



**Melbourne
Water**

Environmental Compliance

Quarterly Report

Quarter Four 2006/2007
(April, May, June)

Incidents, Initiatives and Issues

Incidents

None to report.

Initiatives and Issues

Ecological Burns at Sites of Biodiversity Significance

A number of ecological burns were undertaken at Sites of Biodiversity Significance to promote the growth and diversity of native vegetation communities. These included Western Basalt Plains Grassland along the Kayes Creek in Derrimut, Tarnuk Reserve in Westmeadows, Galada Tamboore on the Merri Creek in Campbellfield and grassland at WTP.



Western Treatment Plant Biodiversity Conservation Program

The annual Environment Protection and Biodiversity Conservation Act Compliance Plan report was submitted to Canberra. A botanical survey and benchmarking report was completed for the Northern Grasslands of the WTP to establish the current, benchmark condition of these grasslands. The Western Treatment Plant Land Use Strategy identified this area for net gain offsets under the Native Vegetation Management Framework.

The population of nationally threatened Spiny Rice-flower was surveyed and assessed. Other studies and monitoring included a trial of multiple outlets of effluent, a waterfowl daily activity budget study, a shorebird study and monitoring of key biodiversity values.

Lewin's Rail is one of the rare and threatened species of crakes and rails found in our region. It is included in the International Union for the Conservation of Nature and Natural Resources Red List of threatened species and is a listed species under the *Flora & Fauna Guarantee Act* 1988. Following two projects to establish survey protocols for the secretive bird, a habitat preference study was initiated for this species.

Edithvale-Seafood Wetlands

The Edithvale-Seafood Wetlands *Sites of Biodiversity Significance Management Strategy* has been finalised and endorsed, setting a 10 year vision for these sites. The dry conditions in the wetlands allowed a trial slashing of Phragmites reed in some areas supported by birdwatching groups. After a worrying drying out of both Edithvale and Seafood Wetlands, water is again flowing into these wetlands after repairs to the pump supplying water.

Parwan Creek and Tributaries Geomorphic Overview

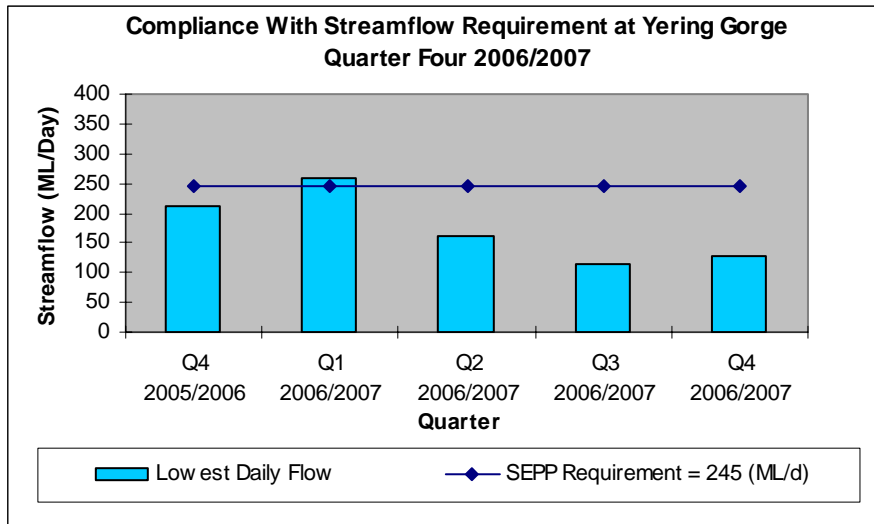
An overview study has been completed for the Parwan Creek and its tributaries. These are located in the Rowsely Valley, to the west of Baccus Marsh. The area is within the Eocene Werribee Formation, a highly erosive and dispersive fluvial formation renowned for tunnel erosion, gullying and sheet wash. The study has provided Melbourne Water with an understanding of the current condition of the waterways and of the geomorphic processes active in the waterways. The study also included a condition assessment of 38 historic erosion control structures constructed by the Soil Conservation Authority in the 1940s to 1960s. These structures have largely been successful in halting headward incision, however, with little or no maintenance over the past years, some of the structures are now at risk of failure. The report will be used to inform management of the waterways in this area.

Qualification of Bulk Entitlements

Due to the severe drought and resulting record low streamflows experienced in the Melbourne Water Supply catchments during 2006 the Minister for Water, Environment and Climate Change agreed to temporarily qualify environmental flow entitlements for the Thomson and Yarra Rivers. More information on this is in the Corporate Compliance section.

Statutory Compliance

State Environment Protection Policy Requirement for Passing Flow in the Yarra River



Consistent with the qualification of the *Yarra Environmental Entitlement 2006*, Melbourne Water is required to continue to operate to environmental flow rules specified under Schedule F7 (Waters of the Yarra Catchment) of the Waters of Victoria State environment protection policy. The policy provides for, to the extent practicable, a flow of no less than 245 ML/day in the Yarra River downstream of the Yering Gorge diversion. The gauge at Yering Gorge below the pumping station is used to manage pumping into Sugarloaf Reservoir to ensure the minimum flow is met.

In accordance with the Yarra Drought Response Plan, when flows at Yering Gorge fall below 245 ML/day, Melbourne Water ceases filling Sugarloaf Reservoir from Yering Gorge Pumping Station. The Yarra Drought Response Plan also requires Melbourne Water to manage diversions from the Yarra by applying progressively tighter restrictions.

Yarra River monitoring by Melbourne Water has shown that when flows fall below 150 ML/day environmental conditions deteriorate due to low dissolved oxygen levels in the river. Melbourne Water considers releasing water to ensure environmental conditions in the Yarra River do not deteriorate when flows fall below 150 ML/day at Yering Gorge.

During this quarter, the minimum flow at Yering Gorge was 128 ML/day and Melbourne Water met the requirements of the Yarra Drought Response Plan.

Sewerage System Summary of Statutory Compliance by Facility

Summary of Compliance by Facility Quarter Four 2006/2007

Facility	Compliance * of Samples Q4 (%)	of Samples 2006/07 (%)	Non-Sample Compliance**	Sewage Spills	Odour Complaints
Eastern Treatment Plant				0	14
Western Treatment Plant				0	0
Wastewater Transfer	N/A	N/A	N/A	0	0
Total	N/A	N/A	N/A	0	14

	Compliance achieved for all parameters
	Compliance not achieved for one or more parameters.

* Compliance of samples details the compliance status for maximum/minimum/range or annual discharge parameters as indicated by the quarter's results.

**Non sample compliance covers licence breaches for issues other than discharge parameter limits. Details on compliance breaches appear in following sections.

***Sewage spills include all spill types (operational failures, compliant and non-compliant less than 1:5 rainfall event spills and greater than 1:5 rainfall event spills)

Annual Licence Compliance – 2006/2007

Eastern Treatment Plant

The Eastern Treatment Plant achieved 100 % compliance with effluent discharge requirements in the EPA Victoria licence during 2006/2007.

Western Treatment Plant

The Western Treatment Plant achieved 100 % compliance with effluent discharge requirements in the EPA Victoria licence during 2006/2007.

Sewerage System Statutory Compliance Detail

Compliance of Samples – 4th Quarter 2006/2007

The following table shows compliance of Melbourne Water's wastewater treatment plants with parameters in EPA Victoria licences where limits are expressed as a maximum, minimum or a range.

Treatment Plant Compliance with EPA Victoria Licences by Parameter *
Quarter Four 2006/2007

SITE	Amm	Surf	Metals	PH	D.O.	Flow	TRC	Other#
	Max	Max	Max	Range	Min.	Max	Max	
WTP all outlets								
ETP								
Air Emissions								

	Compliance achieved
	Compliance not achieved** - See following sections for details
	Not applicable

* See Appendix One for a guide to the above parameters and Appendix Five for the location map of Western Treatment Plant Outlets.

Parameters that are less significant and rarely fail to meet the required standard.

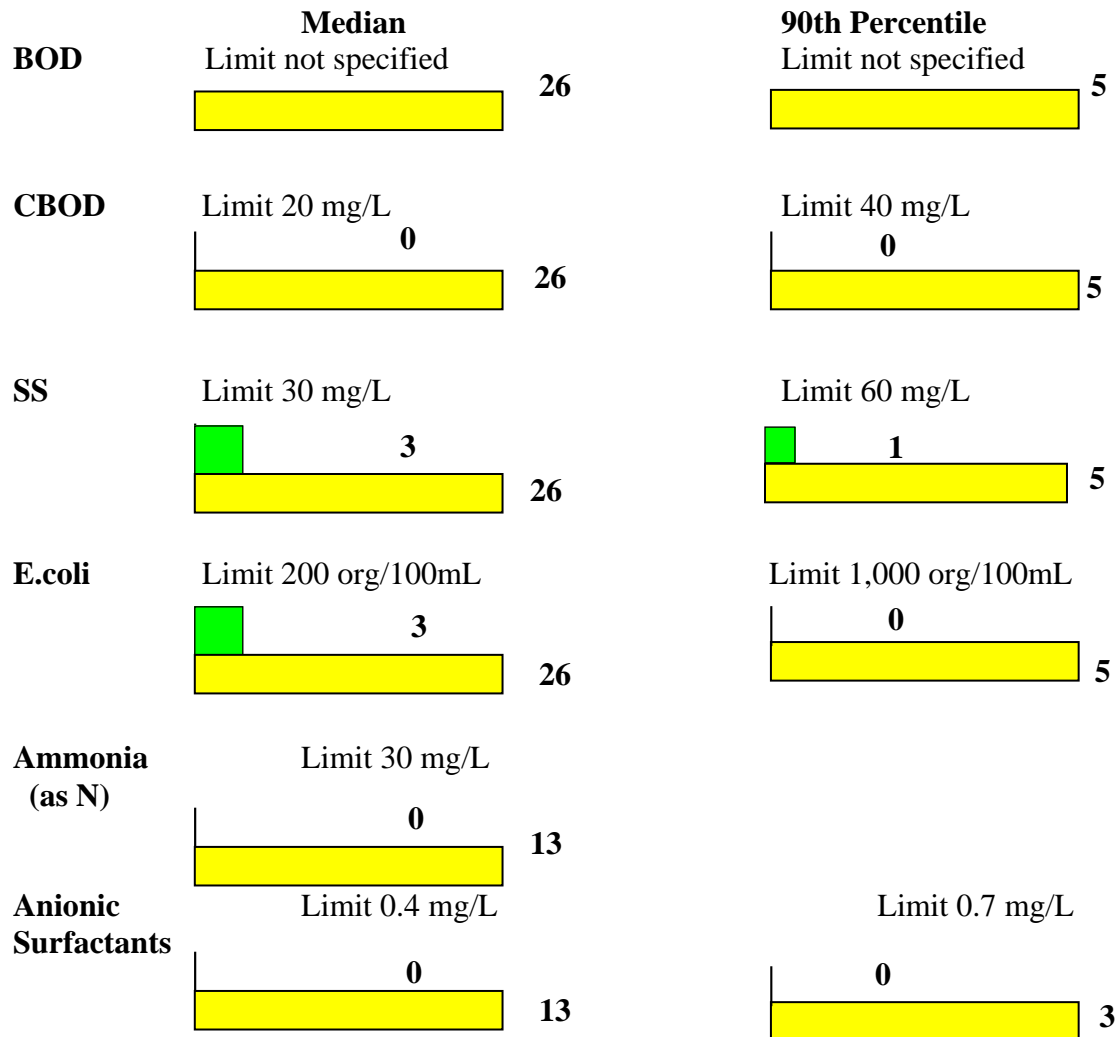
** EPA Victoria is given an explanation for each non-compliance

Eastern Treatment Plant

Annual Parameters

The following details Eastern Treatment Plant's performance for critical parameters. Performance with respect to other parameters is reported here only if the results exceed licence limits, in which case explanatory information is contained in the following section.

NOTE: The plant has been granted a waiver for BOD compliance by EPA Victoria on the understanding that CBOD is also monitored and CBOD limits are complied with.



	Number of sample results to date greater than the Licence Limit – exceeds the total allowance for the year (licence breach).
	Number of sample results to date greater than the Licence Limit – exceeds the allowance for the year to date.
	Number of sample results to date greater than the Licence Limit – within the allowance for the year to date.
	Number of sample results during the year allowed to exceed the Licence Limit.

General Licence Requirements

No issues.

