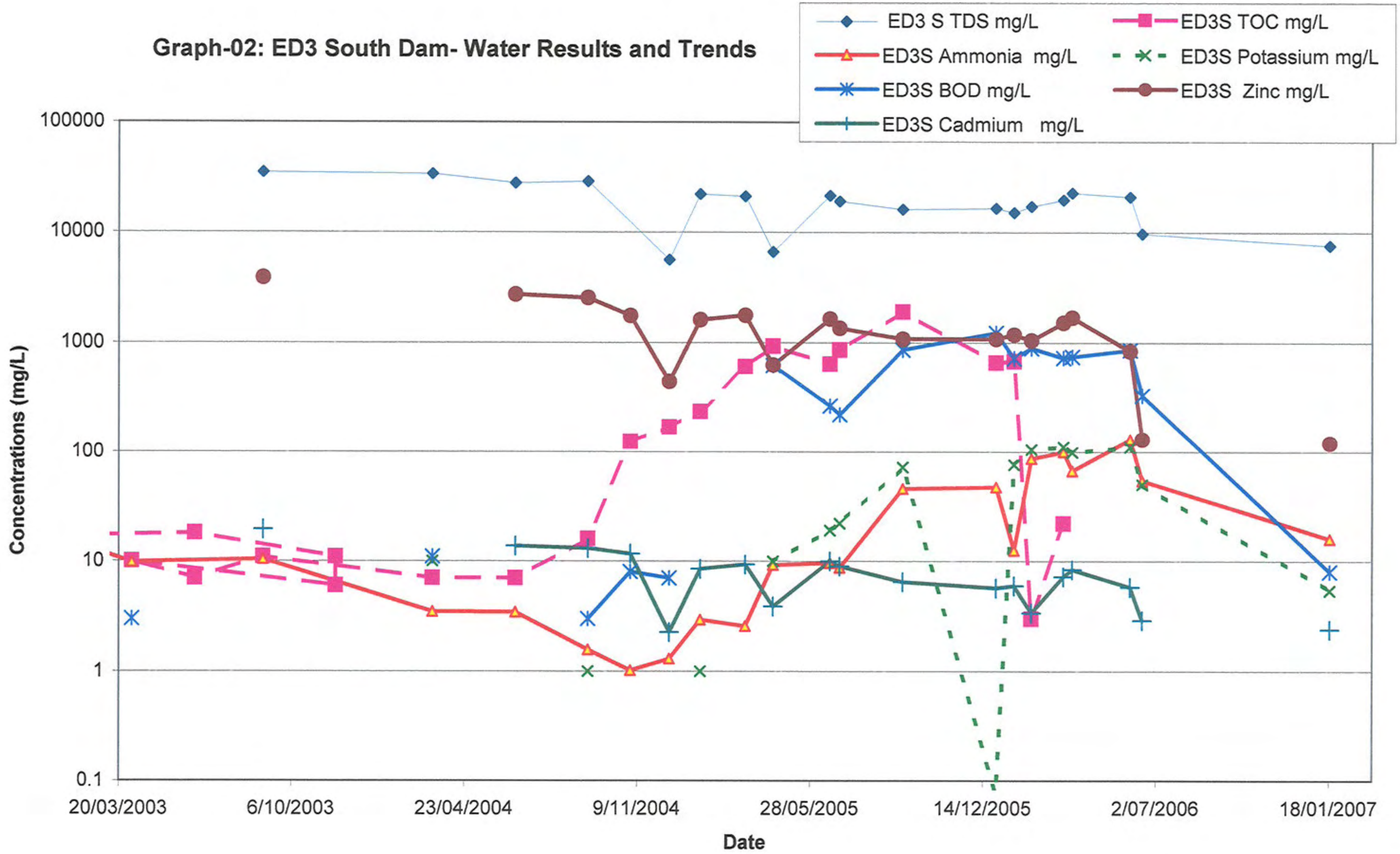


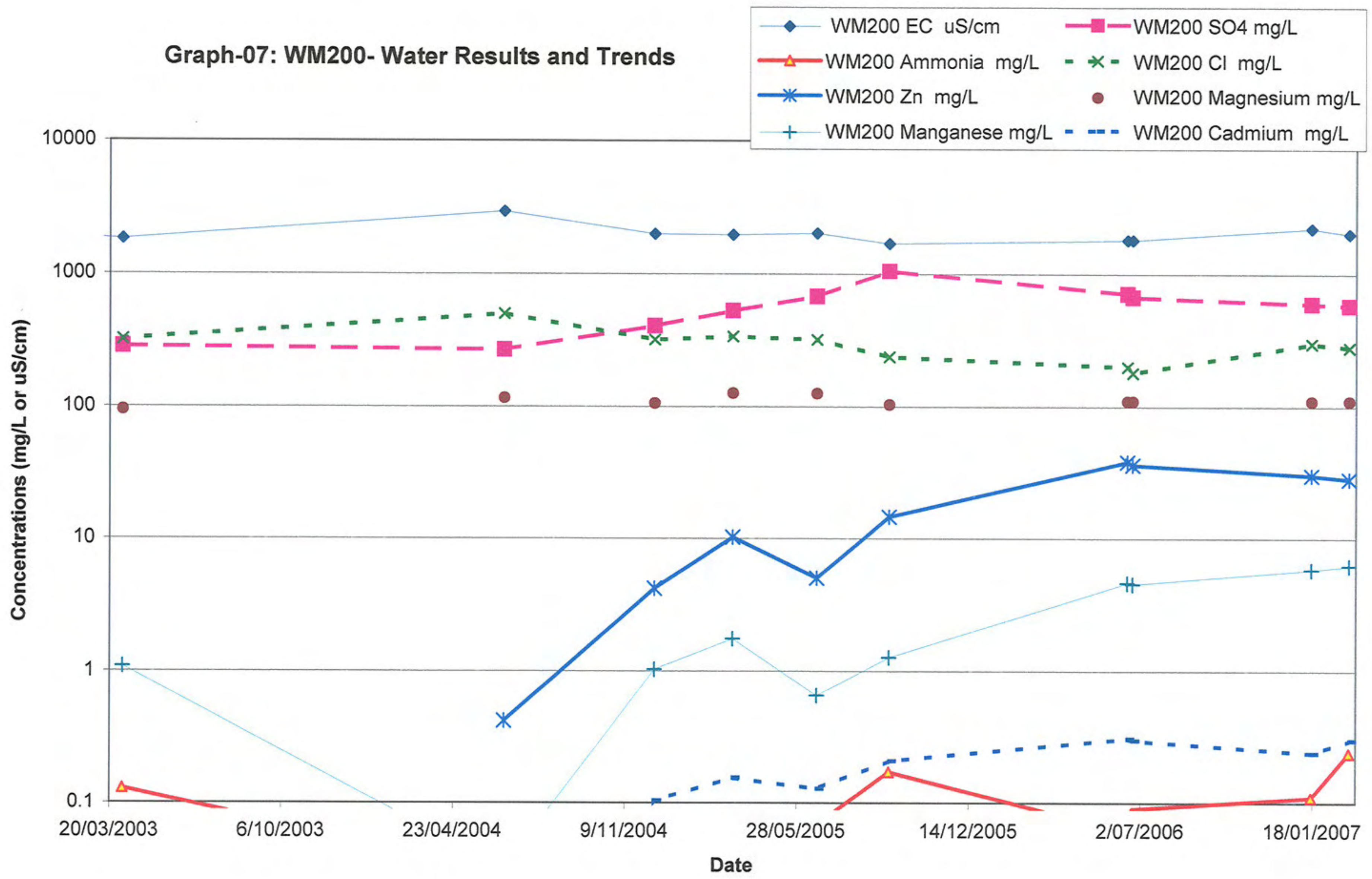
Surface Water- Time Series for Spring 2
pH
EC uS/cm
Sulphate mg/L
Chloride mg/L
Zinc mg/L
Iron mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
PH or mg/L
19/04/01
16/09/01
13/02/02
13/07/02
10/12/02
9/05/03
6/10/03
4/03/04
1/08/04
29/12/04
28/05/05
25/10/05
24/03/06
21/08/06
18/01/07
17/06/07
Date

