

WESTERN
WATER

focused on sustainability
**RECYCLED WATER
REPORT 2010/11**

TK40001
CLASS A WATER

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About Western Water

Western Region Water Corporation (trading as Western Water) is one of Victoria's 13 regional urban water corporations. In 2010/11, Western Water supplied drinking water to over 52,000 properties over a service area of 3,000 square kilometres. During the year, 10,250ML drinking water was consumed and 8,000 million litres of recycled water was produced.

Residential customers comprised 94% of the customer base this year and numbered over 150,000. Rapid housing development continued in conjunction with strong population growth of 3.9%. In the past decade, the region's population has grown by 44% and forecasts indicate this level of growth will accelerate over the coming 10 years.

Our Vision, Values & Pathways

Western Water's Vision reflects principles and practices of sustainability that are embedded throughout the Corporation. This Vision is based on the belief that all people, as individuals and communities, must play a part in protecting and preserving our finite water resources.

Our Vision maintains a strong community focus. Our Values embody how we will act, and define our behaviours. Our Pathways drive strategic and corporate planning, focussing the whole organisation on building an economically, socially and environmentally sustainable future. They provide the framework for the Balanced Scorecard business performance tool.

During 2010/11, our third Pathway was changed from "To proactively manage our destiny" to "To actively manage growth". This change reflects the significant impact on the business that will occur from the strong population growth forecast for the region.

Our Vision	Our Values	Our Pathways
To be a leading service provider working with our community towards a sustainable future	<ul style="list-style-type: none">• Commitment• Integrity• Fairness• Leadership• Accountability• Sustainability• Inclusiveness	<p>To be a valued and innovative service provider as judged by our customers and the wider community</p> <p>To drive an environmentally sustainable future</p> <p>To actively manage growth</p>



Olive grower, Sam Pitruzzello, with Minister for Water, the Hon Peter Walsh MP, at the launch of Gisborne GRoWS.

2010/11 Highlights

- Produced 7,992 million litres of recycled water with 51% reused by customers
- Substituted of over 1,500 million litres of drinking water
- Completed Stage 2 Upgrade of Melton Recycled Water Plant
- Secured funding to construct Gisborne Recycled Water Scheme (GRoWS)

Water Industry Regulatory Framework

As a statutory Corporation, Western Water operates under the *Water Act 1989*. A skills-based Board of Directors, supported and advised by management, is appointed by the Minister for Water to set our strategic direction and business policy.

Western Water is responsible to the Minister for Water, the Hon Peter Walsh MP, via the Department of Sustainability and Environment (DSE). The Department of Treasury and Finance (DTF) have a shareholder governance role and the Department of Health (DH) sets and supervises our water quality standards.

The Environment Protection Authority (EPA) governs environmental standards - particularly for wastewater discharge, recycled water and biosolids management.

Jointly, DH and EPA set the guidance and monitoring regimes for the quality of Class A recycled water.

Since January 2004, the Essential Services Commission (ESC) has also regulated Western Water. The ESC's role encompasses approving Western Water's prices, service standards and market conduct.

Recycled Water Classifications

Different classes of recycled water are appropriate for different levels of use. There are four distinct classes of recycled water, based on treatment process and water quality. Western Water produces Class A, B and C recycled water.

Class A is the highest quality recycled water, with the widest range of potential uses including residential garden watering, closed system toilet flushing, fire protection, food crops (consumed raw or sold to consumers uncooked or processed) and all the uses allowed for Classes B, C and D.

Class B may be used for such things as the irrigation of dairy cattle grazing land, industrial wash down water and the uses listed for Classes C and D.

Class C recycled water has a number of uses including cooked or processed human food crops (including wine grapes and olives), for livestock grazing and fodder, municipal water use and human food crops grown over a metre above the ground and eaten raw such as apples, pears, table grapes and cherries.

Class D receives the least amount of treatment of all four classes and may be only used for non-food crops such as instant turf, woodlots and flowers. Western Water does not produce Class D recycled water.

Recycled water is supplied for a variety of uses across the region including outdoor residential use, toilet flushing, irrigation of public open spaces, recreation reserves, agriculture, horticulture and golf courses.



Message from the Chairman and Managing Director

Recycling water has been a core component of Western Water's business strategy for over 9 years.



Western Water was created 15 years ago to supply water related services to customers across the region. Over that time, continuous and significant advancements and investments have been delivered. These are highlighted in annual reporting each year.

Prior to this reporting period, 13 consecutive years of lower than average rainfall necessitated connection to the Melbourne supply system to keep the region alive. Preserving and recycling local water became priorities for the organisation.

Meeting the Challenge of Growth

Western Water's service population of 150,000 grew by almost 4% in the past year and is forecast to triple by 2030. This rapid growth, combined with dwindling local water sources, has presented significant challenges to the management team.

As a result, recycling water has been a core component of Western Water's business strategy for over 9 years. This Recycled Water Report illustrates the priority this resource has for the future sustainability of our region, and demonstrates compliance with the requirements set by EPA Victoria.

Planning for Integrated Water Cycle Management

Western Water has embraced a new paradigm for business planning called WaterSphere. It is an Integrated Water Cycle Management model which recognises the value of all water and incorporates the principles of the Government's Living Victoria Roadmap.

These principles have been evident at Western Water for many years already - through our commitment to water recycling and local catchment solutions, as well as ongoing investigation into stormwater harvesting.

Through WaterSphere, Western Water's contribution to the region will extend from that of a service provider to a solutions provider, harnessing the potential of all water sources to ensure viable, liveable communities. This initiative is a major step to servicing the significant growth forecast for the region. Recycled water is core to its success.

Recycled Water Results

During 2010/11, Western Water's seven recycled water plants received close to 8,500 million litres of wastewater and produced 7,992 million litres of recycled water. Of this, over half was used by customers.