Groundwater Monitoring

Groundwater monitoring for the Eastern Treatment Plant was conducted by URS during December 2006 and May 2007. Monitoring included

- Measurement of standing water levels
- Measurement of groundwater quality for pH, temperature, dissolved oxygen, electrical conductivity, reduction/oxidation potential
- Laboratory analysis for total dissolved solids, total organic carbon, total nitrogen, calcium, magnesium, potassium, sodium, bicarbonate, carbonate, sulphate and chloride.

The salinity concentrations at the Eastern Treatment Plant reference bore vary from 1,910 mg/L to 2,160 mg/L. State Environment Protection Policy – Groundwaters of Victoria, 1999, classifies the groundwater flowing onto the site as falling into Segment B. Waters in Segment B are to be protected for the following applicable beneficial uses:

- Maintenance of Ecosystems;
- Potable Mineral Water Supply;
- Agriculture, Parks and Gardens;
- Livestock Drinking Water;
- Industrial Water Use;
- Primary Contact Recreation; and
- Buildings and structures.

Because the Patterson Lakes area is the receiving marine water body, the objectives used are the trigger values for marine waters specified in the ANZECC guidelines.

Based on the findings of this report the following conclusions are made:

- Groundwater flow follows the regional gradient from north-east towards south-west, with local flow diversions associated with groundwater mounding around the effluent holding basins, in the vicinity of the Patterson River and in the shallow aquifer near bore MW81;
- The majority of the salinity concentrations were consistent with the previous results without showing any particular trend developing. Bores MW45 and MW 68 continued a rising trend first noted in May 2005;
- The majority of the Total Organic Carbon concentrations were consistent with previous results. Bore MW43 showed a continuing increasing trend and bores MW68/69 showed an increase compared to previously reported concentrations;
- All heavy metals concentrations were within the range of the historically reported results;

Melbourne Water has an on-going program of Sludge Drying Pan refurbishment. The refurbishment program includes repairs to the impermeable liners in the pans to control groundwater contamination.

Details of Licence Non-Compliance/Parameter Exceedances

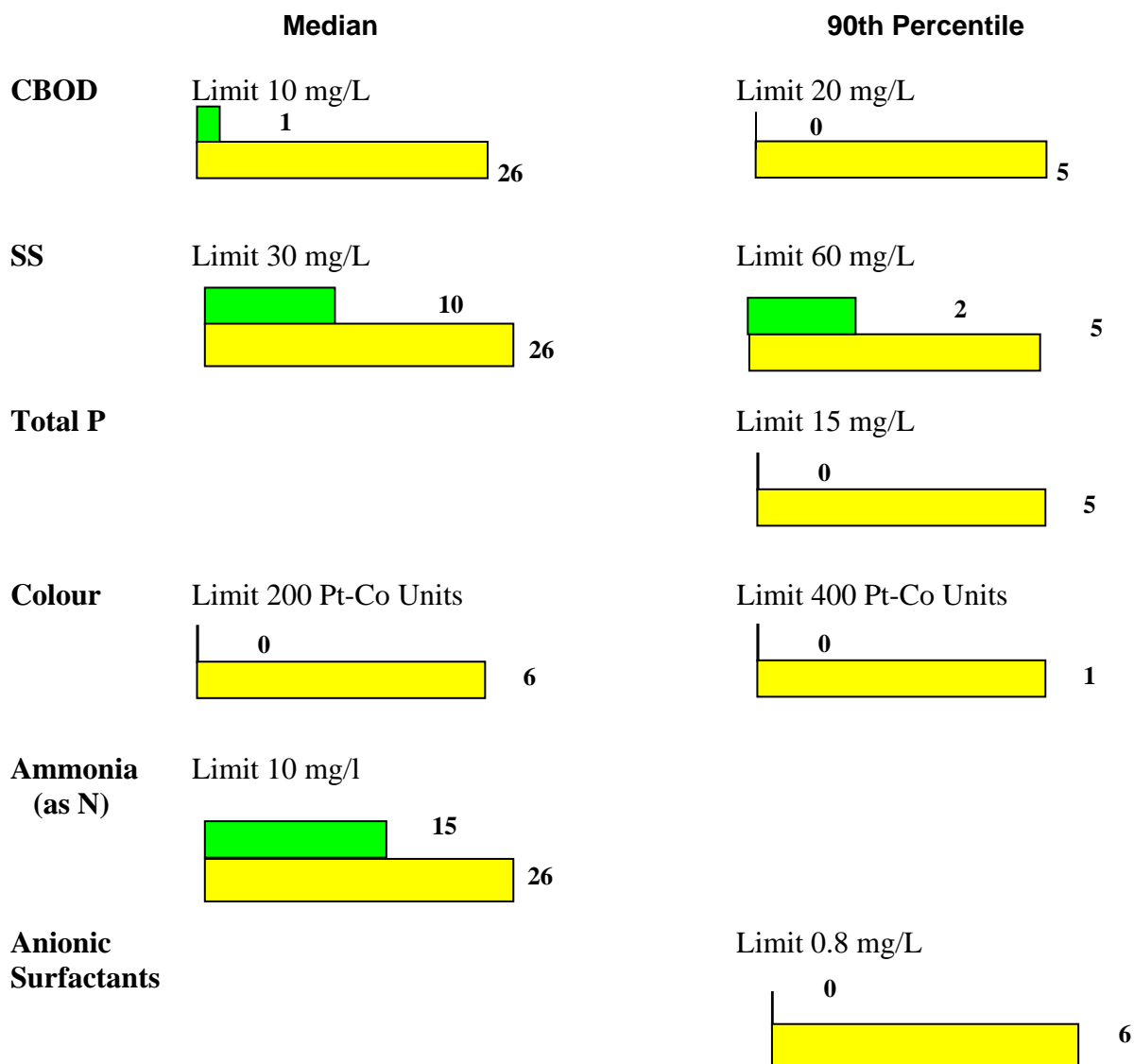
Result of E.coli for sample taken at final effluent sampling point, Trueman's Road on 5 April 2007 was 210 orgs./100 ml.

Although this single sample event resulted in E.coli numbers higher than 200 orgs/100 ml, the number of results greater than the annual median is within the allowable number. The annual median value of E.coli result for the year 2006/07 is 26 orgs/100 ml and 90th percentile annual is 110 orgs./100 ml.

Western Treatment Plant

The following details Western Treatment Plant's performance for critical parameters. Performance with respect to other parameters is reported here only if the results exceed licence limits.

Annual Parameters - flow weighted average of all four licensed outlets



	Number of sample results to date greater than the Licence Limit – exceeds the total allowance for the year (licence breach).
	Number of sample results to date greater than the Licence Limit – exceeds the allowance for the year to date.
	Number of sample results to date greater than the Licence Limit – within the allowance for the year to date.
	Number of sample results during the year allowed to exceed the Licence Limit.

General Licence Requirements

No issues.

Details of Licence Non-Compliance/Parameter Exceedances

None to report.

Groundwater Monitoring

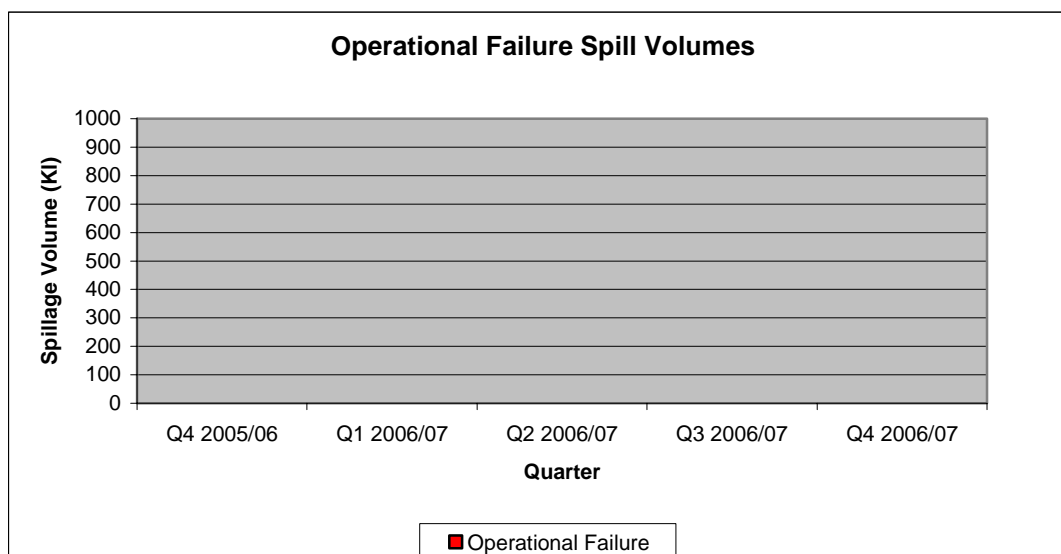
Melbourne Water reviewed the Western Treatment Plant groundwater monitoring program to take into account recommendations made in the December 2005 groundwater monitoring report, the accredited licence audit report and the review of the Environment Improvement Plan.

A revised program was approved by EPA Victoria. The program, including decommissioning of ineffective bores, repairing damaged bores and installing new bores, monitoring water levels and quality sampling and analysis, has begun. Melbourne Water is awaiting a report that analyses and assesses trends from the consultants

Sewage Spills Summary

Number of Spills	Q4 2005/06	Q1 2006/07	Q2 2006/07	Q3 2006/07	Q4 2006/07
Number of Spills	0	1	0	0	0
Operational failure	0	0	0	0	0
<1:5 compliant	0	1	0	0	0
<1:5 non-compliant	0	0	0	0	0
>1:5	0	0	0	0	0
Significance*	Q4 2005/06	Q1 2006/07	Q2 2006/07	Q3 2006/07	Q4 2006/07
Minor (Rating 1 - 3)	0	1	0	0	0
Significant (Rating 4 – 5)	0	0	0	0	0
Not Rated	0	0	0	0	0
EPA Victoria Reporting Protocol Met	Yes	Yes	Yes	Yes	Yes

*Melbourne Water reports spills according to the Melbourne Water-EPA Victoria spill reporting protocol that is contained in Appendix Three. The rating assigned to a spill is determined by applying the potential impact rating to the incident (refer to Appendix Two). If a spill is contained on site with no damage to the environment it will be reported in this report but not included in spills publicly reported.



Spills Due to Operational Failures

There were no spills due to operational failure during the quarter.

The above graph indicates the volume of sewage spilt due to equipment breakdown or human error.

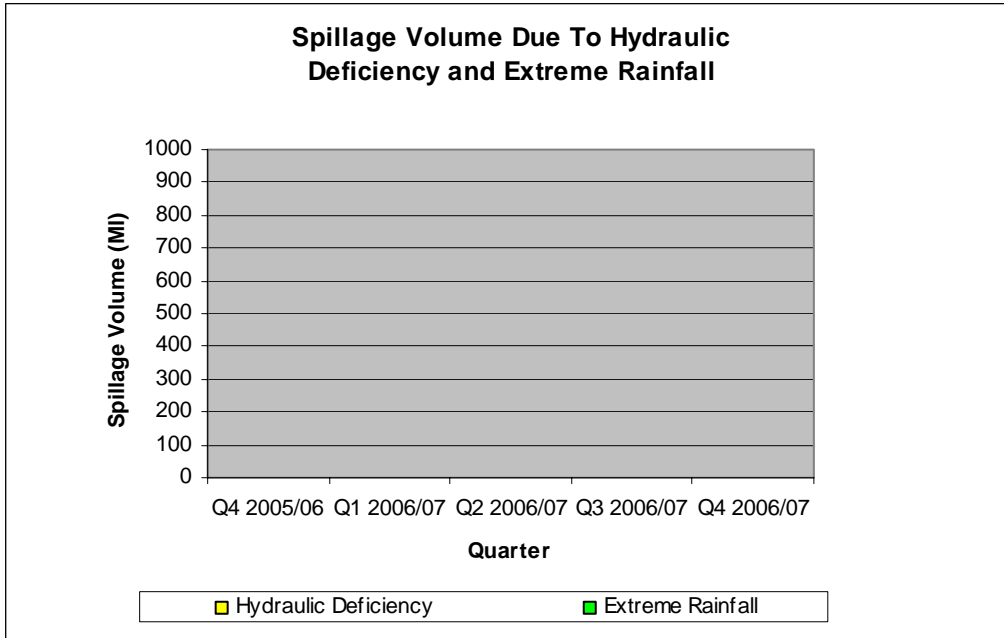
Eastern Treatment Plant

There were no spills at Eastern Treatment Plant during the quarter.

Western Treatment Plant

There were no spills at Western Treatment Plant during the quarter.