Surface Water- Time Series for WM201

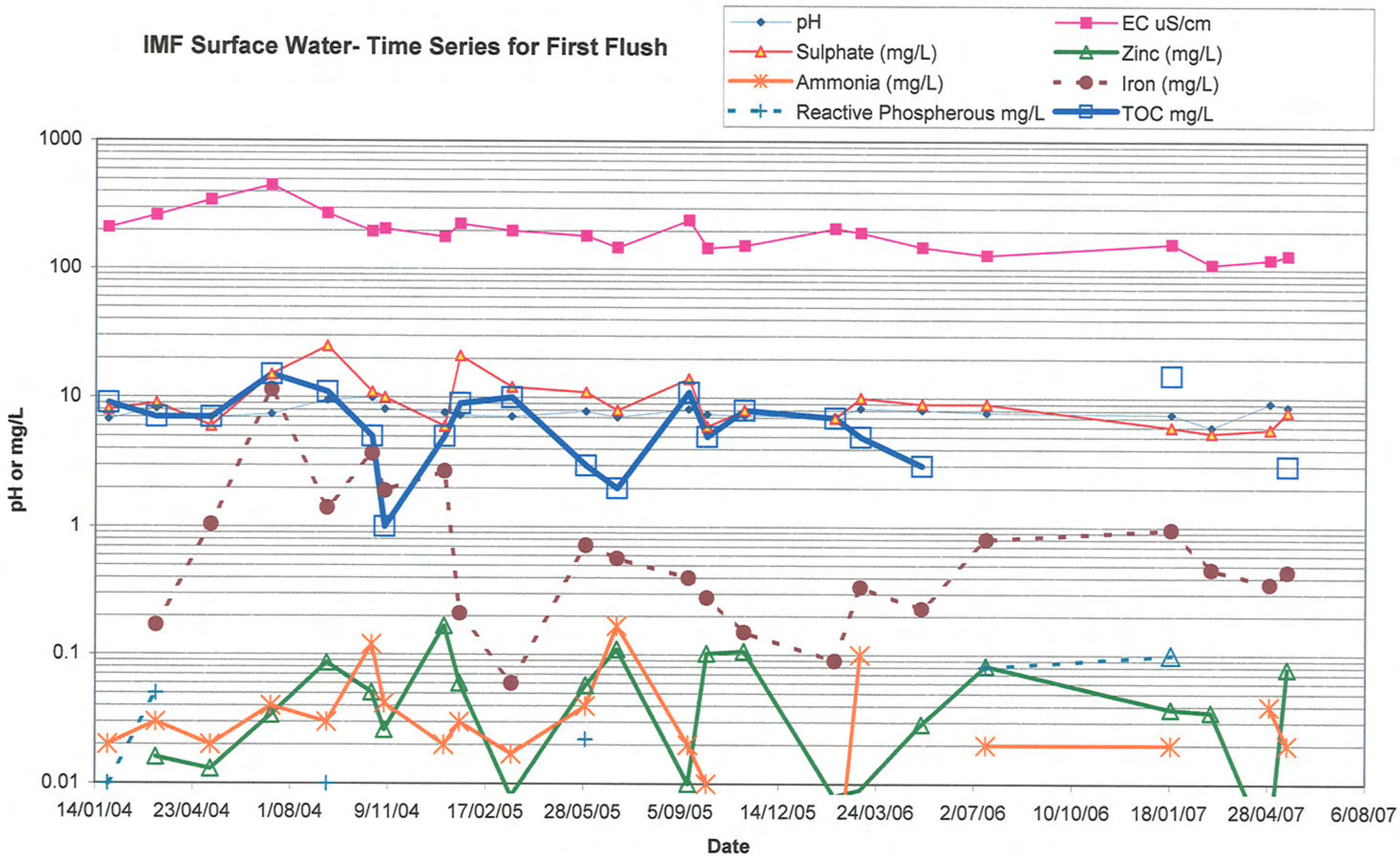



Graph-01: ED3 North Dam- Water Results and Trends
ED3N TDS mg/L
ED3N TOC mg/L
ED3N Ammonia mg/L
ED3N Potassium mg/L
ED3N BOD mg/L
ED3N Zinc mg/L
ED3N Cadmium mg/L
1000000
100000
10000
1000
100
10
1
Concentrations (mg/L)
20/03/2003
6/10/2003
23/04/2004
9/11/2004
28/05/2005
14/12/2005
2/07/2006
18/01/2007
Date