This reuse rate is significantly lower than previous reporting periods due to the high level of rainfall experienced in the region in the past twelve months. Nonetheless, an estimated 1,500 million litres of drinking water was saved through substitution with recycled water in the past twelve months.

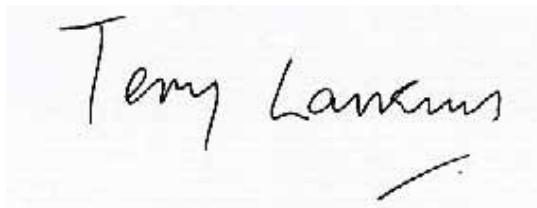
Ensuring Future Success

The successful funding of the Gisborne Recycled Water Scheme will ensure further uptake of recycled water in the region in years to come, reducing reliance on drinking water supplies for agricultural purposes and enhancing the viability of the Gisborne South precinct.

Western Water will continue to pursue innovative solutions that increase drinking water substitution and provide customers with a reliable source of high quality, alternative water.

A key focus for coming years is integrating recycled water in the new residential developments planned for the region. The first of these, at Toolern near Melton, is projected to become home to 55,000 new residents by 2020.

We would like to take this opportunity to thank Western Water's Recycled Water Plant and Renewable Resources teams for their professional approach to producing and delivering recycled water across the region. It is with pleasure that we submit the first published edition of Western Water's Recycled Water Report to customers, stakeholders and regulators.



Terry Larkins
Chairman



John Wilkinson
Managing Director

1. COMMITMENT TO RECYCLED WATER MANAGEMENT

Western Water continues to set a benchmark for the water industry in Australia aiming to beneficially recycle 100% of all water by 2013.

Renewable Resources team members



Commitment to Recycled Water Management

Western Water continues to set a benchmark for the water industry in Australia aiming to beneficially recycle 100% of all water by 2013. Recycled water quality is closely monitored to ensure compliance with the requirements of both the Environment Protection Authority and the Department of Health.

Western Water maintains a register of regulatory and other formal requirements for the delivery of recycled water through its Regional Environmental Improvement Plan (REIP) for Class B and C recycled water, and its Health and Environmental Management Plan (HEMP) for Class A recycled water. A full list of Western Water's Regulatory and Formal Requirements can be found in Appendix 1.

Western Water ensures responsibilities in relation to recycled water are understood internally by referencing these regulatory and formal requirements in applicable policies, procedures, work instructions, position descriptions and individual performance reviews.

A review of requirements is conducted periodically by Western Water's Renewable Resources team to ensure changes are reflected throughout Western Water's systems.

1.1 Environmental Management System (EMS)

Western Water's EMS is incorporated as part of its Integrated Management System (IMS), which also incorporates Western Water's Quality and Occupational Health & Safety (OH&S) Management Systems. The IMS has the following International Standards accreditations:

- EMS accreditation to AS/NZS 14001;
- Quality Management System (QMS) accreditation to AS/NZS 9001; and
- OH&S Management System accreditation to AS/NZS 4801.

The EMS guides Western Water's daily activities and provides the framework for identifying opportunities for continuous environmental improvement. The Environment Committee oversees the administration of the EMS, and monitors and reports on performance and compliance.

The EMS is subject to internal and external audit programs to ensure international standard accreditations are maintained. Audit outcomes are reported through internal reporting procedures to all levels of the organisation.

Any non-conformances whether major, minor or improvement opportunities are recorded and reported during the audit process and issues rectified in consultation with Western Water staff and relevant contractors.

1.2 Environmental Policy & Recycled Water Policy

Western Water has developed an Environmental Policy and Recycled Water Policy under its EMS. These policies include commitments to work with customers and the community to increase environmental awareness, promote water savings, and maximise beneficial use of recycled water to preserve drinking water and achieve the 100% water recycling target.



1.3 EPA Corporate Licence

In 2008, Western Water received an EPA Corporate Licence, amalgamating the seven previously separate waste discharge licences held for its recycled water plants (RWPs).

The licence includes both sustainability commitments to help Western Water meet its long term business goals, as well as compliance requirements for environmental performance, monitoring and reporting for protection of the environment and human health.

Under the licence, Western Water is committed to identifying “fit-for-purpose” opportunities for beneficial use as a safe and alternative to drinking water, again with the target for 100% beneficial use.

1.4 Regulatory and Formal Requirements

Western Water maintains a register of regulatory and other formal requirements for the delivery of recycled water through its EMS. This includes all relevant Federal and State legislation, codes of practice, standards, service level agreements, contracts and operating agreements.

A full list of Western Water’s Regulatory and Formal Requirements for Recycled Water can be found in Appendix 1.

1.5 Engaging Stakeholders

Western Water is committed to building positive, cooperative relationships with all stakeholders that have the potential to either affect or be affected by our operations. Established processes are in place to engage with key stakeholders, prompting their involvement and commitment. This includes community representation, customer groups, regulatory bodies and others.

This process is tracked through the Balanced Scorecard and reported monthly.

A Recycled Water User Group is established for regular discussions and updates. This group, as well as Western Water’s Customer Advisory Group and Community Reference Groups, are recognised as significant stakeholders for recycled water consultation.

The Western Water Communications team plays an important role in keeping customers and the community well informed of recycled water issues and changes and, when required, facilitates consultation.

Internal stakeholders including management, office, plant and field workers are engaged regularly through the monthly reporting program.

Major external stakeholders include regulatory bodies such as EPA, DH, DSE and ESC. These organisations are actively engaged through meetings and/or reporting. Other significant external stakeholders are those contractors who provide analytical services or treatment chemical supplies.

Western Water also maintains active membership of industry groups to ensure awareness, communication and involvement with our broader stakeholder groups.