Spills Due to Rainfall Events Greater than 1:5 Year Return Frequency (Extreme Rainfall) and Hydraulic Deficiency

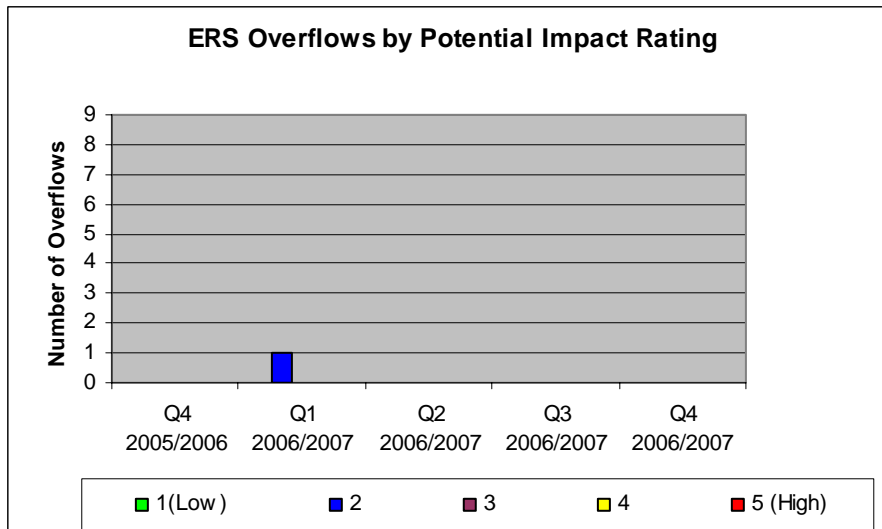


Hydraulic Deficiency - Spills due to insufficient pipe/pump capacity

Extreme Rainfall - Spills due to rainfall events greater than 1: 5 year return frequency

There were no spills due to hydraulic deficiency or extreme rainfall (greater than 1 in 5 event)

ERS Overflows

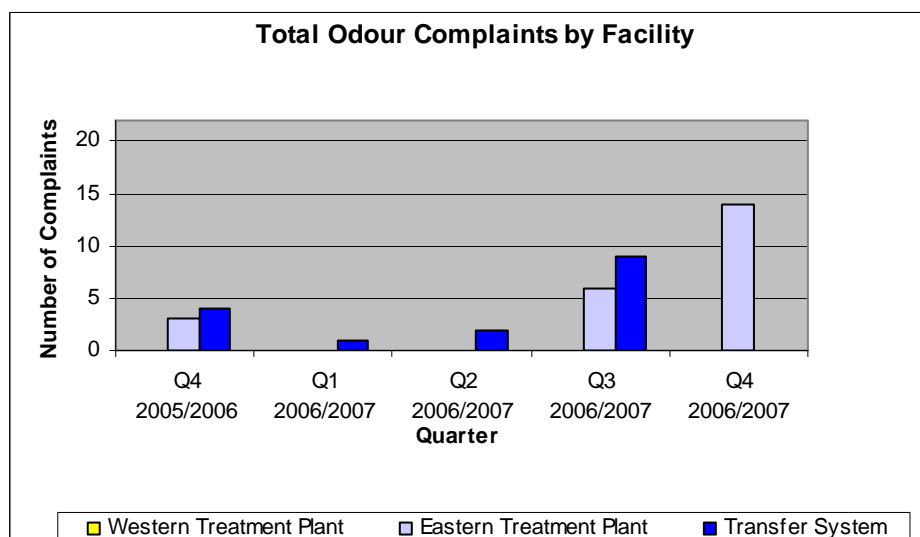


Odour Complaints

EPA Victoria regulates odour and this requires Melbourne Water to have no offensive odour attributable to its activities. New facilities have to be designed to meet this requirement and existing facilities with odour have to establish improvement programs to achieve this in agreement with EPA Victoria. Melbourne Water has an odour management strategy to ensure that treatment plant and transfer system odour performance meets regulatory requirements. This strategy has been developed with EPA Victoria agreement. This includes targeted actions for Eastern and Western Treatment Plants and the Transfer System.

Odour performance from facilities is measured through odour complaints attributable to the facility. EPA Victoria will consider an odour complaint a discharge licence breach if it is attributable to Melbourne Water and if either the relevant improvement program is not being implemented or the program is considered unsatisfactory. Odour complaints from facilities without a discharge licence could result in a requirement to develop and implement a neighbourhood improvement plan. Should odour become a significant local issue EPA Victoria could strengthen this approach and require a review of improvement strategies or issue sanctions such as penalty infringement notices.

None of the odour complaints described below are considered to be licence breaches by EPA Victoria at this time.



Eastern Treatment Plant

There were 14 odour complaints received during the quarter, nine that are considered to have been contributed to by the plant. Most of the complaints received during the quarter came from the Patterson Lakes area. Information about Melbourne Water's odour control strategy has been sent to complainants to indicate the works that have been completed and those planned for the second Water Plan period. EPA Victoria is happy with the progress being made in implementing these projects. Details are as follows:

On 2 April 2007 a member of the public reported an odour to EPA Victoria in the vicinity of Patterson Lakes. No specific details were provided but the wind direction showed that Eastern Treatment Plant could have contributed to the odour.

On 10 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were unable to visit the site due to a time delay in receiving the complaint. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 11 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were unable to visit the site due to a time delay in receiving the complaint. Wind track analysis showed that the odour was not related to Eastern Treatment Plant as the wind direction was from the north.

On 12 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were unable to visit the site due to a time delay in receiving the complaint. Wind track analysis showed that the odour was not related to Eastern Treatment Plant as the wind direction was from the north.

On 13 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were unable to visit the site due to a time delay in receiving the complaint. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 14 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were unable to visit the site due to a time delay in receiving the complaint. Wind track analysis showed that the odour was not related to Eastern Treatment Plant as the wind direction was from the southeast.

On 17 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. The complaint was received five hours after the odour and Melbourne Water staff visited the site then but did not detect an odour. Wind track analysis showed that the odour was not related to Eastern Treatment Plant as the wind direction was from the east southeast.

On 17 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water visited the site and detected an odour. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 19 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff were not able to visit the site and wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 20 April 2007 a member of the public reported an odour in the vicinity of Chelsea Heights. Melbourne Water staff visited the site and could not detect an odour at the site but did detect an odour returning to the plant. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 29 April 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff visited the site and could not detect an odour. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 2 May 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff visited the site but were unable to detect an odour. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 16 May 2007 a member of the public reported an odour in the vicinity of Patterson Lakes. Melbourne Water staff visited the site and detected an odour. Wind track analysis showed that Eastern Treatment Plant could have contributed to the odour.

On 29 May 2007 a member of the public reported an odour in the vicinity of Carrum Downs. Melbourne Water staff visited the site but were unable to detect an odour. Wind track analysis showed that the odour was not related to Eastern Treatment Plant as the wind direction was from the north east.

Western Treatment Plant

There were no odour complaints received during the quarter.

Transfer System

There were no odour complaints received during the quarter.

Corporate Compliance

Melbourne Water Passing Flow Compliance in Rivers and Streams

The table below outlines compliance with passing flow requirements at various sites. These passing flow requirements are consistent with the environmental flows specified under the relevant bulk entitlement orders and subsequent qualifications of these entitlements (refer to information about the *Qualification of the Environmental Entitlements*).

The bulk entitlement orders include:

- Yarra Environmental Entitlement 2006
- Bulk Entitlement (Thomson River – Environment) Order 2005
- Silver and Wallaby Creeks Environmental Entitlement 2006
- Qualifications to these orders due to the water shortage declaration

Yarra Environmental Entitlement

On 26 October 2006, the Minister for Water, Environment and Climate Change granted an environmental entitlement for the Yarra River. This entitlement allocates 17,000 ML per annum to the Yarra River to be stored and released from storage to provide the recommended environmental flow regime; and specifies the minimum environmental flow requirements at specific locations on the Yarra River and selected tributaries.

The environmental water requirements specified under the *Yarra Environmental Entitlement 2006* supersede the requirements set out under Schedule F7 (Waters of the Yarra Catchment) of the Waters of Victoria State environment protection policy.

Qualification of the Environmental Entitlements - Yarra River

Melbourne Water was required to develop an Annual Watering Plan for the river by 26 April 2007 detailing how the environmental water reserve is to be used to benefit river health. On the 16 April 2007, the Minister for Water, Environment and Climate Change qualified the environmental water reserve by deferring it until level 2 restrictions are lifted in Melbourne. Consequently, the submission of the Annual Water Plan was also deferred.

Thomson Environmental Entitlement

The Thomson River Bulk Entitlement for the Environment allocates the first 10,000 ML of inflow for environmental purposes. This commences on 1 July each year and is to be stored as an environmental water reserve and released to achieve the desired environmental flow regime. The West Gippsland Catchment Management Authority is required to develop an Annual Watering Plan that details the release pattern for the 10,000 ML environmental water reserve held in Thomson Reservoir.

Since 1 July 2006 Melbourne Water has released 4,587 ML from the environmental water reserve to meet orders placed by the Catchment Management Authority to benefit river health. The full 10,000 GL entitlement has not been released from storage due to the severe drought conditions. The remaining volume will be used as an emergency reserve and will be accessed to manage the impacts of drought and bushfires on the Thomson River environment.

Qualification of the Environmental Entitlements - Thomson River

As for the Yarra, the Minister agreed to temporarily qualify the Thomson River requirements. This qualification deleted the operating tolerance of the entitlement, which allows for the provision of the passing flow 95% of the time in any continuous 12-month period.

The objective of this qualification is to reduce over releases of water, particularly during periods when catchment inflows make a significant contribution to the flows at the Narrows and Coopers Creek gauging stations. Under the qualification the environment will continue to receive the minimum passing flows in accordance with operating tolerances specified in the Schedule. The key difference will be that the recorded flows at the Narrows and Coopers Creek gauging stations may drop below the daily target flow more often. Any shortfall will be made up within seven days and the minimum total volume required to meet the passing flows will remain unchanged

The qualification is to remain in place until Level 2 restrictions are lifted in Melbourne.

Maribyrnong River Bulk Entitlement

Melbourne Water is required to manage its share of releases from Rosslynne Reservoir and water extractions from the Maribyrnong River to ensure that, as a result of diversion activities, passing flows in the river at Keilor do not fall below requirements specified in the Maribyrnong Bulk Entitlement Orders - 5 ML/day or the natural flow, whichever is the lesser. Natural flow is based on flow at Deep Creek at the Bulla gauging station.

Days when flow at Keilor was below that required		0
	Compliance achieved	
	Compliance non achieved	

The table below outlines compliance with passing flow requirements at various sites. Some of these passing flows may vary due to the Yarra bulk entitlement conversion process.

**Melbourne Water Passing Flow Compliance
Quarter Four 2006/2007**

Site	Passing Flow (ML/d)	Actual Min. Flow (ML/d)	Compliance	Comments
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RESERVOIRS:

Cardinia Res. to Cardinia Ck	5	5	✓	Melbourne Water agreement with former SR&WSC
Maroondah Res. to Watts R.	1	1	✓	Melbourne Water operating rule – 1 ML/d released via ungauged outlet pipe
O'Shannassy Res. To O'Shannassy R.	4	4	✓	Melbourne Water operating rule – 4 ML/d released via ungauged outlet pipe
Silvan Res. to Olinda Ck	2	2	✓	Melbourne Water operating rule – 2 ML/d released via ungauged outlet pipe
Tarago Res to Tarago R At Scalp Ck	5	9	✓	Melbourne Water agreement with former SR&WSC
Thomson Res. To Thomson R: Below Dam	25	25	✓	Melbourne Water Bulk Entitlement provision for Thomson Reservoir.
At Narrows	80	67	✓	
At Coopers Ck	150	193	✓	
Toorourrong Res. to Plenty R.	0.2	0.2	✓	Melbourne Water operating rule - 0.2 ML/d released for stock
Upper Yarra Res. to Yarra R: Upper Yarra Dam	10	10	✓	Melbourne Water operating rule since 1993. Based on past agreement with the SR&WSC 1999 SEPP requirement
At Millgrove	98	78	✓	
At Yering Gorge	245	128	✓	

WEIRS[†]:

Armstrong Ck Weir	5	5	✓	Melbourne Water operating rule
Coranderrk Ck Weir	3	3	✓	Melbourne Water operating rule – via ungauged outlet pipe
Donnelly Ck Weir	1	1	✓	Melbourne Water operating rule– via ungauged outlet pipe
Graceburn Ck Weir	3	3	✓	Melbourne Water operating rule. Reduced to 1ML/d in times of low flow and high demand from Healesville
McMahons Ck Weir	2	2	✓	Melbourne Water operating rule
Silver Ck Weir	1	0	✓	Bulk Entitlement provision - 1 ML/d is released when stream flow is 4 ML/d or greater
Starvation Ck Weir	2	2	✓	Melbourne Water operating rule
Wallaby Ck Weir	1	0	✓	Bulk Entitlement provision - 1 ML/d is released when stream flow is 2 ML/d or greater

[†] Flows from weirs are either the table's passing flow or natural inflows if less than this.