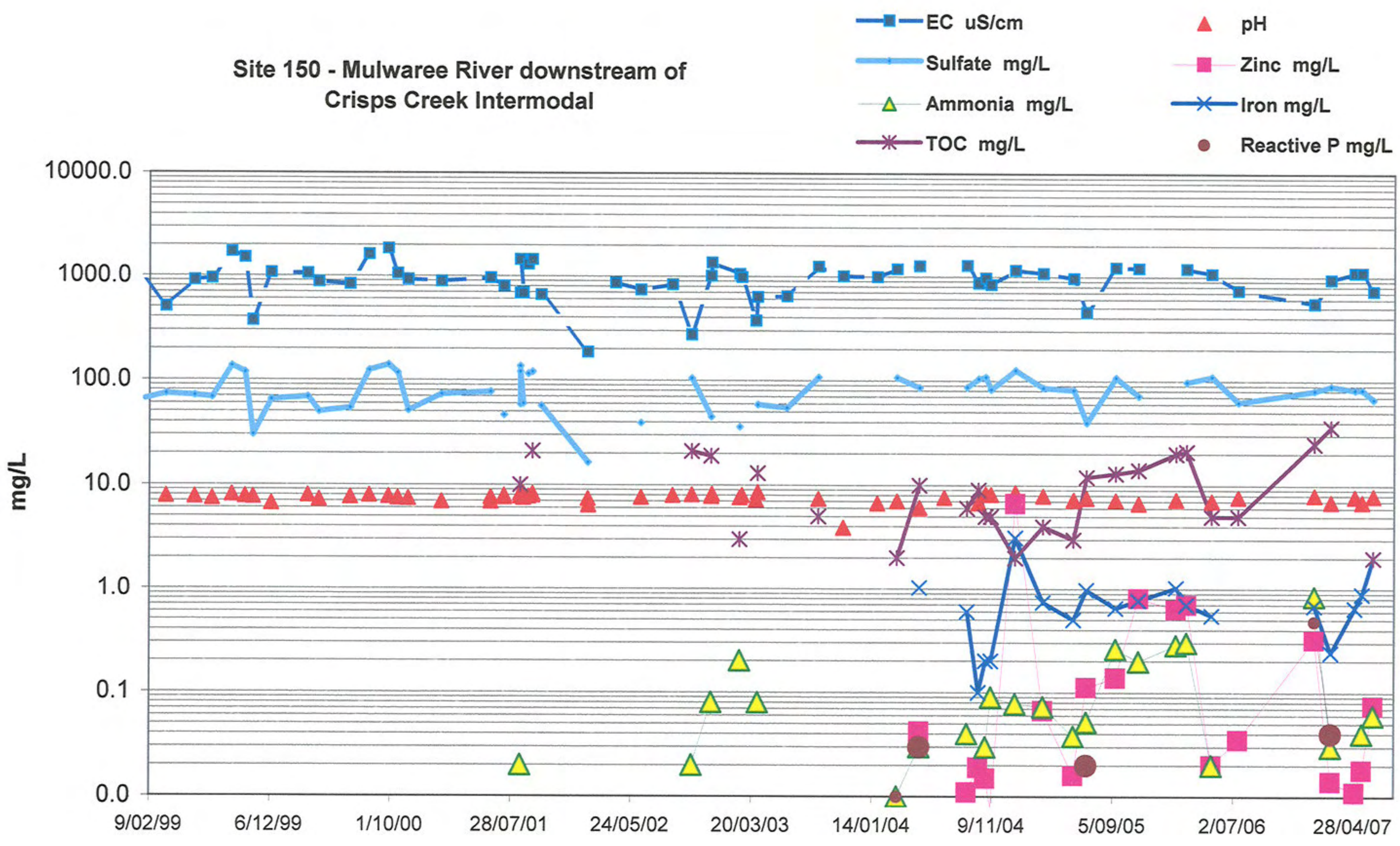

Graph-02: ED3 South Dam- Water Results and Trends
ED3 S TDS mg/L
ED3S TOC mg/L
ED3S Ammonia mg/L
ED3S Potassium mg/L
ED3S BOD mg/L
ED3S Zinc mg/L
ED3S Cadmium mg/L
Concentrations (mg/L)
100000
10000
1000
100
10
1
0.1
20/03/2003
6/10/2003
23/04/2004
9/11/2004
28/05/2005
14/12/2005
2/07/2006
18/01/2007
Date