Class A Balancing Storage Tank under construction at Melton

2. ASSESSMENT OF THE RECYCLED WATER SUPPLY SYSTEM

Western Water provides recycled water through three supply methods – reticulated (piped), standpipes and via farm leases.



Recycled Water Supply System

2.1 Recycled Water Supply System Analysis

Western Water operates recycled water plants at Woodend, Romsey, Riddells Creek, Gisborne, Sunbury, Melton and Bacchus Marsh and each plant produces recycled water within various guidelines and regulations including Western Water's Corporate Licence, HEMP, REIP and the relevant EPA Guidelines.

In 2010/11, Western Water's seven recycled water plants received 8,479 million litres of wastewater and produced 7,992 million litres of recycled water. Of this, just over half was used by customers.

This reuse rate is significantly lower than previous reporting periods, which is directly related to the much higher rainfall and lower evaporation rates experienced during the year which dramatically reduced irrigation demand.

Table 1: Recycled Water Produced and % Used – 5 Years

	2006/07	2007/08	2008/09	2009/10	2010/11
Recycled Water (ML)	5,589	5,904	6,058	7,386	7,992
Recycled Water Used (%)	84%	86%	88%	85%	51%

Water balance assessments are being undertaken at the Melton, Bacchus Marsh, Riddells Creek and Romsey recycled water plants to determine the storage volumes and land areas required to maintain sustainable recycled water schemes, and assess how much more water can be made available to customers of each scheme.

Concurrently, new customers are being sought for each scheme and we are working with local councils and landholders in the region to identify further market development opportunities.

Western Water provides recycled water through three supply methods – reticulated (piped), standpipes and to Western Water owned farms via commercial leases.

Recycled water reticulation schemes exist at each recycled water plant. At almost 50km, the Sunbury Melton Scheme, which supplies Class B recycled water, is the longest.

In total, 295 properties are provided with recycled water across the region through more than 100km of recycled water pipelines.

Class A recycled water is connected via a dual reticulation system to the new township of Eynesbury and Harness Racing Victoria's Tabcorp Park in Melton South.



Recycled Water Standpipe

Customers who are remote from reticulated schemes can access recycled water through standpipes at Sunbury, Melton and Gisborne. In addition, the Macedon Ranges Shire Council accesses recycled water through a standpipe in Romsey.

There are significant control systems for recycled water use. Standpipe access is granted via a permit system, approved in accordance with the EPA requirements. Any properties using recycled water must comply with a Western Water approved site management plan. In addition, recycled water carters must have permits to transport recycled water.

Recycled water is used on farm leases at the Sunbury, Romsey, Melton and Bacchus Marsh recycled water plants. Section 5 provides summary information for each recycled water plant including method of supply, class produced and total volumes supplied during 2010/11. Appendix 2 provides details of Western Water's recycled water customers for the reporting period.



2.2 Assessment of Recycled Water Quality Data

Recycled water quality and customer site data has been collected and reported annually for all recycled water schemes for over nine years. Site specific testing and reporting is undertaken throughout the supply system including at the recycled water plants, within the supply systems, at standpipes, customer taps and customer recycled water storages.

2.3 Hazard Identification & Risk Management

Western Water has completed a risk assessment for all of its recycled water schemes. All identified risks are ranked for significance based on their likelihood, consequence and sensitivity, and taking into account existing management controls in place to reduce their likelihood and mitigate residual risks to acceptable levels.

The various risk management controls are outlined in Western Water plans and procedures including:

- Regional Environmental Improvement Plan (REIP), for Class B and C recycled water;
- Health and Environmental Management Plan (HEMP), for Class A recycled water;
- Environmental Management System (EMS) procedures and emergency response plans.

Individual property risks are identified and management controls documented in:

- Individual Customer Site Management Plans (SMP); and
- Temporary Supply Agreements and SMPs.

These documents ensure residual risks do not pose significant or adverse health, livestock or environmental impact. Adverse impact is defined as an exceedance of water, soil or other environmental or health quality objective, and the resultant potential for adverse impact on the beneficial uses of segments of the environment including surface water, groundwater, soil, air, stock or public health.

2.4 Recycled Water Supply Financials

Western Water has \$23.3M in recycled water supply assets, representing 4.9% of the organisation's total assets. This figure does not include recycled water plants. The business aims to ensure long term viability of recycled water by recovering all costs over time, including operating costs and necessary returns on capital. The operating result for the 2010/11 financial year compared to prior years is shown below in Table 4.

	2006/07	2007/08	2008/09	2009/10	2010/11
Total revenue	3,536	2,958	2,628	938	2,364
Net results after operating costs	2,776	2,233	765	(1,130)	67



During 2010/11, Western Water commissioned an assessment of any cross subsidies between recycled water and other key business operations. The analysis was undertaken across all three recycled water types – Class A (Eynesbury, Toolern and Sunbury), Class B (Sunbury and Gisborne) and Class C (Romsey, Riddells Creek, Melton, Woodend and Bacchus Marsh).

The assessment identified that no cross subsidies exist for Class A recycled water and there was no cross subsidy for the combined Class B and Class C products.

2.4.1 Recycled Water Prices 2010/11

	Upfront \$/lot or ML	Annual Fixed \$	Usage \$/ML
Class A	\$1,159.67*	\$83.62**	\$1,243.40
Class B and C non-residential peak (Nov-Mar)	\$600/ML	\$549.48	\$339.10
Class B and C off peak (Apr- Oct)	\$600/ML	\$549.48	\$208.00

*Based on average lot size 450-1350 sqm

** Based on 20mm service charge

	Upfront \$/lot or ML	Fixed Daily Charges	Usage \$/ML
Class B & C non-residential (all periods)	\$0	\$6.02/day	\$339.10

Recycled water supplied through farm lease arrangements are publicly tendered and subject to commercial negotiations.