Trade Waste Agreements

Retail water company operating licences require that a company must accept any trade waste that complies with the trade waste standards. A retail company can only accept a trade waste if it does not:

- Endanger human health;
- Compromise the safety of a person or the works of any licensee; and
- Significantly adversely affect the operation of a sewage treatment plant or any part of the environment.

They may accept trade waste that does not comply with the above requirements after consultation with Melbourne Water.

A trade waste discharge that is outside the trade waste standards or an agreed variation to the standard is a non-compliant discharge and the retail water companies provide data on non-compliance to Melbourne Water every month.

The trade waste compliance requirement in retail water company licences requires quality assured systems for detecting and managing non-compliance with trade waste agreements. The three retail companies are all certified to ISO 9001 and have Sewage Quality Management Systems to meet this requirement.

Melbourne Water has established new performance targets to monitor customer performance in meeting their trade waste agreements with the retail water companies as follows:

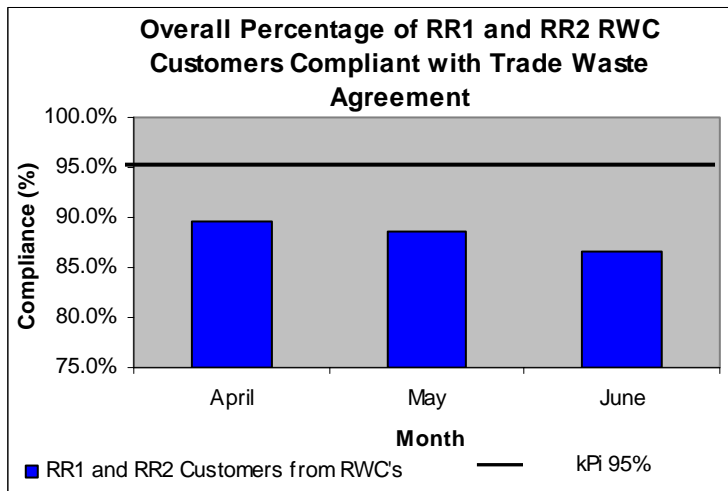
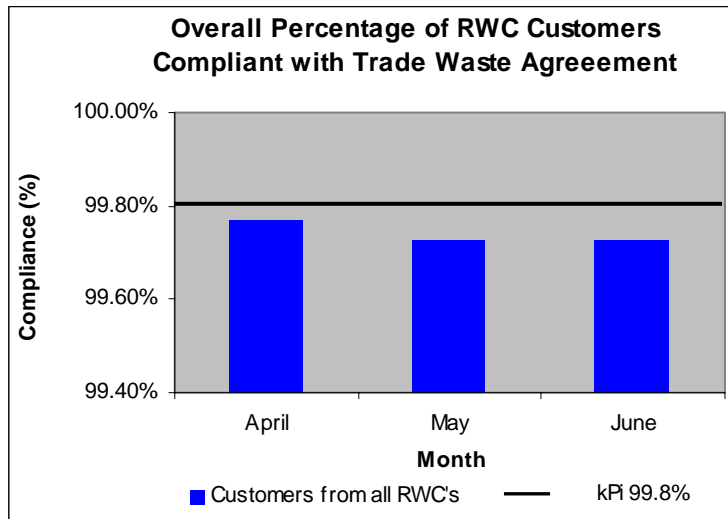
- 99.8% of trade waste customers should be compliant with their trade waste agreement
- 95% of risk rank 1 and 2 trade waste customers should be compliant with their trade waste agreement

When these targets are not met Melbourne Water will discuss the non-performance with the retail water company to see if there are any opportunities to bring the trade waste customer into compliance. Melbourne Water is discussing with the retail water companies how they can improve trade waste performance reporting so that the surveillance of high-risk customers is appropriate.

The performance targets are based on historical levels of non-compliance provided by the retail water companies and are designed to provide a baseline with which to compare future performance. The nature of Trade Waste discharges means that there will always be a background level of non-compliance, therefore a 100% target is not realistic. The performance targets provide an increased focus on the management of customer discharges by the retail water companies.

South-East Water and Yarra Valley Water include all trade waste customers, including greasy waste customers, in their report to Melbourne Water. City West Water does not include their low risk greasy waste customers in their reporting to Melbourne Water.

An explanation of the stages of the non-compliance management process for trade waste discharges is given in Appendix Four.



RR1 and RR2 RWC customers compliant with Trade Waste Agreement

The following table shows the data broken down by retail water companies. The KPI is to have 95 percent compliance measured and aggregated for the three retail water companies each month.

Percentage of RR1 and RR2 customers compliant	CWW	YVW	SEW
April	79.17	91.89	98.04
May	72.92	94.59	98.04
June	75.00	86.49	98.04

The above comparison shows the percentage of RR1 and RR2 customers that are compliant with the agreements each month. The cause of the non-compliance is not considered in this KPI and it therefore does not necessarily relate to potential risk for Melbourne Water. For example a non-compliance with a treatable parameter such as nitrogen is not as large a risk as non-compliance with an explosive or non-treatable toxicant. The differences in KPI

performance can also be related to the level of monitoring conducted by the retail water company. This is not consistent across the retail water companies.

Non compliance discussion

Most reported non-compliances have been assessed as a negligible or minor risk and have either been rectified or are being managed by the retail water company with the customer and Melbourne Water.

The performance targets were increased during 06/07 to a level higher than historical levels of non-compliance. These targets were designed to provide an increased focus on managing customer discharges by the retail water companies. Melbourne Water and the retail water companies have agreed to develop a risk assessment framework for non-compliances for future reporting and this work is currently underway.

Melbourne Water is also working with the retail water companies to develop KPIs that better reflect risk to Melbourne Water and that reflects a more appropriate measure of performance. Existing KPI's will change and will be used for reporting during 2007/08.

Summary Table of Quarterly and Annual Average Results

The table below shows the average percentage of NC's for each quarter, with an overall average of all four quarterly results for the 2006/2007 financial year.

	Overall %age RR1/2 compliant with TW agreement	Overall %age customers compliant with TW agreement
Q1	85	99.8
Q2	93	99.8
Q3	89	99.8
Q4	88	99.7
Average	89	99.8

Water Recycling at Western and Eastern Treatment Plants

Waste minimisation, through effluent and biosolids reuse, and by other means, is a licence objective for both Eastern Treatment Plant and Western Treatment Plant. Melbourne Water has established a target to recycle on average 20 % of effluent by 2010.

Eastern Treatment Plant

During the quarter approximately 196 ML of recycled water was supplied to customers along the South East Outfall and 2059 ML was supplied to the Eastern Irrigation Scheme. In addition to this approximately 3242 ML of water was used onsite at the Eastern Treatment Plant.

The Eastern Irrigation Scheme provides “Class A” recycled water from their plant off Thompson Road to the Sandhurst Club, Wedge Rd Reserve and other customers in the Cranbourne and Five Ways districts.

Western Treatment Plant

During the quarter approximately 2148 ML of Class A recycled water from the chlorination and UV disinfection plant was supplied to Southern Rural Water for the Werribee Irrigation District. A further 8 ML was supplied to the Werribee Tourist Precinct, incorporating both the Werribee Park Golf Club and the State Equestrian Centre. In addition to this, 13 ML was supplied to Mc Killop College and 23 ML to the retail water companies as part of the drought relief initiative.

Approximately 5535 ML of Class C recycled water was used onsite at the Western Treatment Plant.

Influent Total Dissolved Solid Limit

To ensure that flows into Western Treatment Plant do not have total dissolved solids levels that would compromise effluent reuse opportunities, the revised discharge licence from EPA Victoria has a future influent limit of median total dissolved solids to not exceed 1000 mg/L by 2009. This section will report on compliance with the current compliance limit of 1250 mg/L.

Influent limit of 1250 mg/L total dissolved solids			
Compliance	Not Achieved	Achieved	

Biosolids Reuse at Western and Eastern Treatment Plant

Melbourne Water had previously developed a biosolids management strategy that included targets to beneficially use 100% of annual production at Eastern Treatment Plant by 2005 and Western Treatment Plant by 2010. The capacity to achieve these targets is being reviewed and new targets will be established for the second Water Plan.

EPA Victoria approved the Eastern and Western Treatment Plant biosolids management plans in January 2004. These plans describe biosolids inventories, address quality and quantity issues, beneficial use options and set relevant Melbourne Water operational targets.

The Board noted the 2006 Biosolids Beneficial Use Strategy in July 2006. The Strategy outlined actions to achieve the use of clay-rich biosolids stored onsite at the Eastern Treatment Plant as construction fill in roads in the short to medium term. The strategy also outlined plans for further investigations into the potential use of Eastern Treatment Plant biosolids for land application in the longer term, subject to clarification of potential risks and liabilities. In addition, a research program for identifying future innovative options for beneficial use of biosolids from both the Eastern and Western Treatment Plants will be implemented. At Western Treatment Plant, the strategy recommends developing a business case for the potential use of biosolids as a fuel at the Blue Circle Southern Cement facility at Geelong.

Eastern Treatment Plant

During the quarter there were no biosolids removed from the Eastern Treatment Plant for beneficial use.

Due to the high clay content of the Eastern Treatment Plant stockpiled biosolids, Melbourne Water is pursuing the use of biosolids as road embankment fill in the Vic Roads Deer Park bypass project. Melbourne Water has received confirmation from EPA Victoria that the project is consistent with regulatory obligations and is working with EPA Victoria to develop guidelines for using biosolids in this application. Developing these guidelines would allow biosolids structural fill projects like this to proceed under an approved Environment Improvement Plan.

Western Treatment Plant

During the quarter no biosolids were removed from the Western Treatment Plant for beneficial use.

Due to the high contaminant levels and potentially useful calorific value of the Western Treatment Plant biosolids, Melbourne Water completed a feasibility study into energy recovery. The study investigated both onsite and offsite energy recovery alternatives and found that use of biosolids as a fuel at Blue Circle Southern Cement was the preferred option.

Status Report - Meeting SEPP Targets for Melbourne's Waterways

The following information describes the physico-chemical and bacteriological condition of Melbourne's waterways during the reporting period. Objectives set out in the three relevant State environment protection policies (SEPPs) are the long-term targets for water quality. There is no specific statutory obligation on Melbourne Water to meet these targets.

The Waters of Victoria SEPP has a provision for the development of interim waterway water quality objectives if there is little chance of attaining the desired quality within the ten-year time frame of the SEPP. Melbourne Water will be developing interim objectives where relevant as part of the Regional River Health Strategy. Melbourne Water has adopted a long-term target to achieve good waterway health in all natural waterways by 2025.

This quarterly report uses a rolling twelve months of waterway water quality data and applies 25th, 50th and 75th percentiles to the data, as well as minimums, maximums and geometric means, dependant on the particular SEPP schedule and segment a waterway falls within. The map shows SEPP segments and where the monitoring points are located. The performance tables show performance against relevant SEPP objectives. The results are shown in a new format this quarter with the tables showing the performance of each site with its relevant SEPP objective. Red is non-compliance and green is compliance with SEPP and the number in each cell is the result for the previous 12 months sampling. SEPP compliance calculations require eleven samples for most parameters. For a small number of sites in this report, data was unavailable due to drought or access conditions.

New monitoring sites are being added in the extended area and as data becomes available this will be included in the tables.

Waterway monitoring data from the last twelve months showed that waterways within Greater Melbourne performed well in all catchments for pH, generally well for turbidity, and poorly for dissolved oxygen and nutrients. Results were more varied for E.coli, with catchments ranging from zero to full compliance with SEPP objectives.

Waterway Water Quality

Quarter Four, 2006/2007

The table below shows the environmental quality of Greater Melbourne's waterways during the reporting period, sorted by catchment. Results indicate the percentage of samples taken in each catchment that comply with State water quality guidelines.