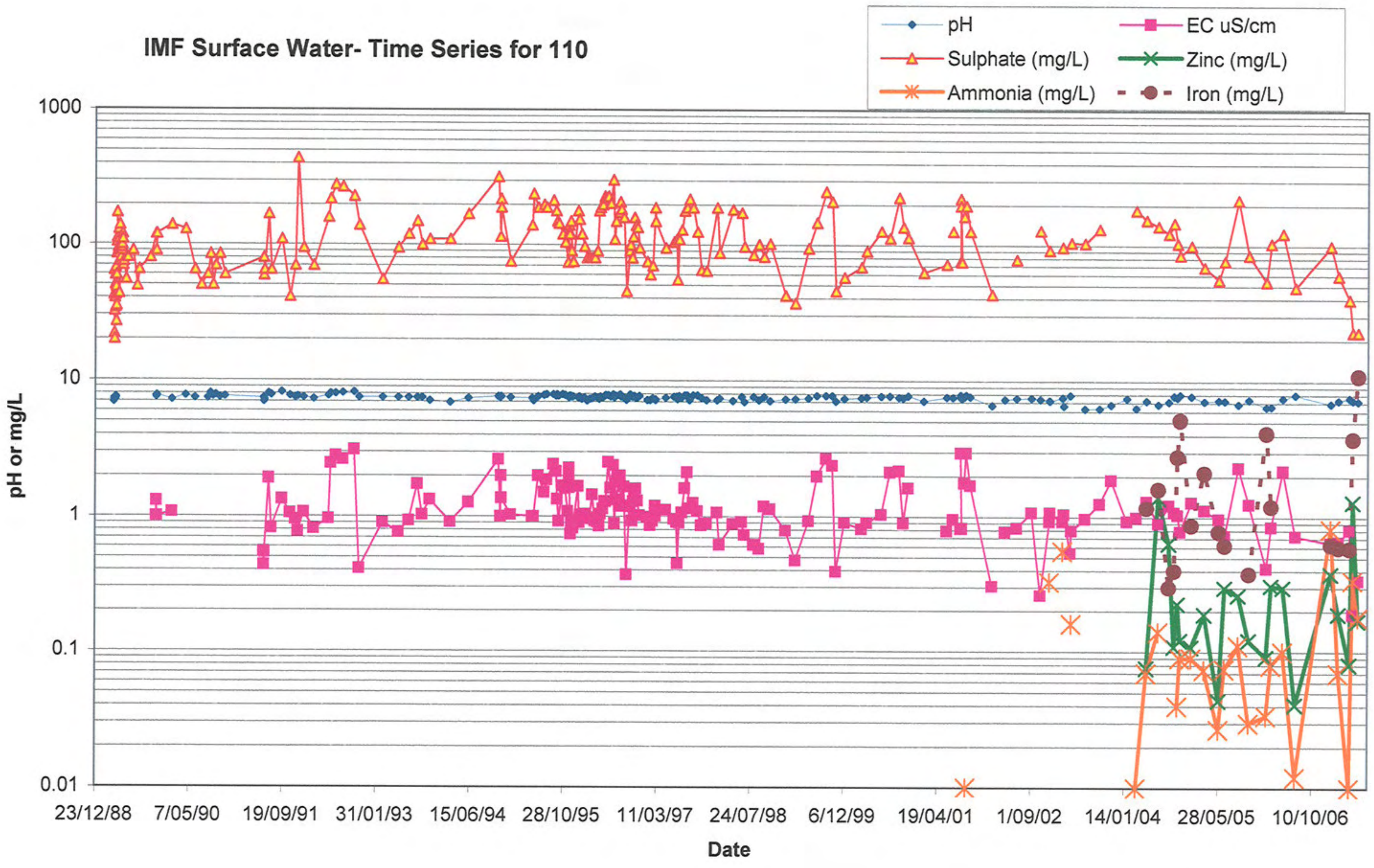

Graph-07: WM200- Water Results and Trends
WM200 EC uS/cm
WM200 SO4 mg/L
WM200 Ammonia mg/L
WM200 Cl mg/L
WM200 Zn mg/L
WM200 Magnesium mg/L
WM200 Manganese mg/L
WM200 Cadmium mg/L
10000
1000
100
10
1
0.1
Concentrations (mg/L or uS/cm)
20/03/2003
6/10/2003
23/04/2004
9/11/2004
28/05/2005
14/12/2005
2/07/2006
18/01/2007
Date