3. PREVENTATIVE MEASURES FOR RECYCLED WATER SUPPLY

Regular monitoring ensures recycled water is fit for purpose.



Sunbury Recycled Water Plant

Preventative Measures for Recycled Water Supply

Regular monitoring occurs to ensure recycled water is fit for purpose according to the guidelines published by the Environment Protection Authority.

Class A recycled water quality is monitored on a continuous basis whilst quality testing is conducted weekly for Class B and monthly for Class C supplies.

Sampling and testing occurs at several key points in the process to ensure compliance with EPA Guidelines and to further reduce additional risks identified by Western Water.

3.1 Site Management Plans

Western Water ensures recycled water is used in accordance with agreed site management plans (SMPs), regional environmental improvement plans, EPA guidelines, the Corporate Licence and other requirements. SMPs must be completed by customers before recycled water is approved for use.

SMPs identify and ensure that potential livestock and public health and environmental risks associated with the intended use are managed. This plan also ensures recycled water is supplied in accordance with Western Water's Corporate Licence and EPA guidelines and is reviewed periodically.

3.2 Monitoring

Highly trained operators monitor each RWP on a regular basis. Pipelines, storages, customer properties and connections are also regularly audited.

In addition, regular audits and monitoring is undertaken on soil structure and groundwater, and both upstream and downstream sampling is taken at discharge points for RWPs. Section 5 provides a detailed overview of all recycled water parameters measured and their frequency for each RWP.

Recycled water carter audits were conducted during 2010/11 to ensure carters and users were filling, delivering and applying recycled water in a safe and sustainable manner. The results found general compliance. Where any non compliance was identified, steps were taken to immediately rectify the situation.

Customer irrigation rates are reviewed monthly to ensure protection of the local environment. An independent consultant conducts annual audits on selected recycled water users to determine compliance according to their individual contracts, customer site management plans, Western Water's REIP and EPA Guidelines.

Three vineyards were audited in 2010/11: Galli Vineyard and Winery Witchmount Estate in Rockbank, and Goonawarra Vineyard in Sunbury. All were found to be in general compliance with requirements. Follow up actions are being undertaken for continuous improvement.



Melton Recycled Water Plant

All significant information regarding the monitoring of recycled water supply and use in the service region is recorded and maintained in Western Water's Data Management System.

3.3 Recycled Water Treatment Practices

3.3.1 Treatment Practices

Recycled water quality (class, nutrients and salinity) differs marginally between each of the RWPs due to a combination of factors including:

- Raw sewage inflow quality, which is largely dictated by the unique sewerage catchment size and conditions for each township including population and proportion of domestic, commercial and industrial sources; extent of stormwater inflows and groundwater infiltration, and impact of water restrictions.
- Treatment process design and operating conditions at each RWP; and
- Size of lagoon systems and recycled water storage facilities and evaporative losses at each RWP.

Treatment processes at each RWP are designed and operated to ensure recycled water quality complies with both the return to stream water quality limits of the EPA corporate licence and the recycled water quality objectives of EPA Victoria's Environmental Guidelines for the Use of Reclaimed water.

This ensures that the Class A, B or C recycled water produced from each RWP is suitable (or fit for purpose) for the wide range of intended uses by existing and future customers.

RWP treatment processes and recycled water quality characteristics are summarised in Table 4.

Table 4: RWP Treatment Process by Plant and Class		
RWP	Treatment Processes	Class
Sunbury	Activated sludge	B
	Biological de-nitrification (modified MLE) process	
	Phosphorous reduction by Ferric Sulphate dosing	
	Tertiary Media Filtration (sand and filter coal)	
	Chlorination	
Bacchus Marsh	Facultative lagoons	C
	Maturation lagoons	
	Winter storage	
Melton	Primary sedimentation	C
	Activated sludge	
	Secondary sedimentation	
	Maturation lagoons	
Melton	Microfiltration	A
	UV light	
	Chlorination	
Gisborne	Activated sludge	B
	Aerated lagoons	
	Phosphorous reduction by Ferric Sulphate dosing	
	Maturation lagoons	
Riddells Creek	Facultative lagoons	C
	Maturation lagoons	
Romsey	Facultative lagoons	C
	Maturation lagoons	
Woodend	Activated sludge	C
	Phosphorous reduction by Ferric Sulphate dosing	
	Maturation lagoons	

RECYCLED WATER TREATMENT

(based on Class C treatment at Melton RWP)

Screening

The sewage that arrives at the recycled water plant is 99.9% water. To capture large objects and grit that could damage the plant and reduce its capacity, incoming sewage first passes through a coarse sieve with 50mm gaps, then a fine sieve with 3mm gaps and finally a grit trap which removes heavy particles such as dirt and sand. The captured matter is washed to remove organic matter and the resulting water is returned to the sewage treatment system. The non-biodegradable matter is disposed of in landfill offsite.

Primary Sedimentation

Sewage next enters a circular tank where solid 'sludge' settles to the bottom and fatty 'scum' floats to the surface. This separation of layers is called sedimentation. The sludge is scraped from the bottom of the tank and pumped to the sludge digester for treatment. The scum is also moved to the digester. The remaining water flows to the aeration tanks.



Biological Breakdown in Aeration Tanks

By carefully controlling the environment in the aeration tanks, selected microorganisms are encouraged to grow and digest the sewage. These microorganisms are called zooplankton. They eat and break down organic matter and other contaminants like ammonium, nitrogen and phosphate. The resulting mixture of decontaminated sewage and microorganisms is called biomass.

Secondary Sedimentation

The water flows from the aeration tanks into other tanks for further sedimentation. Once again, sludge settles to the bottom and is removed by scraping. The water that remains can then be sent to the plant's lagoons or filters. Some of the sludge is returned to the aeration tanks so the microorganisms can begin the process again. The remainder is sent to the sludge digester.