Definitions

DO	Dissolved oxygen
EC	Electrical conductivity
Turb	Turbidity
T-P	total phosphorus
T-N	total nitrogen
min	Minimum
max	maximum
...%tile	..th percentile
geo	geometric mean
*	This SEPP requires 5 samples at regular intervals within 30 days, however these figures have been calculated using 12 monthly readings
**	This SEPP requires a 42 day geometric mean, however these figures have been calculated using 12 monthly readings.
%sat	percentage saturation
uS/cm	micro Seimen per centimetre
NTU	nephelometric turbidity units
mg/l	milligrams per litre
org/100ml	organisms per 100 millimetres
NA	none applicable

Waters of the Yarra Catchment	DO% Min	EC 75%	pH Min	pH Max	Turb 50%	TP Max	TN Max	E Coli Geomean
	% sat	µS/cm	ph units	ph units	NTU	mg/l	mg/l	org/100ml

Rural Eastern Waters

SEPP Objective	80	N/A	6	8.5	15	0.05	0.6	200
Arthurs Creek at Hurstbridge-Arhturs Creek Road, Hurstbridge	29		6.6	7.8	11	0.09	1.614	39.68
Cockatoo Creek at Tschampions Road, Macclesfield	63		6.4	7.5	23	0.058	1.716	39.84
Diamond Creek at Strathewan Road, Cottlesbridge	18		6	7.1	6	0.083	1.8115	109.37
Little Yarra River at Corduroy Road, Yarra Junction	64		6.2	7.5	13.5	0.056	1.195	282.29
Steels Creek at Yarra Glen-Healesville Road, Yarra Glen	44		6.4	7.1	13	0.018	0.912	54.04
Stringybark Creek at Melba Highway, Yering	47		6.7	7.8	9.5	0.15	1.756	80.7
Wandin Yallock Creek at Killara Road, Gruyere	25		6.4	7.5	8.5	0.049	1.968	66.7
Watsons Creek at Henley Road, Kangaroo Road	42		7	7.8	2.5	0.035	0.546	46.51
Woori Yallock Creek at Macclesfield-Woori Yallock Road, Yellingbo	62		6.7	7.5	17	0.057	1.506	125.9
Woori Yallock Creek at Warburton Highway, Woori Yallock	62		6.3	7.5	19.5	0.077	1.507	169.49
Watts River at Healesville-Kinglake Road, Healesville	51		6	8	8	0.06	1.859	341.98
Yarra River at McKenzie-King Drive, Millgrove	66		6.1	7.8	3	0.024	0.912	157.3
Yarra River at Don Road, Launching Place (EPA 2916)	64		6.3	7.5	6	0.027	0.914	179.1
Yarra River at Maroondah Hwy, Healesville (EPA 2904)	65		6.2	7.5	12	0.055	1.246	213.43
Yarra River at Spadonis Reserve, Coldstream	58		6.8	7.8	11	0.05	1.186	204.81

Rural Western Waters

SEPP Objective	60	N/A	6	8.5	25	0.05	0.6	200
Merri Creek at Summerhill Road, Craigieburn	46		7.1	8.3	4	0.13	1.312	48.56
Plenty River at Kurrak Road, South Morang	33		6.8	7.9	9	0.079	1.413	46.56

Upper Estuary

SEPP Objective	60	N/A	6.5	8.5	30	N/A	N/A	200
Yarra River at Princes Bridge, Melbourne	52		6.7	8.1	5.5			228.1

Urban Waters

SEPP Objective	60	N/A	6	8.5	30	0.08	0.9	200
Andersons Creek at Everard Drive, Warrandyte	10		6.6	7.7	17	0.56	5.058	248.47
Brushy Creek at Lower Homestead Road, Wonga Park	60		6.9	7.6	18.5	0.65	13.75	485.32
Darebin Creek at Clark Road, Alphington	56		6.9	8.4	8.5	0.21	2.219	914.4
Diamond Creek at Main Road, Eltham	34		6.8	8.3	20.5	0.12	1.218	348.59
Gardiners Creek at Glenferrie Road, Hawthorn	43		6.9	9.4	7.5	0.16	2.39	378.23
Jumping Creek at Jumping Creek Road, Wonga Park	29		6.9	8.1	5.5	0.076	1.235	123.14
Koonung Creek at Bulleen Road, Bulleen	29		6.8	8.1	14.5	0.2	3.29	859.44
Merri Creek at Roseneath Street, Yarra Bend	58		6.9	8.8	6.5	0.18	1.847	275
Moonee Ponds Creek at Racecourse Road, Flemington	26		6.9	8.8	7	0.19	4.2	1103.04
Mullum Mullum Creek at Deep Creek Reserve, Warrandyte	48		6.9	7.8	19.5	0.34	5.145	397.61
Olinda Creek at MacIntyre Lane, Coldstream	61		7	7.6	12.5	0.12	5.322	254.67
Plenty River at Henty Road, Lower Plenty	38		6.9	8.8	20	0.16	1.526	350.43
Ruffey Creek at Parker Street, Templestowe	46		7.1	8	6	0.25	2.725	624.52
Yarra River at Kangaroo Ground-Warrandyte Road, Warrandyte	58		6.8	7.9	9	0.058	1.148	79.62
Yarra River at Chandler Hwy, Kew (Replaces MY01)	45		6.6	8	16.5	0.076	1.381	312.76

Waters of Victoria	DO%	EC	pH	pH	Turb	TP	TN	E coli
	25%	75%	25%	75%	75%	75%	75%	50%
	% sat	uS/cm	ph units	ph units	NTU	mg/l	mg/l	org/100 ml

Cleared Hills & Coastal Plains Werribee/Maribyrnong

SEPP Objective	85	1500	6.5	8.3	10	0.05	0.6	150
Maribyrnong River at Brimbank Park Ford (upstream Taylors Creek), Keilor	50	2300	7.6	7.9	10	0.05	1.33	70
Maribyrnong River at Canning Street Ford, Avondale Heights (EPA 6070)	57.25	2300	7.6	8.05	15.3	0.063	0.9815	70
Maribyrnong River at end of Newsom St. 500m d/s of Ascot Vale MD, Ascot Vale West	53	43000	7.6	7.825	8.25	0.17	0.743	60
Steele Creek at Rose Avenue, Niddrie	66.25	965	7.6	8.125	9.25	0.048	0.64875	150
Stony Creek at Bena Street, Yarraville	55.75	332.5	7.275	8.05	20.8	0.423	2.5525	2300
Kororoit Creek at Millbank Drive, Deer Park (Replaces EPA5509)	49	2275	7.4	7.7	7.25	0.057	0.6995	45
Kororoit Creek at Racecourse Road Ford, Altona	46	33000	7.8	8.125	27.3	0.223	1.7215	135
Skeleton Creek at Ayr Street, Laverton	46.75	4875	7.3	7.6	13.5	0.198	0.7735	250

Cleared Hills & Coastal Plains Westernport

SEPP Objective	85	500	6.4	7.7	10	0.05	0.6	150
Corhanwarrabul Creek at Wellington Road, Rowville	52	485	6.8	7.4	30	0.088	1.28725	230
Dandenong Creek at Boronia Road, Wantirna	59.25	605	7.1	7.4	17.5	0.103	1.84125	135
Dandenong Creek at Stud Road, Dandenong North (EPA 5654)	60	572.5	6.85	7.55	39.8	0.083	1.1785	150
Dandenong Creek at Pillars Crossing, Dandenong South	69.75	710	6.975	7.825	52.8	0.101	1.29175	160
Elster Creek at Cochrane Street, Elwood	54	522.5	7.1	7.7	13	0.1	1.33525	2200
Eumemmerring Creek at Worsley Road, Bangholme	66.25	900	7.325	7.75	17.8	0.148	1.48275	150
Hallam Main Drain at South Gippsland Highway, Hampton Park	58	1100	6.875	7.45	16.8	0.063	1.04925	150
Kananook Creek at Wells Street, Frankston	44.5	40750	7.65	7.95	10.8	0.14	0.84325	480
Mile Creek at Cheltenham Road, Keysborough	63	1900	6.8	7.8	16	0.11	1.548	560
Mordialloc Creek at Wells Road, Mordialloc	51.25	19000	7.175	7.725	38.3	0.215	1.30825	165
National Water Sports Centre outlet, Bangholme (EPA 5682)	66.75	30000	7.9	8.15	43.3	0.128	1.348	130
Balcombe Creek at footbridge off Uralla Drive, Mt Martha	49.5	1575	7.2	7.7	18	0.087	1.25625	490
Chinamans Creek at Eastborne Road, Rosebud West	30.5	1025	7.2	7.6	7.25	0.133	1.2365	580
Dunns Creek at Marine Drive, Safety Beach	62.5	6075	7.4	7.6	7.75	0.071	0.745	990
Main Creek at Boneo Road, Flinders	76.5	2525	7.45	7.95	3.25	0.026	0.55075	40

Forest-A

SEPP Objective	90	100	6.4	7.7	5	0.03	0.5	150
Dandenong Creek at Sheffield Road, Doongalla Forest	74.25	160	6.775	7.625	11	0.039	1.21975	80

Waters of Westernport Bay & Catchment	DO% Min	EC 75%	pH Min	pH Max	Turb 50%	TP Max	TN Max	E Coli Geome an
	% sat	uS/cm	ph units	ph units	NTU	mg/l	mg/l	org/100 ml

Lowlands & Phillip Island

	80	N/A	6.5	9	15	0.05	0.6	200
Bunyip River at Healesville Koo-Wee-Rup Road, Koo-Wee-Rup	64		4.3	8.5	24	0.35	2.5065	62.08
Cardinia Creek at Ballarto Road, Cardinia	60		6.9	8.4	19.5	0.099	2.177	194.76
Deep Creek at Ballarto Road, Rythdale	38		6.7	7.7	83	1.2	3.966	212.97
Toomuc Creek at Ballarto Road, Rythdale	28		6.7	8.1	22.5	0.14	1.645	124.95
Warrangine Creek at Frankston-Flinders Road, Hastings	39		6.9	7.9	8	0.093	1.532	250.17
Watsons Creek at Dandenong-Hastings Road, Somerville	21		6.7	7.6	10	1.6	291.575	365.76
Yallock Outfall at South Gippsland Highway, Monomeith	51		7.1	7.8	94	0.65	6.899	81.04

Northern Hills

SEPP Objective	85	N/A	6.5	9	5	0.03	0.2	200
Bunyip River at North Labertouche Road, Labertouche	53		6.6	8.2	6.5	0.031	0.904	54.69
Bunyip River d/s Cannibal Creek, Longwarry North	57		6.8	8.2	10.5	0.042	0.875	327.52
Cardinia Creek at Chadwick Road, Upper Beaconsfield (Replaces AM089)	62		6.8	8.7	4.5	0.042	3.27	114.34
Tarago River at Morrisons Road, Labertouche	55		6.7	8.3	7	0.065	1.365	325.6
Toomuc Creek at Princes Highway, Pakenham	22		6.5	8.1	12	0.098	2.45	117.39

Peninsula

SEPP Objective	80	N/A	6.5	9	15	0.05	0.6	200
Merricks Creek at Bridge Street, Merricks (Beach Road)	38		6.9	8.2	6	0.16	3.534	164.98
	80	N/A	6.5	9	15	0.05	0.6	200
Bunyip River at Little Road, Iona	58		6.6	8	9.5	0.1	1.015	671.94
Lang Lang River upstream Drouin-Poowong Road, Athlone	17		6.7	8.1	10.5	0.42	1.694	230.59
Lang Lang River at South Gippsland Highway, Lang Lang	46		7	7.9	15	0.31	5.29	204.27

Reporting Alert Levels for Waterway Water Quality

Water quality alert levels were agreed between EPA Victoria and Melbourne Water in 1994. Alert levels are generally well above water quality objectives specified in relevant State environment protection policies, representing instances of particularly undesirable water quality. Melbourne Water is required to report all alert-level exceedances that occur within our jurisdiction to provide a means of identifying sites that often experience poor water quality and also to provide a mechanism for locating and mitigating chronic pollution problems.

From April to June 2007, a total of 75 alert-level exceedances were reported to EPA Victoria, or about 1.8 % of the total number of water quality measurements.

This compares with 56 exceedances reported in the 4th quarter of the last year and 137 exceedances (3.3%) reported in the 3rd quarter of this year. Exceedances were most commonly reported for nitrogen containing compounds (26), conductivity (15) and dissolved oxygen (19). There were 4 sites with more than 5 exceedances. The largest number of exceedances was reported in Watsons Creek at Dandenong-Hastings Road, Somerville (7) and Brushy Creek at Lower Homestead Road Bridge, Wonga Park (6).

There was a total of 365 exceedances reported during the 2006-2007 year. One of the most common sites with exceedances was Stony Creek at Yarraville due to highly urbanized and industrial catchment. A recent water quality investigation looked at isolating pollution sources in the catchment. Other sites were Watsons Creek at Dandenong-Hastings Road, Somerville (associated with market garden run off) and Brushy Creek at Lower Homestead Road Bridge, Wonga Park due to STP upstream.