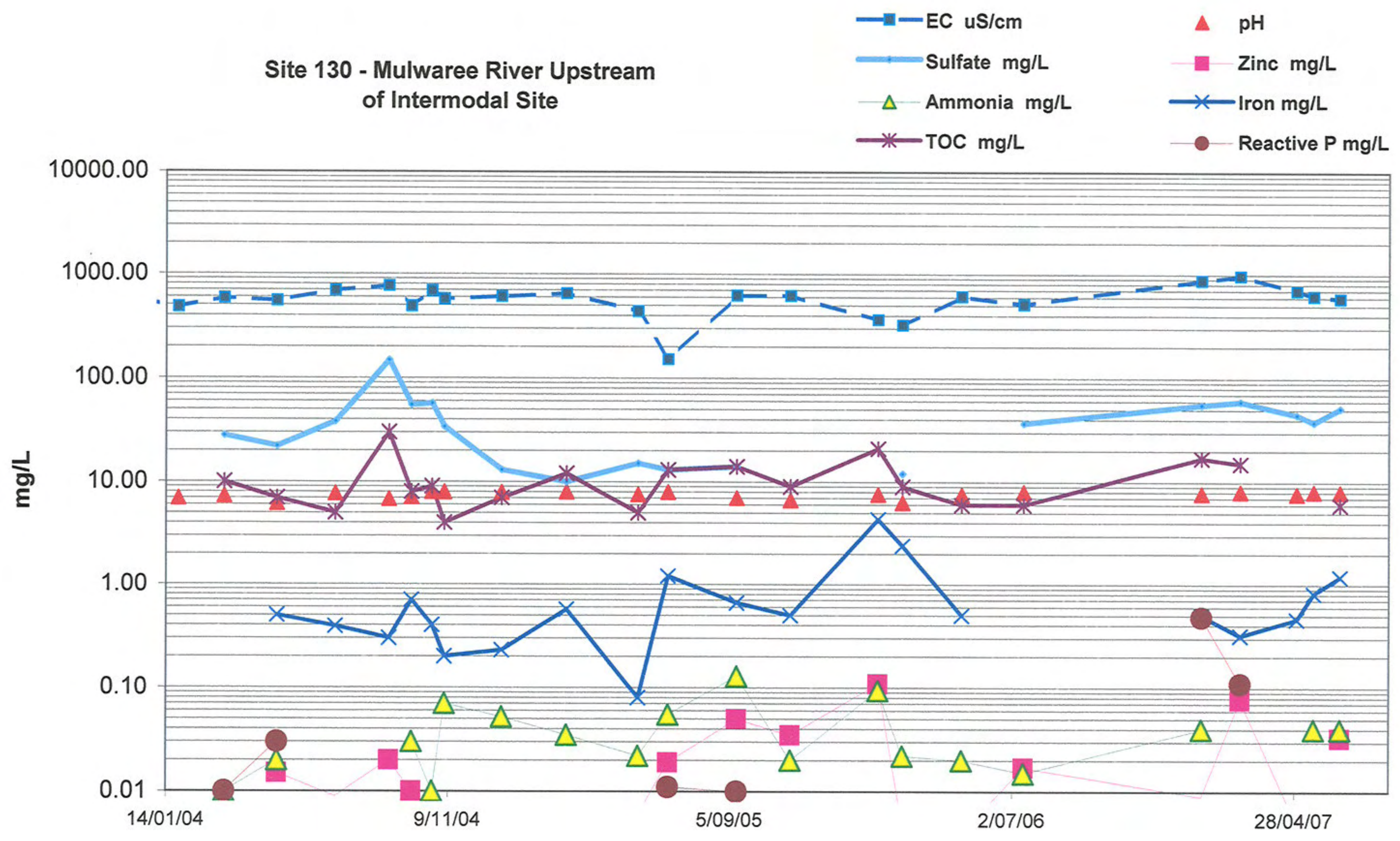
APPENDIX F



IMF Surface Water- Time Series for First Flush
pH
Sulphate (mg/L)
Ammonia (mg/L)
Reactive Phospherous mg/L
EC uS/cm
Zinc (mg/L)
Iron (mg/L)
TOC mg/L
pH or mg/L
1000
100
10
1
0.1
0.01
14/01/04
23/04/04
1/08/04
9/11/04
17/02/05
28/05/05
5/09/05
14/12/05
24/03/06
2/07/06
10/10/06
18/01/07
28/04/07
6/08/07
Date