Storage Lagoons

Further settling and biological breakdown continues over many days retention in the lagoons which continues to clean the water. At the same time, ultraviolet light from the sun damages bacteria in the water, rendering them incapable of reproducing. This stored water is either reused by customers for fit for purpose uses or, in Melton, is sent to the Class A RWP for further treatment to produce Class A recycled water.

CLASS A RECYCLED WATER TREATMENT

Using Class C Recycled Water

At Melton RWP, some Class C recycled water is transferred to the Class A plant for further treatment. Class A is the highest quality recycled water and can be used in and around the home for toilet flushing, gardening, car washing and other suitable purposes.

The Class A RWP at Melton was commissioned in 2009, designed to supply up to 5 million litres of recycled water daily to the residential areas of Melton South and Toolern. Because the local population is growing rapidly, the plant has a modular design so it can be easily expanded to deliver up to 15 million litres per day.

Coagulation and Screening

As Class C recycled water enters the Class A plant, Ferric Chloride – a coagulant – is added to the water, causing any dirt in the water to stick together in lumps called floc. The water then passes through a screen or sieve, leaving the floc behind.

pH Correction

Water's acidity is corrected to provide a neutral pH at different stages of the treatment process ensuring added chemicals are effective and to minimise corrosive impact on pipes and associated fittings within the distribution network.

pH may be corrected by adding lime and carbon dioxide or sodium carbonate at the start of the treatment process to assist with coagulation. The pH may be adjusted again at the end of the process to ensure effective disinfection and limit final water corrosiveness.

Microfiltration

Water next passes through a filter made of strands of fine plastic tubes covered in extremely small holes, 1,000 times smaller than a human hair. As the water squeezes through the tiny (micro) holes, this microfiltration process removes particles of dirt and the majority of microorganisms (which are reduced by around 300 times).

The microfilters are cleaned regularly through backwashing with water. Less frequently they are also flushed with cleaning chemicals, hot water and compressed air.

UV Light Disinfection

The microfiltered water is then treated by exposure to strong ultraviolet (UV) light in specially designed equipment providing UV light 1,000 times more intense than sunlight. This damages any remaining germs, ensuring they are incapable of reproduction.

Chloramination

In the final treatment stage, Chlorine is added to the water and reacts with small amounts of Ammonia to form Chloramine, a long lasting disinfectant. The water has now completed the treatment process to become Class A recycled water.

Storage Tank

Class A water is transferred to a 5 million litre storage tank before being piped on demand to nearby Eynesbury for appropriate use through a 'third pipe'.

Class A recycled water pipes are purple to avoid confusion with drinking water supply, sewerage and other utility services.

The first residential connection to Class A recycled water at Eynesbury was made in 2008. By 2030, nearly 20,000 homes in the surrounding area are expected to be using Class A recycled water, reducing drinking water use in each household by up to 50% and saving around 4 million litres of drinking water per year.

BIOSOLIDS TREATMENT

Biosolids are a nutrient rich, organic material produced during the treatment of recycled water. They can be used for a range of functions including application to land as a soil conditioner and fertiliser. Western Water's RWPs produced 2,123 tonnes of biosolids in 2010/11 with 126% of these reused by customers which includes uptake of stockpiled quantities.

Anaerobic Digestion

In the sludge digester, microorganisms break down the organic waste in a low oxygen environment, known as anaerobic digestion. Anaerobic digestion reduces smells, kills germs and produces a nutrient rich sludge which is sent to the de-watering facility.

Anaerobic digestion also produces biogas which is used at Melton RWP as a fuel in the Biogas Cogeneration Facility to produce electricity and heat.

Dewatering

The sludge from the digester travels on a belt through a press which squeezes excess water out of the sludge, turning it into biosolids.

Using Biosolids

After being mixed with green waste and composting for several weeks, the biosolids may be used as a fertiliser. The composting process generates heat that kills germs in the biosolids.

Biosolids may only be applied to soil in compliance with strict criteria set out by the EPA to ensure safe and sustainable use.



3.3.2 Source Reduction & Cleaner Production

Simply treating waste once it is generated (end of pipe treatment) is costly and unsustainable. Western Water works with customers to identify and put into place all opportunities to minimise the generation of waste in the first place. This is known as source reduction.

Western Water also works with the community to reduce the use of nutrients (such as chemicals found in manufacturing processes) and their impact on the environment through cleaner production techniques and trade waste management.

Approximately 450 million litres of trade waste were produced in the region this year. Western Water conducts regular monitoring of trade waste discharged to the sewer to ensure it does not adversely impact the sewer assets, compromise the safety of workers or impact on recycled water quality or treatment processes.

3.3.3 Sewer System Maintenance

Western Water maintains 1,120km of sewer mains with 34km new sewer mains constructed in 2010/11. During the reporting period, Western Water launched its Sewer Spill Prevention Strategy (SSPS), aimed at reducing the number of sewer spills throughout the region.

The main focus for SSPS will be on the ground actions such as replacing ageing sewer mains, increased inspections including the use of CCTV, tree root foaming and the removal of problem trees. Fail safe alarms and other monitoring devices will be installed at key points in the sewerage system and at pumping stations to help in the early detection of blockages or equipment failure that could lead to a sewer spill.



Trade Waste Removal

3.3.4 Recycled Water Distribution System Maintenance

Western Water's recycled water assets (both above and below ground) are designed and constructed in accordance with relevant Australian and WSAA standards. These assets are maintained in accordance with Operations Manuals and other procedures.

As the population in the region has grown, Western Water has embarked on a series of upgrades for all sewerage assets across the region with major activity occurring at Melton RWP. Melton's population growth rate is one of the highest in Victoria.