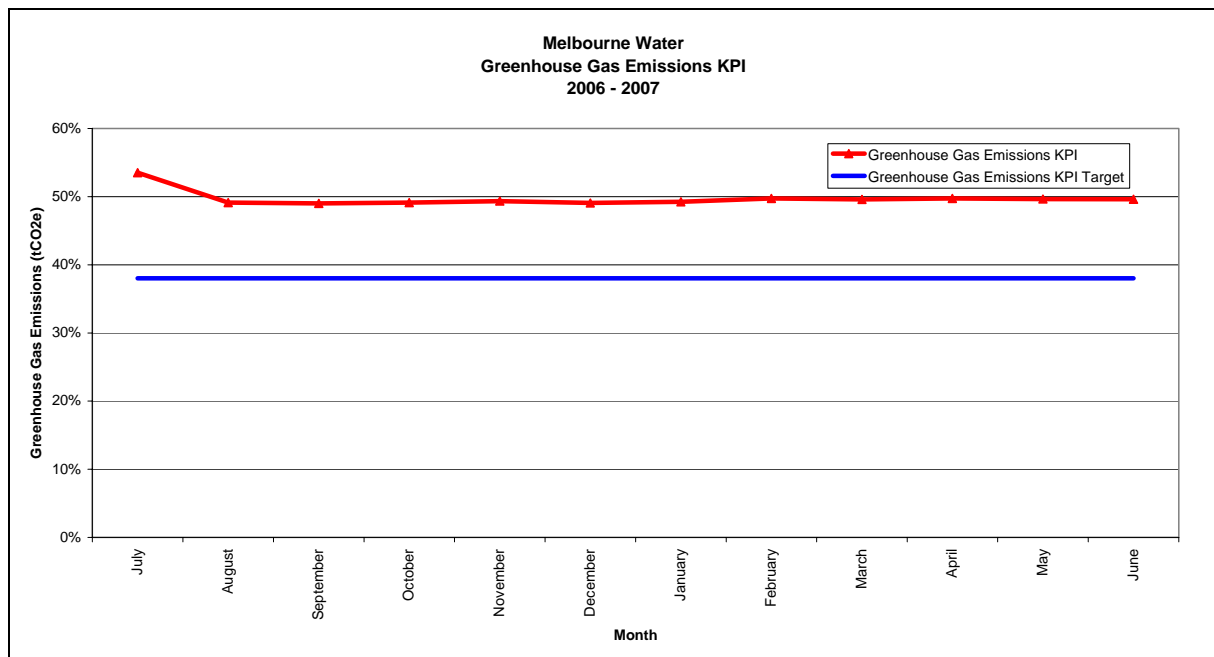
Renewable Energy and Greenhouse Gas Emissions Performance

Melbourne Water has established Key Performance Indicators for increased renewable energy and reduced greenhouse gas emissions. While there are no strict regulatory requirements for these, there are increasing soft regulatory requirements such as EPA Victoria's discharge licence requirement to implement energy efficiency projects with pay back periods of three years or less. The Commonwealth Government is also introducing similar requirements for businesses that use more than 0.5 PJ of energy each year and Melbourne Water uses about 2 PJ.

The following graphs show performance against the two Key Performance Indicators. The definition for each is included with each graph. For information two additional charts are included showing the energy content of sewage and water and the fuel efficiency of Melbourne Water's vehicle fleet.

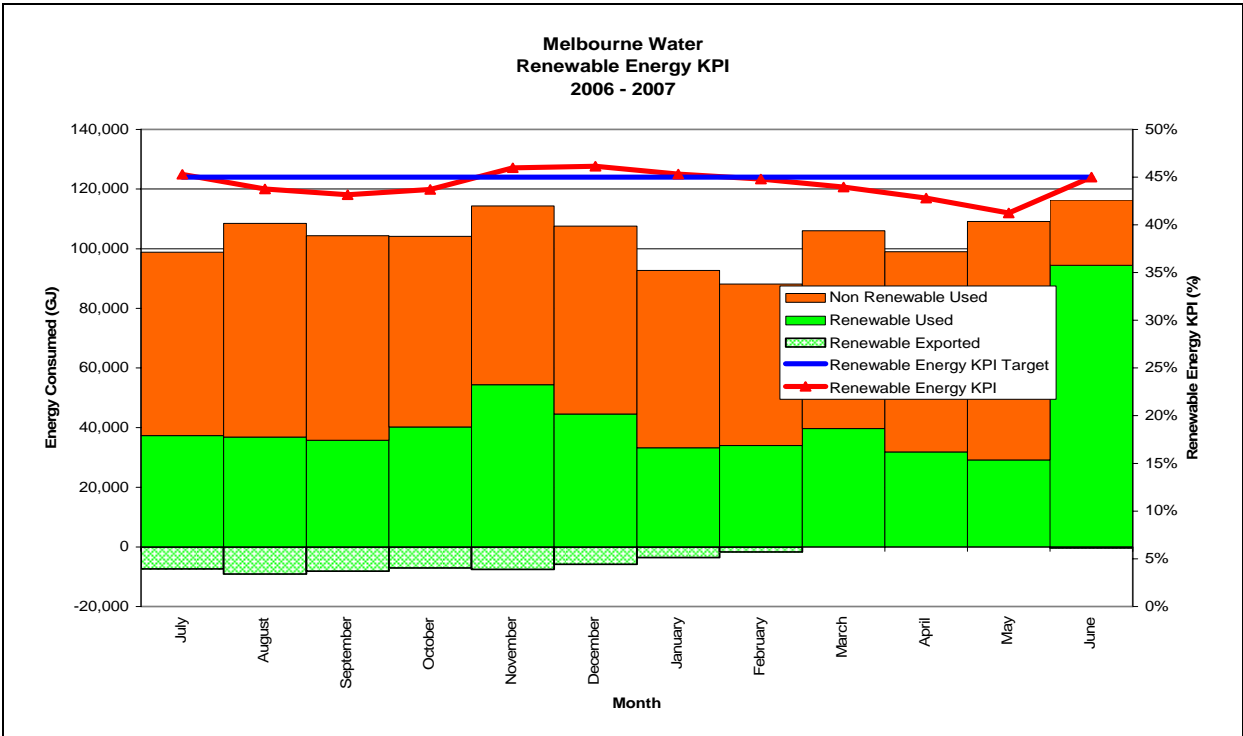
Greenhouse Emissions KPI

$$= (\text{Total Emissions 2000/01} - \text{Total Emissions 2005/06}) / \text{Total Emissions 2000/01}$$



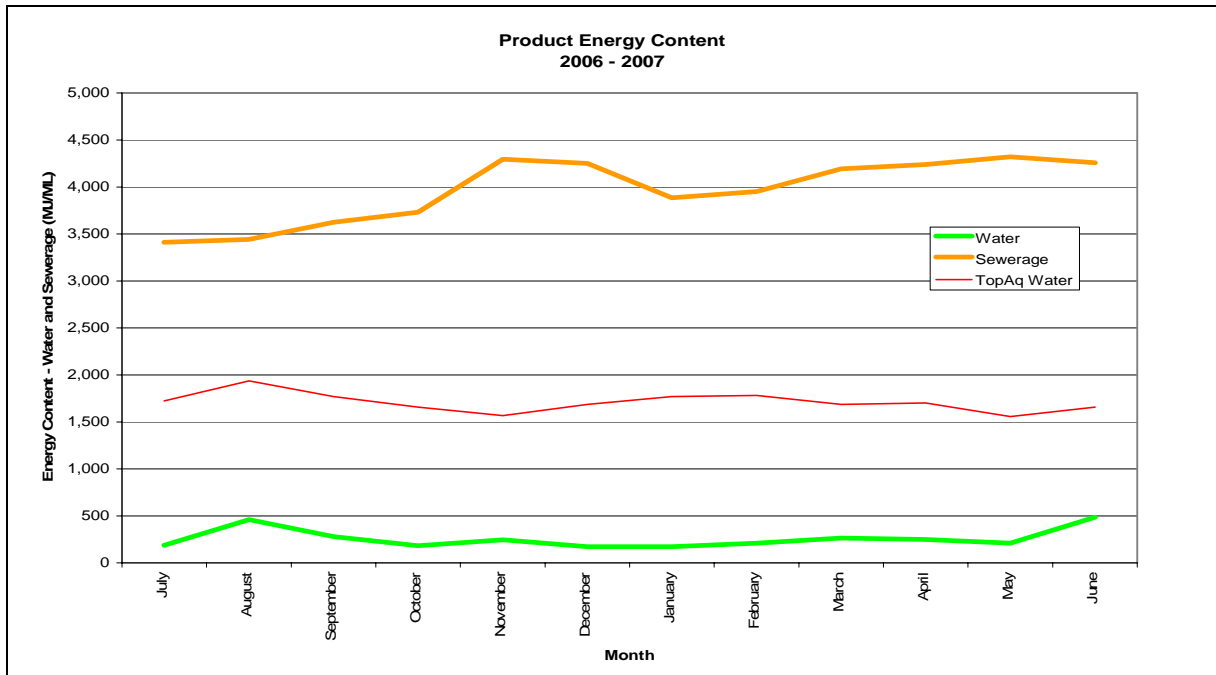
Renewable Energy KPI

= Renewable Energy Produced or Used / Total Energy used by Melbourne Water



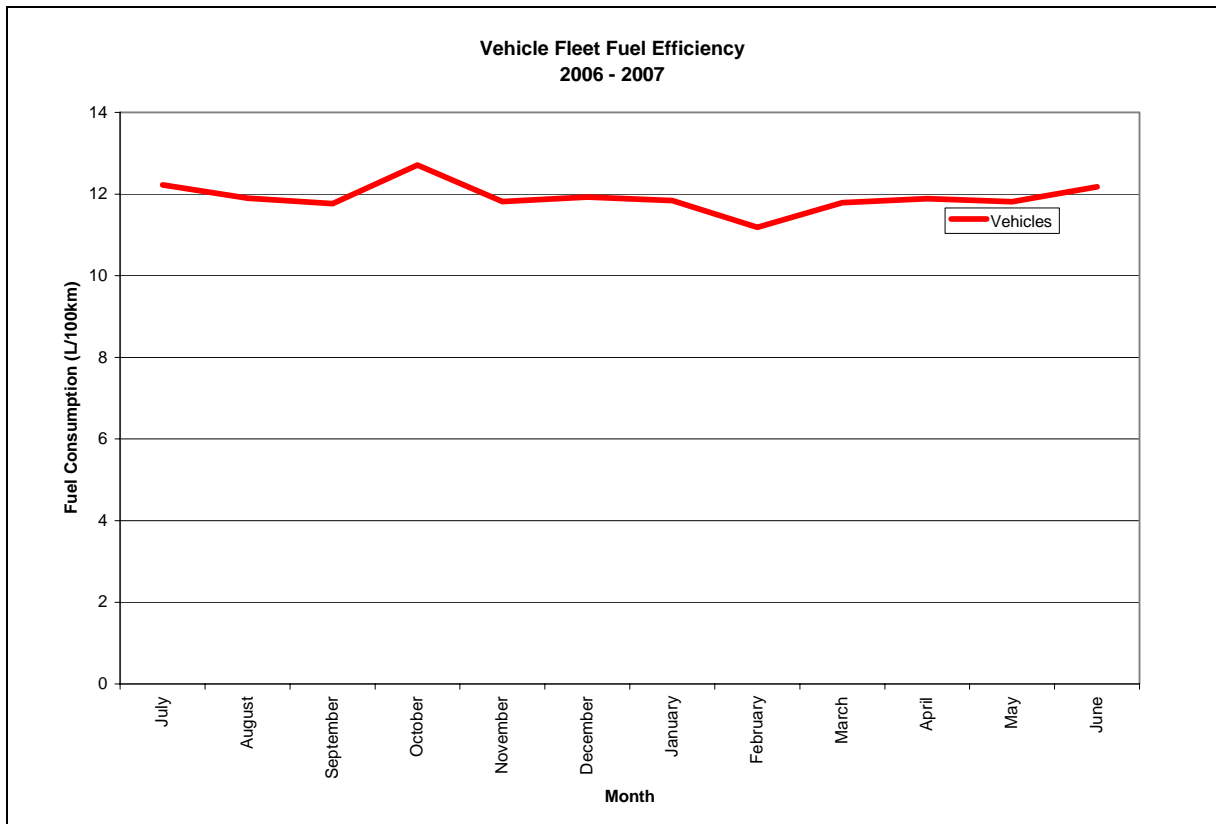
Energy content

Energy content is how much energy Melbourne Water or Earth Tech (TopAq Water) uses to produce a ML of product. Earth Tech's line is the average energy required per ML of Class A water from ETP effluent.