Site 150 - Mulwaree River downstream of
Crisps Creek Intermodal
EC uS/cm
Sulfate mg/L
Ammonia mg/L
TOC mg/L
pH
Zinc mg/L
Iron mg/L
Reactive P mg/L
mg/L
10000.0
1000.0
100.0
10.0
1.0
0.1
0.0
9/02/99
6/12/99
1/10/00
28/07/01
24/05/02
20/03/03
14/01/04
9/11/04
5/09/05
2/07/06
28/04/07


IMF Surface Water- Time Series for 110
pH
EC uS/cm
Sulphate (mg/L)
Zinc (mg/L)
Ammonia (mg/L)
Iron (mg/L)
1000
100
10
1
0.1
0.01
pH or mg/L
23/12/88
7/05/90
19/09/91
31/01/93
15/06/94
28/10/95
11/03/97
24/07/98
6/12/99
19/04/01
1/09/02
14/01/04
28/05/05
10/10/06
Date



Site 130 - Mulwaree River Upstream of Intermodal Site
EC uS/cm
Sulfate mg/L
Ammonia mg/L
TOC mg/L
pH
Zinc mg/L
Iron mg/L
Reactive P mg/L
mg/L
10000.00
1000.00
100.00
10.00
1.00
0.10
0.01
14/01/04
9/11/04
5/09/05
2/07/06
28/04/07

APPENDIX G

Woodlawn Bioreactor

Summary Particulate Dust Monitoring 2006 - 2007

Site Name	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
		g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG28	Sep-06	0.7	0.2	0.5	0.1	0.4	46
DG28	Oct-06	1.2	<0.1	1.2	0.5	0.7	10
DG28	Nov-06	1	0.6	0.4	<0.1	0.4	8
DG28	Dec-06	3.8	2.1	1.7	0.4	1	36
DG28	Jan-07	2	0.5	1.5	0.7	0.8	39
DG28	Feb-07	1.6	0.7	0.9	0.4	0.5	70
DG28	Mar-07	2.6	1.5	1.1	0.4	0.7	26
DG28	Apr-07	1.3	0.6	0.7	0.3	0.4	29
DG28	May-07	3.5	1.9	1.6	1	0.6	34
DG28	Jun-07	2.5	0.9	1.6	0.5	1.1	117
DG28	Jul-07	0.8	0.5	0.3	<0.1	0.3	17
DG28	Aug-07	0.9	0.2	0.7	0.3	0.4	10
	Min	**0.7**					
	Ave	**1.8**					
	Max	**3.8**					

Site Name	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
		g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG24	Sep-06	3.5	0.5	3	0.3	2.7	30
DG24	Oct-06	9.3	1.4	7.9	1	6.9	4
DG24	Nov-06	3.9	0.9	3	0.4	2.6	<1
DG24	Dec-06	3.3	1.6	1.7	0.4	1.3	48
DG24	Jan-07	2.5	0.1	2.4	1	1.4	60
DG24	Feb-07	3.4	1.5	1.9	0.2	1.7	95
DG24	Mar-07	2.7	1.2	1.5	0.3	1.2	27
DG24	Apr-07	2.3	1.8	0.5	<0.1	0.5	30
DG24	May-07	2.1	1	1.1	0.4	0.7	35
DG24	Jun-07	1.3	0.6	0.7	0.4	0.3	118
DG24	Jul-07	2.1	1.4	0.7	0.3	0.4	21
DG24	Aug-07	3	2.3	0.7	0.2	0.5	11
	Min	**1.3**					
	Ave	**3.3**					
	Max	**9.3**					

Site Name	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
		g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG22	Sep-06	3	0.8	2.2	0.2	2	55
DG22	Oct-06	3.3	0.9	2.4	0.4	2	11
DG22	Nov-06	4.9	1.6	3.3	1.3	2	6
DG22	Dec-06	2.3	0.7	1.6	1.1	0.5	37
DG22	Jan-07	1.6	0.4	1.2	0.3	0.9	60
DG22	Feb-07	2.3	0.4	1.9	0.4	1.5	82
DG22	Mar-07	2.2	0.6	1.6	0.4	1.2	29
DG22	Apr-07	3.4	2	1.4	0.4	1	28
DG22	May-07	6.7	1.2	5.5	0.9	4.6	40
DG22	Jun-07	2	0.4	1.6	0.5	1.1	117
DG22	Jul-07	4.2	2.2	2	0.4	1.6	23
DG22	Aug-07	4.4	3	1.4	<0.1	1.4	12
	Min	**1.6**					
	Ave	**3.4**					
	Max	**6.7**					

Site Name	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
		g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG18	Sep-06	0.9	0.1	0.8	0.3	0.5	44
DG18	Oct-06	2.9	1.6	1.3	0.7	0.6	5
DG18	Nov-06	1.2	0.3	0.9	0.3	0.6	<1
DG18	Dec-06	4.4	2.8	1.6	0.5	1.1	43
DG18	Jan-07	1.7	0.3	1.4	0.5	0.9	29
DG18	Feb-07	1.9	1.2	0.7	0.2	0.5	71
	Min	**0.9**					
	Ave	**2.2**					
	Max	**4.4**					