Western Water recognises that algal growth can occur in recycled water storages, particularly during summer and autumn. Large blooms can cause elevated pH, suspended solids and/or BOD levels with potential to temporarily exceed Corporate Licence and recycled water quality limits.

Algal management procedures established by Western Water are part of routine daily operations and are aimed at minimising algal growth in recycled water storages in the first instance.

3.3.5 Storage Tank Integrity and Cleaning

Recycled water storage tanks are inspected on a weekly basis and require only periodic maintenance.

A 5 million litre Class A balancing storage tank was commissioned in December 2009 to cater for growing demand from the Melton South region.

3.3.6 Recycled Water Discharges

Typically the majority of recycled water produced by Western Water is supplied to customers. Any unused supplies within specified EPA Licence conditions are stored for later use or may be returned to local waterways at Sunbury, Gisborne and Woodend recycled water plants.

In 2010/11, significant rainfall in the region decreased demand for recycled water. This, combined with an increase in available recycled water, meant Western Water needed to manage excess supplies.

Some recycled water discharges occurred and these were made in accordance with special conditions agreed with the EPA to ensure excess volumes were managed whilst protecting the environment and other stakeholders.

Western Water is committed to minimising the environmental impacts caused by releasing recycled water to the environment.

Core actions include:

- increasing customer use of recycled water
- improving recycled water quality by reducing nutrient content through RWP upgrades and process improvements (e.g. the recent upgrade at Woodend has led to noticeably improved nutrient levels)
- conducting ecological risk assessment of streams receiving recycled water
- monitoring groundwater quality
- upgrading internal laboratories to improve operational monitoring and process enhancement.

3.3.7 Monitoring Groundwater at RWPs

Groundwater monitoring bores are installed at all seven recycled water plants to monitor any potential impact from recycled water treatment on the groundwater aquifers. Groundwater quality is assessed against regulatory requirements for concentrations of various parameters including heavy metals, nutrients and bacteria.

In 2010/11, 32 groundwater bores were tested and found to be compliant with State Environment Protection Policy (Groundwater of Victoria). In addition, the water levels in the bores were accurately measured against sea level providing information to predict groundwater flow directions at the recycled water plant.

This information will enhance Western Water's ability to prevent adverse impacts from its activities.

3.4 Critical Control Points

Western Water utilises Hazard Analysis and Critical Control Points (HACCP) to ensure that Class A recycled water quality is maintained in accordance with DH and EPA requirements and to protect public health. HACCP is an internationally recognised food industry standard based on risk prevention and management in food processing applications.

Western Water has a HACCP plan established for the Melton Class A recycled water plant and is looking at opportunities to extend this risk management process to other plants in the future.



4. OPERATIONAL PROCEDURES AND PROCESS CONTROL

Western Water understands that formal operational procedures are critical to ensure the consistent delivery of quality recycled water across the region.



Operational Procedures and Process Control

4.1 Operational Procedures

Western Water understands that formal operational procedures are critical to ensure the consistent delivery of quality recycled water across the region.

Standard operating procedures (SOPs) and work instructions (WIs) are used and referenced for maintenance tasks, specific or more complex tasks, or may exist as a standalone single reference for the agreed best way of undertaking routine operational jobs. SOPs including environmental, quality and OH&S are continuously being reviewed and updated in line with risk management requirements.

Current SOPs, WIs and relevant documents available at Western Water include:

- Dual Pipe Meter Connection Work Instruction
- SCADA Monitoring Work Instruction
- Biocide Application Work Instruction
- In-house and External Water Quality Monitoring Work Instruction
- Dam Inspection Work Instruction
- Blue Green Algae Response Work Instruction
- Working with Recycled Water Work Instruction
- Depot Operations Manual
- Class A Recycled Water Management Plan CFA/MFESB
- Customer Site Management Plans (various customers)
- Recycled Water Carter Permit (various customers)
- Temporary Recycled Water Supply Agreement (various customers)
- Current Customer Application Form and New Customer Application Form
- Customer Application Instructions and Information Pack
- Customer Supply Contract [for permanent pipeline schemes].
- Registration Form - Expression of Interest
- Western Water Recycled Water Strategy
- It's Greener Living with Purple
- How to Connect Recycled Water - A Guide for Plumbers and Builders
- Conditions of Connection for the Installation of Class A Recycled Water Supply at Open Space and Municipal Watering

Western Water's Integrated Management System (IMS) addresses and links various business practices including the Quality Management System (QMS), Hazard Analysis and Critical Control Point (HACCP) and Risk Management. As issues, events, audits, incidents or improvement actions are required, they are captured to a common system for co-ordinated monitoring and follow up.

4.2 Operational Monitoring and Process Control

Operational monitoring is conducted at all recycled water plants across the region. Section 5 – Verification of Recycled Water Quality details the results of monitoring in 2010/11.

For Class A recycled water, alert and critical limits obtained from HACCP plans are integrated into treatment plant control systems. This results in plants automatically shutting down and triggering alarms to plant operators if recycled water quality fails critical limits.

5. VERIFICATION OF RECYCLED WATER QUALITY

All recycled water produced at Western Water's recycled water plants is monitored.



Verification of Recycled Water Quality

5.1 Recycled Water Quality Monitoring

All recycled water produced at Western Water's RWPs is monitored in accordance with the frequency described in Table 5. Sampling is undertaken by an independent, NATA certified testing company or, for Class A recycled water, by Water Industry Group.

Results are reviewed by RWP staff to ensure compliance with EPA Corporate Licence requirements and EPA recycled water quality guidelines. They are reported annually to EPA. However, exceedances are reported as required to the appropriate authorities.