Vehicle fleet efficiency

On average how much fuel is used to travel 100 kms.



Catchment Profile

Giant Gippsland Earthworm (*Megascolides australis*) - Habitat and Distribution Study



The Giant Gippsland Earthworm (*Megascolides australis*) has been identified as a species that may be impacted by works undertaken by Melbourne Water. A desktop study was undertaken into the distribution and ecological requirements of the species to provide advice on management actions to protect populations. Known to occur in a relatively small area in south and west Gippsland the Giant Earthworm was discovered in 1878 at Brandy Creek. Reaching up to 1.5 m in length, the Giant Earthworm is claimed to be the largest earthworm in the world.

Biology and Ecology

Much of the biology of Giant Earthworm remains unknown, reflecting the difficulty in sampling a subterranean animal with a very fragile body. Even slight bruising may result in death.

Size	<ul style="list-style-type: none"> • Up to 1.5 m in length. Avg adult length is 80 cm and 2 cm diameter • Up to 400 g in weight. Average adult weight is 200 g
Breeding	<ul style="list-style-type: none"> • A hermaphroditic species. • In Spring/Summer and related to soil moisture and temperature conditions. • One embryo per egg cocoon and over 12 months to incubate • Egg production appears very low and may not occur annually
Population Structure	<ul style="list-style-type: none"> • Studies suggest high longevity, taking up to 5 years to reach sexual maturity • Slow growth rate and population turnover with a low rate of recruitment • Populations isolated from others & opportunities for genetic exchange are limited. The Giant Earthworm has moderate to high levels of genetic diversity.
Burrows	<ul style="list-style-type: none"> • Giant Earthworms remain underground in complex, permanent burrows. • One worm appears to occupy one burrow system around 1-1.5 m in depth. • Up to 10 worms per m³ recorded with mean density of 2 per m³ • Occupied burrows are always wet, aiding in movement & gas exchange.

Distribution

The Giant Earthworm occupies an area of approximately 40,000 ha in the Bass River Valley and is confined to an area roughly bound in the north by Warragul, and in the south by Loch and Korumburra. Three main rivers including the Bass, Lang Lang and Tarago Rivers are within the Giant Earthworm's range. There is little information regarding the historical distribution of the species, particularly before vegetation clearance, yet broad-scale development of the region for agriculture clearly had some affect on the species. Many anecdotal reports suggest "thousands" of Giant Earthworms were killed during ploughing, leaving the fields "red with blood" (Barrett, 1931, 1935, Smith and Peterson 1982).

Identification of Potential Habitat

While streamsidess (within 40 m) provide one of the most important habitats for the Giant Earthworm, there are other features that can be used to predict suitable Giant Earthworm habitat.

Altitude	<ul style="list-style-type: none"> 40 to 400 m with the majority of records over 120 m
Soil and surface hydrology	<ul style="list-style-type: none"> High soil moisture content retained almost all year round Associated with creek banks above the active floodplain More likely to be near tribs & drainage lines than riverbanks Usually absent from areas prone to waterlogging.
Mirco-topography and slope aspect	<ul style="list-style-type: none"> Occurs on steeper hillslopes usually of a west or southerly aspect. Associated with the presence of ripples or terracettes
Soil depth and composition	<ul style="list-style-type: none"> Generally in the deep blue-grey clayey soils formed mainly from cretaceous sediments (sandstone, siltstones and mudstones) Absent from soils that are sandy, shallow or heavily pugged. Generally restricted to the top 800mm to 1800 mm of soil

Threats

The Giant Earthworm is of conservation concern because of its limited distribution and life history characteristics (e.g. low reproductive and recruitment rates and poor dispersal ability) which render the fragmented populations vulnerable to threatening processes. Key threats can be identified as:

Soil Disturbances	<ul style="list-style-type: none"> With no regenerative capacity, Giant Earthworm's die if injured from UV radiation, desiccation and predation when exposed during works. Destruction & alteration of habitat, e.g. through soil compaction and alteration to microclimate
Altered hydrology	<ul style="list-style-type: none"> Probably the most serious threat to Giant Earthworm populations Soil moisture and water table levels influence distribution as water balance is important for worm movement and respiration.
Revegetation	<ul style="list-style-type: none"> Now questioned due to impacts on local hydrological conditions.
Chemical alterations	<ul style="list-style-type: none"> No information on the effects of herbicides and pesticides, yet there is a body of literature on other earthworm species. Generally herbicides have low toxicity, fungicides & fumigants are very toxic and some horticultural sprays are highly toxic

Recommendations and guidelines for Melbourne Water activities that may pose a threat are provided in the report. These activities include:

- Weed control/ herbicide use e.g. willow removal
- Excavator/ heavy equipment movement/ usage
- Fencing
- Revegetation
- Implementation of drainage and stormwater services for developing areas

Recommendations for Future Research and Investigation

- A pilot study undertaken in areas heavily infested by willows to give some indication of the likelihood of the Giant Earthworm's presence in this type of habitat.
- Field Training Day to familiarise workers in identification, management and survey techniques.
- More precise mapping of potential habitat and modeling to predict its distribution.
- Determination of the effects of revegetation of stream banks (e.g. at Stream frontage sites) so that more accurate guidelines for landowners and managers can be developed.

Appendices

Appendix One: Guide to Terms

Parameter	Units	Explanation
BOD <i>Biochemical Oxygen Demand</i>	mg/L*	A measure of the oxygen depleting potential of waste - usually measured over a five day period.
CBOD <i>Carbonaceous Biochemical Oxygen Demand</i>	mg/L*	A measure of the oxygen depleting potential of the carbonaceous (organic) portion of the waste - usually measured over a five day period.
SS <i>Suspended Solids</i>	mg/L*	A gravimetric measure of undissolved matter, when retained on filter.
Amm <i>Ammonia</i>	mg/L*	A form of nitrogen, present in untreated sewage and many industrial wastes. Is toxic to certain fish and marine species.
Surf <i>Anionic Surfactants</i>	mg/L*	Surface active agents, associated with detergents
pH	numeric	A measure of the acidity (pH 0-7) or alkalinity (pH 7-14) of sample. Pure water is slightly acidic, due to dissolved carbon dioxide.
TRC <i>Total Residual Chlorine</i>	mg/L*	A measure of the remaining chlorine associated with the disinfection of effluent.
D.O. <i>Dissolved Oxygen</i>	mg/L*	An indication of "waterway health". Levels may deviate from saturation by pollutant depletion, or supersaturation due to algal activity.
Metals	mg/L* or µg/L#	Are an indication of contamination. Metals tested include lead, cadmium, chromium, copper, zinc, nickel and mercury.
E. coli <i>Escherichia coli</i>	no. of organism s/ 100ml	A common bacteria from the intestines of warm blooded animals. Used as an indicator of faecal contamination.
PAH's <i>Polynuclear Aromatic Hydrocarbons</i>	µg/L#	Polynuclear Aromatic Hydrocarbons are by-products of petro-chemical industries and combustion processes. Many PAH's are highly carcinogenic.
Total P or TP <i>Total Phosphorus</i>	mg/L*	Measured as phosphate after acid digestion of total sample to convert all combinations of phosphorus to phosphate.
Phenols	µg/L#	Phenols are widely used in resins, disinfectants and industrial products. Trace residuals are resistant to decomposition.
Total N or TN Total Nitrogen	mg/L*	The total amount of nitrogen comprising organic nitrogen, ammonia, nitrate and nitrite
Turb Turbidity	NTU	Cloudiness caused by materials suspended in water
EC Electrical conductivity	µS/cm	A measure of the ability to conduct an electrical current and used as an indicator of salinity
Org N <i>Organic Nitrogen</i>	mg/L*	A distinction between the inorganic nitrogen forms (ammonia, nitrite and nitrate), and the organic compounds present in food/body wastes. (proteins, amines)

* milligrams per litre of water sampled - is equivalent to parts per million

usually expressed as micrograms per litre of water sampled - is equivalent to parts per billion

Appendix Two: Details of the Environmental Impact Rating of Sewer Spillages

The development of an environmental impact rating for sewer spills includes the following factors:

- environmental quality of the receiving water;
- spill content;
- dilution of effluent in receiving water; and
- the volume of the spill.

The impact rating is based on a procedure that considers the various combinations of grade for each of the factors together and then groups them into an impact rating based on a simple model. Each possible combination of grades has been put into one of the ratings from one to five. Although this may appear to be an arbitrary process, the results represent a reasonable estimation of the potential environmental impact of a spill from a sewer.

The environmental impact rating is an indication of the potential impact of spill events, not a measure of actual impact.

Examples

An example of a significant spill achieving an impact rating of “5” occurred during Period 12 1994/95. ERS number 327 discharged 10 826 Kl of untreated sewage into the Maribyrnong River. The volume of this spill was the key determinant in the spill classification of “5”.

ERS number 327 discharged on another occasion during Period 12 1994/95 resulting in 68 Kl of sewage being discharged into the Maribyrnong River. This spill was given a rating of “2” due to the relatively minor volume of sewage discharged into the waterway and was not regarded as significant.

Appendix Three: Melbourne Water Spillage Reporting

How Melbourne Water reports sewerage system spills within Melbourne Water and to EPA Victoria is described below.

All spills, regardless of volume or content, are reported internally or to an external authority. The significance of the spill determines the reporting process.

Spills where there may be an environmental or public health hazard*

1. Immediately by phone or fax using the EPA NOTIFICATION OF SEWER SPILL form by a senior manager to EPA Victoria.
2. These spills require a SEWER SPILL NOTIFICATION FOLLOW-UP report to EPA Victoria within 21 days of the spill.
3. Subsequent written reports are provided to Melbourne Water executives (as required) and EPA Victoria (quarterly).

Where there is potential for a public health impact DHS is also notified.

All Spills (including spills of low significance)

1. Each period, a summary of all spills is included in the Business Unit's Operating Report to Board.
2. The Quarterly Board Environmental Compliance Report provides more details on all spills.
3. A Quarterly Spills Report summary of spills is forwarded to EPA Victoria.

*Hazards that require immediate follow up include where there is a:

- public health concern
- sensitive receiving environment
- large industrial or commercial waste component
- sewer spill very visible in a public area
- potential for media involvement
- sewer pipe 300mm diameter or greater
- flow >80L/min (ie: two house taps going flat out for approx hour = 5 KL)

Appendix Four: Description of the Phases of Trade Waste Agreement Restrictions

The retail water companies use a risk-ranking model as one of the tools used to manage trade waste discharged to sewer. The risk-ranking model has been developed over many years and takes into account key aspects of each customer's circumstances.

These include:

- Location of the discharge in relation to the receiving sewage treatment plant;
- Volume of trade waste discharged to sewer;
- Compliance history of the customer;
- Activities undertaken on the customer's site which generate trade waste; and
- Substances in the trade waste.

The risk-ranking model calculates a risk weighting for each customer and from this customers are allocated to one of five risk categories, with a risk ranking of 1 being the highest risk and 5 being the lowest. The risk rating determines the level of monitoring required for a company.

Retail water companies initiate a three-step management process when a customer does not comply with the conditions of their Trade Waste Agreement or Consent.

Stage 1:

When a non-compliant sample is identified, an Initial Trade Waste Notice is issued. The Notice specifies how the trade waste fails to comply and requires the customer to remedy the problem, provide written documentation explaining reasons for the non-compliance and the steps taken to ensure it will not happen again.

Stage 2:

If further samples of trade waste do not comply after the date specified in the Notice a letter is issued requiring the customer to:

- review its waste treatment processes;
- attend a meeting to discuss the cause of the non-compliance and processes to prevent a recurrence; and
- meet costs in ensuring trade waste complies with the Agreement.