Summary Particulate Dust Monitoring 2006 - 2007

Appendix G

Site Name	ALS Batch Code	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
			g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG28	EN0601537	Sep-06	0.7	0.2	0.5	0.1	0.4	46
DG28	EN0601705	Oct-06	1.2	<0.1	1.2	0.5	0.7	10
DG28	EN0601900	Nov-06	1	0.6	0.4	<0.1	0.4	8
DG28	EN0700135	Dec-06	3.8	2.1	1.7	0.4	1	36
DG28	EN0700271	Jan-07	2	0.5	1.5	0.7	0.8	39
DG28	EN0700458	Feb-07	1.6	0.7	0.9	0.4	0.5	70
DG28	EN0700728	Mar-07	2.6	1.5	1.1	0.4	0.7	26
DG28	EN0700929	Apr-07	1.3	0.6	0.7	0.3	0.4	29
DG28	EN0701082	May-07	3.5	1.9	1.6	1	0.6	34
DG28	EN0701294	Jun-07	2.5	0.9	1.6	0.5	1.1	117
DG28	EN0701437	Jul-07	0.8	0.5	0.3	<0.1	0.3	17
DG28	EN0701650	Aug-07	0.9	0.2	0.7	0.3	0.4	10
		Min	**0.7**					
		Ave	**1.8**					
		Max	**3.8**					

Summary Particulate Dust Monitoring 2006 - 2007

DG24 East Void

Site Name	ALS Batch Code	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
			g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG24	EN0601537	Sep-06	3.5	0.5	3	0.3	2.7	30
DG24	EN0601705	Oct-06	9.3	1.4	7.9	1	6.9	4
DG24	EN0601900	Nov-06	3.9	0.9	3	0.4	2.6	<1
DG24	EN0700135	Dec-06	3.3	1.6	1.7	0.4	1.3	48
DG24	EN0700271	Jan-07	2.5	0.1	2.4	1	1.4	60
DG24	EN0700458	Feb-07	3.4	1.5	1.9	0.2	1.7	95
DG24	EN0700728	Mar-07	2.7	1.2	1.5	0.3	1.2	27
DG24	EN0700929	Apr-07	2.3	1.8	0.5	<0.1	0.5	30
DG24	EN0701082	May-07	2.1	1	1.1	0.4	0.7	35
DG24	EN0701294	Jun-07	1.3	0.6	0.7	0.4	0.3	118
DG24	EN0701437	Jul-07	2.1	1.4	0.7	0.3	0.4	21
DG24	EN0701650	Aug-07	3	2.3	0.7	0.2	0.5	11
		Min	**1.3**					
		Ave	**3.3**					
		Max	**9.3**					

Summary Particulate Dust Monitoring 2006 - 2007

DG22 East Void

Site Name	ALS Batch Code	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
			g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG22	EN0601537	Sep-06	3	0.8	2.2	0.2	2	55
DG22	EN0601705	Oct-06	3.3	0.9	2.4	0.4	2	11
DG22	EN0601900	Nov-06	4.9	1.6	3.3	1.3	2	6
DG22	EN0700135	Dec-06	2.3	0.7	1.6	1.1	0.5	37
DG22	EN0700271	Jan-07	1.6	0.4	1.2	0.3	0.9	60
DG22	EN0700458	Feb-07	2.3	0.4	1.9	0.4	1.5	82
DG22	EN0700728	Mar-07	2.2	0.6	1.6	0.4	1.2	29
DG22	EN0700929	Apr-07	3.4	2	1.4	0.4	1	28
DG22	EN0701082	May-07	6.7	1.2	5.5	0.9	4.6	40
DG22	EN0701294	Jun-07	2	0.4	1.6	0.5	1.1	117
DG22	EN0701437	Jul-07	4.2	2.2	2	0.4	1.6	23
DG22	EN0901650	Aug-07	4.4	3	1.4	<0.1	1.4	12
		Min	**1.6**					
		Ave	**3.4**					
		Max	**6.7**					

Summary Particulate Dust Monitoring 2006 - 2007

DG Chinnery

Site Name	ALS Batch Code	Date	Total Solids	Soluble Matter	Insoluble Solids	Combustibles	Ash Residue	Calculated Rainfall
			g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	g/m2/mth	mm
DG18	EN0601537	Sep-06	0.9	0.1	0.8	0.3	0.5	44
DG18	EN0601705	Oct-06	2.9	1.6	1.3	0.7	0.6	5
DG18	EN0601900	Nov-06	1.2	0.3	0.9	0.3	0.6	<1
DG18	EN0700135	Dec-06	4.4	2.8	1.6	0.5	1.1	43
DG18	EN0700271	Jan-07	1.7	0.3	1.4	0.5	0.9	29
DG18	EN0700458	Feb-07	1.9	1.2	0.7	0.2	0.5	71
		Min	0.9					
		Ave	2.2					
		Max	4.4					