Water Quantity & Quality Parameter	Sunbury	Melton (Class C)	Melton (Class A)	Bacchus Marsh	Gisborne	Riddells Creek	Romsey	Woodend
Volume (Flow Rate)	Daily							
Microbiological (E.coli organisms/100ml)	Weekly	Monthly	Weekly	Monthly	Weekly	Monthly	Monthly	Monthly
Biological Oxygen Demand (BOD)	Weekly	Monthly	Weekly		Weekly	Monthly	Monthly	Monthly
Suspended Solids	Weekly	Monthly	Weekly	Monthly	Weekly	Monthly	Monthly	Monthly
pH	Weekly	Monthly	Daily	Monthly	Weekly	Monthly	Monthly	Monthly
Total Kjeldahl Nitrogen (TKN)	Weekly							
Nitrate & Nitrite (NOx as N)	Weekly				Two Monthly			
Total Nitrogen (as N)	Weekly	Quarterly		Six Monthly		Six Monthly	Six Monthly	Monthly
Total Phosphorous (P)	Weekly	Quarterly		Six Monthly	Monthly	Six Monthly	Six Monthly	Monthly
Total Residual Chlorine (TRC Cl ₂)	Weekly		Daily					
Sulphate	Weekly							
Exchangeable Cations (Na ⁺ , Ca ²⁺ , Mg ²⁺ , K ⁺), SAR	Weekly	Quarterly		Quarterly				
Total Dissolved Solids (TDS) & Electrical Conductivity	Weekly	Monthly	Monthly	Monthly	Two Monthly	Monthly	Monthly	Monthly
Turbidity (NTU)			Daily					
Ammonia (as N)	Monthly		Monthly		Monthly			
Anionic Surfactants (Methylene Blue Active Substances)								
Heavy Metals (Hg, Cd, Pb, Mo, Cu, Zn, Ni, Cr)	Monthly							
Colour			Daily					
Algae Monitoring (full screen, biovolumes etc)	Fortnightly during summer months. Monthly during other seasons.							

5.2 Recycled Water Quality Compliance

In 2010/11, recycled water produced by the recycled water plants at Melton, Sunbury, Gisborne, Bacchus Marsh and Romsey successfully achieved the median water quality requirements stipulated by EPA.

Quality at both Woodend and Riddells Creek recycled water plants temporarily exceeded the unfiltered Biological Oxygen Demand (BOD) maximum requirement of 20mg/L. This was due to a temporary algal bloom and both sites should meet the requirement under other normal conditions.

Table 6: Recycled Water Plant Statistics

RWP	Class	Inflow (ML)	Volume Produced (ML)	Volume Reused (ML)	% Water Recycled	No. of Properties Supplied	Typical use	Method of supply
Bacchus Marsh	B	1,087	576	432	75	1	Irrigation of fodder crops	Farm lease
Gisborne*	B	542	551	362	66	6	Landscaping, municipal sporting and recreation surfaces	Pipeline Standpipe
Melton	A		188	154	82	215	Residential garden watering, toilet flushing, irrigation of public open spaces, recreational surfaces and fire fighting	Pipeline
	C	3,414	3,155	2,263	72	3	Agribusiness and recreational surfaces	Farm lease
Riddells Creek*	C	249	263	19	7	4	Irrigation of fodder crops, municipal sporting surfaces	Pipeline
Romsey*	C	471	525	217	41	3	Irrigation of fodder crops and recreational surface	Farm lease Pipeline Standpipe
Sunbury	B	2,236	2,192	598	27	60	Agribusiness, municipal sporting, garden watering and recreational uses	Pipeline Standpipe
Woodend*	C	445	505	9	2	3	Municipal sporting and recreational surfaces	Pipeline
Total		8,443	7,956	4,054	51	295		

**Customers are supplied through flow meters that measure the recycled water provided. Western Water also provides recycled water by way of short-term water carter permits. The customers opting for this alternative delivery method are not included in the above table.

^ After system losses such as evaporation, seepage & losses through biosolids.

*Excludes Class A volumes as already accounted for through Melton Class C RWP volumes.

*Gisborne, Riddells Creek, Romsey and Woodend RWPs produced more recycled water than inflows due to gains across lagoon surfaces during high rainfall events.

Table 7: Median Quality Results for Recycled Water by Plant and Class

Parameter	Acceptable Range	Melton		Sunbury	Gisborne	Bacchus Marsh	Woodend	Romsey	Riddells Creek
		Class A	Class C	Class B	Class B	Class C	Class C	Class C	Class C
E.coli (org/100ml)	<10 Class A <100 Class B <1000 Class C	0	30	2	21	57.5	10	21	205
pH (units)	6-9	7.6	8.3	7.5	7.5	7.95	8.5	8.3	7.9
Biological Oxygen Demand (mg/L)	<10 Class A <20 Class B & C	5.5	3	2	3	4	23	9.5	23
SS (mg/L)	<5 Class A <30 Class B & C	<2	4	2	2	N/A	21.5	27.5	9.5
Turbidity (NTU)	<2	0.11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Chlorine (mg/L)	<1 mg/L at customer tap	.08	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Salinity - Electrical Conductivity (uS/cm)	NS	N/A	N/A	720	600	750	560	665	800
Ammonia	NS Sunbury = 5	3.5	N/A	0.1	0.18	N/A	1.4	N/A	N/A
Total Nitrogen as N	NS Sunbury = 15	N/A	N/A	10	4	20	7.8	4.65	24.5
Total Phosphorus (P)	NS Sunbury =1	N/A	N/A	0.57	0.2	17.2	6.7	N/A	N/A
Total Dissolved Solids (TDS)	Sunbury - 900	460	402	430	350	450	305	365	380

Class A Recycled Water

Additional compliance is required for Class A recycled water connections to residential properties at Eynesbury in accordance with the EPA's Dual Pipe Guidelines.