Stage 3:

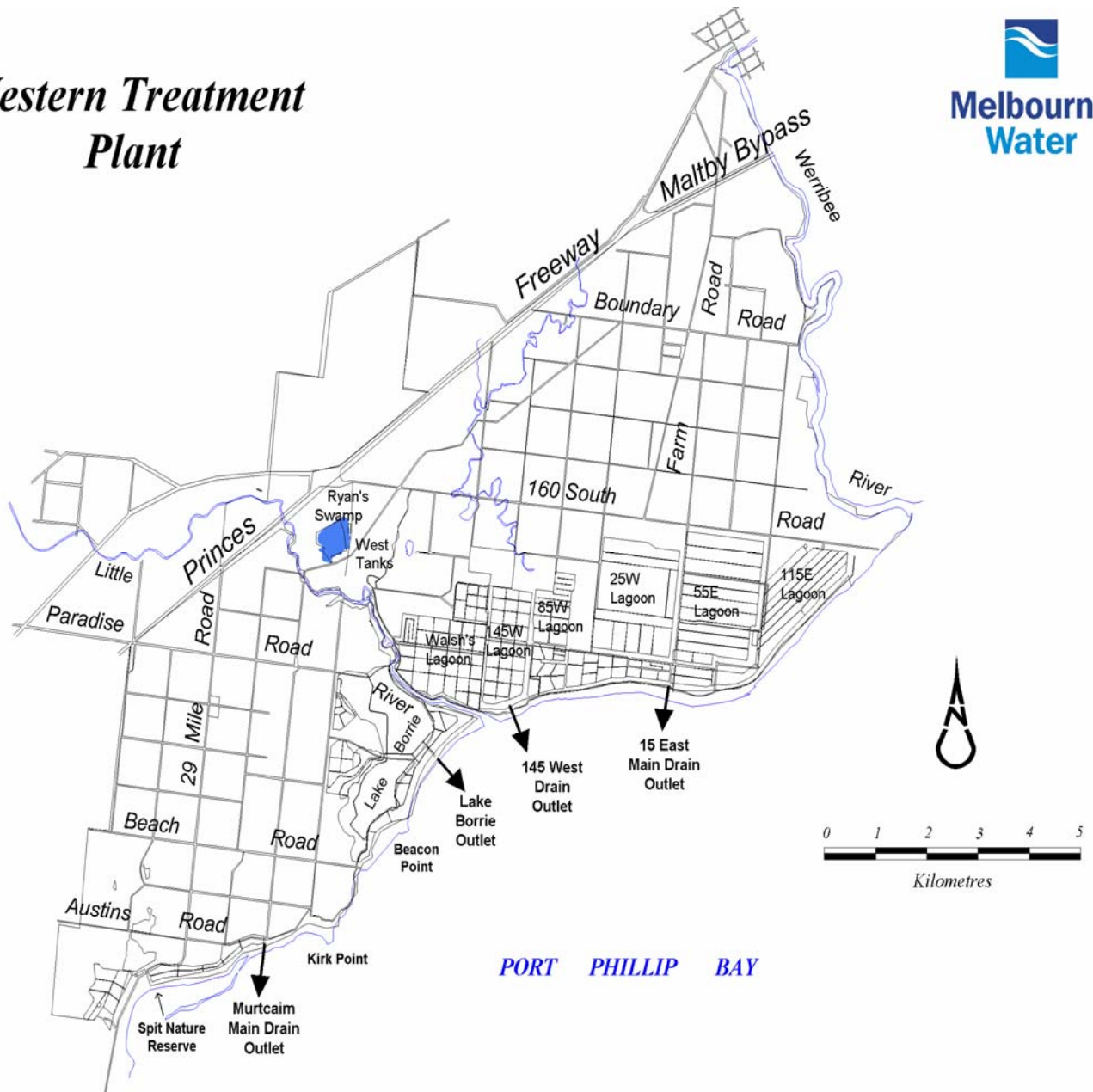
Samples of trade waste will continue to be taken and analysed and no further action will be taken if the trade waste becomes compliant. However if a sample does not comply a Notice of Breach will be issued setting out a date by which the trade waste must comply with the Agreement.

If the trade waste does not comply by the set date the customer must cease discharging trade waste to the sewer immediately, the trade waste connection point will be sealed and the media may be informed. Any further discharge of waste will be liable to a fine of up to \$20,000 and up to \$8000 for each day during which waste is discharged. Before any further trade waste can be discharged, a new Agreement must be negotiated and the customer must prove it will achieve on-going compliance.

Appendix Five: Map of Western Treatment Plant Discharge Points



Western Treatment Plant



Appendix Six: Environment Protection Authority (EPA) Enforcement Policy

The Environment Protection Act (1970) establishes the Environment Protection Authority to provide for a system of administration to ensure a high standard of environmental quality. The Act allows for a range of regulatory and non-regulatory activities including implementation of State environment protection policies, environmental monitoring and community education programs.

EPA Investigations

After an incident has been reported to the EPA, authorised officers from the EPA have the power under the Environmental Protection Act (1970) to embark upon an investigation. The investigation may involve:

- entry to the premises to take samples, photographs, tests, etc
- requesting information such as files, maps and or other documents relating to the incident
- identifying the occupier of the premises
- ordering clean-up procedures
- conducting formal interviews with management or individuals associated with the incident

Enforcement Measures

After investigation of a particular incident by the EPA the following enforcement measures are available under the Environment Protection Act (1970):

- warnings
- directions by an authorised officer
- notices
- infringement notices
- prosecutions
- licence suspension or revocation
- injunctions

Mounting a Prosecution - What is considered

In brief, the following factors are taken into account when deciding upon the most appropriate enforcement measures following an incident:

- the seriousness of the offence and harm to the environment
- previous history of offences
- the prevalence of the offence in the eyes of the public
- enforcement costs for the EPA
- the precedent which may be set by not taking enforcement action
- the cooperation of the alleged offending individual or company.

Melbourne Water and EPA Victoria

Melbourne Water could be subject to formal investigation by EPA Victoria in relation to incidents such as the 1992 Epsom Road Sewer Collapse and subsequent unlicensed discharge into the Maribyrnong River.

Melbourne Water has maintains a long-term cooperative relationship with EPA Victoria, including Quarterly Liaison Meetings of senior managers. This working relationship has resulted in open and honest communication so that the interaction between Melbourne Water's environmental performance and EPA Victoria's expectations holds no surprises.

Every incident such as the overflow of untreated sewage from an Emergency Relief Structure into a waterway could be regarded as an unlicensed discharge and an offence under the Environment Protection Act (1970). Where such incidents lead to unclear regulatory requirements steps are taken so that a clear position is developed. For example EPA Victoria has clarified that releases from the sewerage system through Emergency Relief Structures are compliant if they occur during rainfall events in excess of 1 in 5 years.

Appendix Seven: Emergency Response Procedures in Melbourne Water

A critical element of Melbourne Water's risk management process is ensuring the Corporation is prepared for and can effectively respond to and recover from incidents with potential to have an impact on our stakeholders, customers, the broader community or the environment.

Melbourne Water has established PERFORM (Prompt Emergency Response for Melbourne), which outlines the responsibility all Melbourne Water people have in incident management and details how we will respond to an incident in an integrated manner. The program highlights the need for thorough planning, preparation and training as a means of ensuring the effective and efficient management of any incident.

PERFORM is more than an incident management program, it is a comprehensive risk management program which incorporates prevention, preparedness, response and recovery for any adverse incident which could affect Melbourne Water.

The aims of PERFORM are to:

- Prevent or reduce the risks of incidents occurring in Melbourne Water
- Prevent or reduce the impact and consequences of incidents on customers, local community, stakeholders, environment, service delivery, system assets and operations
- Promote and support the maintenance and control of effective incident and emergency management processes

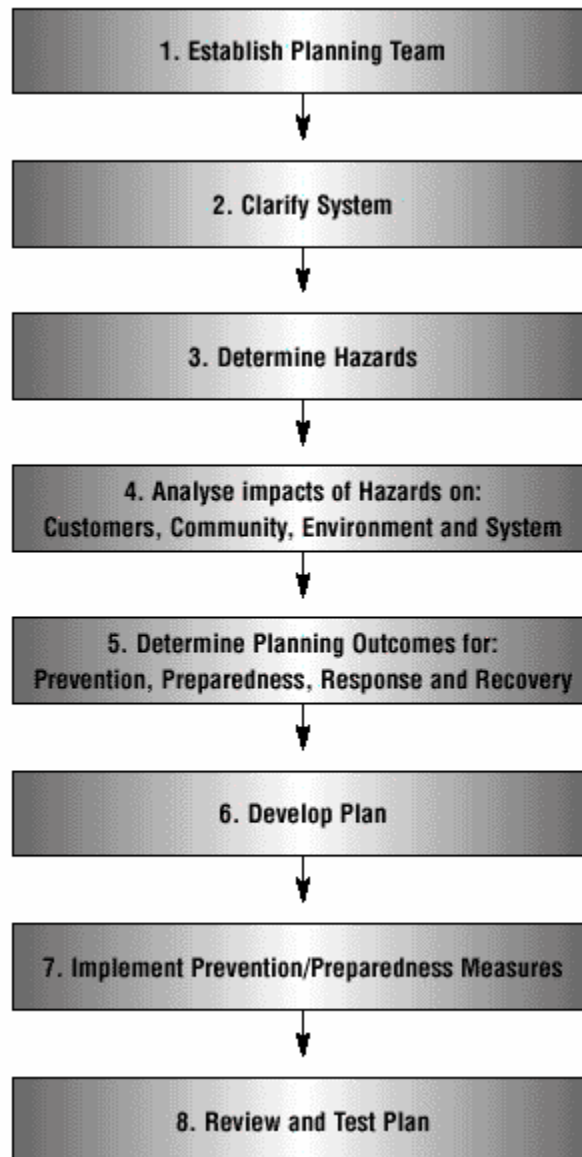
An *Incident* is any event or circumstance within our, or our customers operations that causes or is likely to cause:

- An interruption of service to customers
- A threat to our systems
- A threat to community health and safety
- A threat to the environment
- A threat to private or public property.
- The creation of the need for urgent action under statute or legislation

PERFORM incidents are categorised into five types. The following table defines the incident types and provides some examples of each type:

Category	Definition	Examples
Near Miss	A Near Miss is an unintended event that, but for the intervention of a risk control measure or human intervention, is likely to have resulted in a minor, significant or major incident, or in an emergency.	<ul style="list-style-type: none"> • Detection of a chlorine release of greater than two ppm, but less than 10 ppm at Winneke water treatment plant • Lost bush walkers in catchment area
Minor	A Minor Incident is one where local work teams, under normal supervision, can effectively cope with little or no adverse effects on the Corporation, its customers and the community. <i>Note: If the media become involved, a Minor Incident becomes a Major Incident.</i>	<ul style="list-style-type: none"> • Minor motor vehicle accident • Short duration computer system malfunction • Minor flooding • Vandalism in catchment area • Employee or contractor/visitor injury • Intentional access to catchment area
Significant	A Significant Incident is one that can be managed at the site level but: <ul style="list-style-type: none"> • May need external resourcing over and above that which is usually used by the work team; and/or • The actual or potential impact on the Corporation, its customers, the community and the environment is more widespread. <i>Note: If the media become involved, a Significant Incident becomes a Major Incident.</i>	<ul style="list-style-type: none"> • Burst main causing some property damage • General sewer stoppage with contained spill • Moderate flooding • Prolonged SCADA outage • Minor industrial actions • Asset or system failure causing property damage • Intentional damage to catchment area
Major	A Major Incident is one which requires off-site co-ordination with major levels of external resourcing and support; and/or causes or has the potential to cause major impact on the Corporation, its customers, the community and the environment. <i>Note: All incidents which involve the media are to be considered as Major Incidents</i>	<ul style="list-style-type: none"> • Burst main in a large shopping centre • General sewer stoppage resulting in an uncontained spill • Major or widespread flooding • Bushfire in water supply catchments (natural or intentional) • Dam failure • Major industrial action • Asset or system failure causing major property damage
Emergency	An Emergency is an event which significantly impacts Melbourne Water's ability to continue its operations. It will affect Melbourne Water's: <ul style="list-style-type: none"> • Operability (acceptable level of service) • Image or reputation (community, media, political) • Liability (legal, financial) 	<ul style="list-style-type: none"> • Any of the above major incidents • Fatality or multiple injuries • Loss of stakeholder support • Corporate governance/compliance issue • Occurrence of any of the five key metropolitan water industry threats

PERFORM does not only involve cleaning up after an incident. It also involves planning, training, procedure documentation and test planning. The incident management planning process is described below;



PERFORM applies to all Melbourne Water operations and business areas. Each group has generic plans to cover routine system faults for the different water supply, wastewater and drainage operations or for any other activity that has potential to have an impact on Melbourne Water's business, its customers or the community.

A contingency plan is a series of processes or procedures to prevent, prepare for, and respond to and recover from events that can be foreseen to occur that can affect our operations or service delivery. It identifies any potential problem areas, and provides options for containing and controlling such events.

Each manager is responsible for determining the probability and consequences of failure of assets, systems and work practices, as well as for preparing contingency plans to deal with any failure.