APPENDIX H

Appendix H: Woodlawn Bioreactor- Waste Surface Monitoring

Surface Gas Monitoring 2006-07

Methane % by Volume

Date	12/12/2006

	1	2	3	4	5
A	0	0.1	0.1	0.2	0
B	0.2	0.3	0.2	0.1	0.1
C	0.3	0.1	0.3	0.1	0.3
D	0.1	0.2	0.1	0.2	0.1
E	0.1	0.3	0.3	0.1	0.2

Average	0.16
Min	0
Max	0.3

Date	22/02/2007

	1	2	3	4	5
A	0	0	0.1	0	0.1
B	0.1	0.2	0.2	0.3	0.1
C	0.2	0.3	0.1	0.2	0.2
D	0.1	0.2	0.3	0.2	0.2
E	0.3	0.3	0.1	0.4	0.1

Average	0.17
Min	0
Max	0.4

Date	1/05/2007

	1	2	3	4	5
A	0	0.4	0.3	0.2	0.3
B	0.2	0.2	0.3	0.2	0.1
C	0.2	0.3	0.2	0.2	0.2
D	0.2	0.2	0.2	0.2	0.2
E	0.2	0.3	0.3	0.1	0.2

Average	0.22
Min	0
Max	0.4

Date	11/07/2007

	1	2	3	4	5
A	0	0.1	0	0.1	0.2
B	0.2	0.2	0.1	0.1	0.2
C	0.3	0.2	0.3	0	0.3
D	0.2	0.2	0.4	0.1	0.1
E	0.3	0.3	0.3	0.1	0.2

Average	0.18
Min	0
Max	0.4

CH4 % by Volume	
Yearly	
Minimum	**0**
Mean	**0.18**
Maximum	**0.4**

APPENDIX I

Appendix I: Woodlawn Bioreactor

Landfill Gas Flare - Monthly Average 2006 - 2007

	Temperature (Kelvin)	Flow (m3/hr)
October	709.89	N/A
November	767.74	N/A
December	801.26	N/A
January	893.62	N/A
February	1271.92	N/A
March	1180.01	N/A
April	1107.54	N/A
May	1188.64	N/A
June	1268.92	N/A
July	1264.8	N/A
August	1225.27	384.91
September	1269.08	413.63

Note: Flow Meter was installed at flare August 2007

APPENDIX J

Appendix J: Monitoring Point 18 - ED3 Volumes 2006 - 2007

ED3S		ED3N	ED3N Lagoon 1	Total Volume ED3 System
Date	Volume ML	Volume ML	Volume ML	
Sep-06	**20**	**80.00**	0	100.00
Oct-06	**21.65**	**67.00**	0	88.65
Nov-06	**22.47**	57.90	**6.5**	86.87
Dec-06	**22.57**	45.21	**4.1**	71.88
Jan-07	**24.6**	37.80	**1.5**	63.90
Feb-07	**32.57**	34.37	0	66.94
Mar-07	**37.69**	32.26	0	69.95
Apr-07	**40.52**	**29.80**	0	70.32
May-07	**42.06**	27.10	**3.12**	72.28
Jun-07	**44.82**	**26.80**	8.43	80.05
Jul-07	50	**26.30**	**10.26**	86.56
Aug-07	52	**25.80**	**12.63**	90.43
Sep-07	52	**30.00**	**13.30**	95.30
Minimum	20	25.80	0.00	63.90
Mean	35.61	40.03	4.60	80.24
Maximum	52	57.9	13.3	100.00

30 Estimated volumes based on pumping records & evaporation

APPENDIX K

Appendix K: Woodlawn Bioreactor- Inputs to the Void

Field Information				Analytical Information																				
Date	Site Code	pH	Conductivity	Laboratory Sample Code	pH	Alkalinity (as $CaCO_3$)	Conductivity	Total Organic Carbon	BOD	Sulfide	COD	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Zinc	Sulfate*	Nitrogen (ammonia)	Nitrate	Nitrite	Total Kjeldahl Nitrogen	Nitrogen (total)
			uS/cm			mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L	mg/L
16/01/2007	WM200	6.2	2130	546841	7.4	59	2200	6	<2	<0.02	28	0.002	0.24	0.001	0.07	0.15	0.004	30	600	0.11	0.13	<0.01	1	1.1
1/03/2007	WM200	7	1220	555210	6.8	34	2000	<10	<2	<0.02	15	<0.001	0.3	0.001	0.069	0.06	0.002	28	580	0.24	0.31	<0.01	0.6	0.86
15/05/2007	WM200	6.95	1110	573886	6.7		2000	5	<2						0.31	3.2	0.008	25	640	0.25				
14/08/2007	WM200	7.04	1290	584642	7.1		1700	3	<2						0.11	0.23	0.002	21	550	0.09				
				Minimum	6.7	34	1700	3	0	0	15	0.002	0.24	0.001	0.069	0.06	0.0019	21	550	0.09	0.13	0	0.6	0.86
				Average	7	46.5	1975	4.66667	0	0	21.5	0.002	0.27	0.001	0.13975	0.91	0.004	26	592.5	0.1725	0.22	0	0.8	0.98
				Maximum	7.4	59	2200	6	0	0	28	0.002	0.3	0.001	0.31	3.2	0.0076	30	640	0.25	0.31	0	1	1.1
				Count	4	2	4	4	4	2	2	2	2	2	4	4	4	4	4	4	2	2	2	2

Void Water Inputs - WM200

Date	Water Addition (KL)
4/12/2006	140
5/12/2006	140
6/12/2006	140
7/12/2006	140
8/12/2006	140
11/12/2006	140
12/12/2006	140
13/12/2006	140
14/12/2006	140
15/12/2006	140