For each Class A connection, three Plumbing Industry Commission (PIC) inspections must be conducted to verify systems are installed correctly and ensure recycled water cannot be cross connected with the drinking water supply. During 2010/11, the PIC conducted 240 first and second inspections and commissioned 120 properties at Eynesbury.

Electrical conductivity (EC) checks were also undertaken on the Class A recycled water supply at customer taps during the meter fitting process to ensure the plumber has connected to the correct (i.e. recycled water) supply. No abnormal results were found.

5.3 Customer Feedback

No customer complaints were received in relation to recycled water quality during 2010/11.



6. INCIDENT MANAGEMENT AND EMERGENCY RESPONSE

Any incident associated with the supply and use of recycled water is reported to the EPA.



Incident Management and Emergency Response

6.1 Communication Protocols

Western Water's incident response procedures describe the protocols for communication to the public and other stakeholders in the event of a significant recycled water quality event. This is further supported by formal procedures which identify the key stakeholders to be contacted and provides information on the appropriate communication methods for each stakeholder.

6.2 Incident & Emergency Management

Any major incident associated with the supply and use of recycled water is reported to the EPA. Western Water then works with the EPA to determine the best course of action to minimise any social, environmental and financial impact. Minor incidents are also documented annually in this report as a continuous improvement measure. Three major recycled water incidents were declared in 2010/11.

6.1.1 Class B Supply Break (November 2010)

A customer's Class B recycled water service pipe was broken during a high rainfall event. The break occurred after the meter where the pipeline crossed a normally dry creek bed. The combined water flowed into a large dam on a nearby property and was contained on site.

The EPA was notified, water samples taken and the dam water was not used as a water source for any purpose. The customer's recycled water supply was restricted until an adequate pipe construction was completed to cross the creek.

6.1.2 Recycled Water Consumption by Pigs (November 2010)

A routine conversation with a property owner revealed that pigs were being incorrectly supplied with Class C water as drinking water supply. The EPA, Department of Health and Chief Veterinary Officer (CVO) were contacted with the details of the incident.

The CVO conducted a risk assessment and provided written confirmation to the owner of the pigs that he must not supply the pigs with recycled water. The assessment found the risks were sufficiently low that no further action was required.

Following this incident, a systematic review of all recycled water customers commenced as part of Western Water's recycled water audit program.

The incident will also be communicated to other recycled water practitioners in the Victorian water industry to promote awareness of the potential for incorrect use of recycled water by long term customers.

Western Water will continue to work with EPA, DH and CVO to investigate the root cause and possible changes in guidelines and licensing (DPI) to reduce the likelihood of further instances of incorrect use of recycled water.

6.1.3 Excess Recycled Water at Bacchus Marsh (December 2010)

Low demand for recycled water for irrigation, combined with high inflows into the RWP from rainfall, resulted in high water levels at the recycled water winter storage dam at Bacchus Marsh Recycled Water Plant. These water levels exceeded acceptable levels for operation of the plant and required recycled water to be discharged to adjacent land.

Coping with Extreme Rainfall Events

The region experienced three extreme wet weather storms across January and February 2011, inundating sewer pump stations and recycled water plants in many towns. Managing extreme inflows is vital to maintaining a healthy environment as the potential for sewage to spill to local waterways is high.

Melton Recycled Water Plant recorded 127mm rain over 12 hours in early February. All plant operators were mobilised from 3am when it became clear a significant rainfall event was occurring. The flow on Saturday morning was 884 litres per second - more than triple the normal flow the plant receives during peak flow periods.

Recycled water plants are not designed to handle inflows this extreme and there was a strong likelihood that excess inflows could spill to the environment. Quick thinking staff diverted high flows to the newly constructed aeration tanks on site, which were as yet uncommissioned but had a storage capacity of 4 million litres. This capacity was exhausted by 2pm but by then the flow had begun to reduce.

During the 24 hour period of this storm event, over 30 million litres of sewage passed through the plant. In normal weather the plant would treat around 9 million litres. The fact that no sewage spilled to the environment was due to the incredible commitment of Western Water's plant operators and incident management team.



Extreme Rainfall Inflow at Melton RWP

7. EMPLOYEE AWARENESS AND TRAINING

Western Water is committed to ensuring all employees are fully aware of their responsibilities and trained appropriately.



Employee Awareness and Training

Western Water is committed to ensuring all employees are fully aware of their responsibilities and trained appropriately for our water supply systems.

During 2010/11, staff directly responsible for the supply of recycled water totalled 17 with four based in the Sunbury office, five based at Melton Recycled Water Plant and eight based at Sunbury Recycled Water Plant. They are also responsible for the operation of the recycled water plants at Bacchus Marsh, Gisborne, Woodend, Riddells Creek and Romsey.

As the population in the region continues to grow at a strong rate, Western Water is upgrading recycled water plants to increase capacity, replace ageing infrastructure and upgrade technology.

Growth in customer numbers is also being addressed by bringing in new employees. Additional staff will ensure Western Water can meet the needs of a fast growing population and a changing environment, as well as inject fresh ideas into the business and guarantee future continuity.

Staff responsible for the supply of recycled water are a significant asset to the business with the relevant experience, skills and training to ensure the ongoing safe delivery of recycled water across the region.



7.1 Employee Awareness and Involvement

Western Water's internal communication program provides tools that build a genuine sense of team spirit and cooperation and ensure employee information needs are met.

Staff attend regular site and team meetings to remain up to date with the latest developments. Changes to existing policies and the introduction of new ones are also included in meeting agendas, and can be accessed on our intranet.

In addition, the Managing Director regularly meets employees at each site, attending meetings, safety presentations and functions throughout the business.

Western Water reinforces key safety messages via safety alerts, the intranet and site/toolbox meetings.

7.2 Employee Training

All staff directly responsible for the supply of recycled water undertook training during the year.

In addition to formal training, ongoing training and reskilling is required as procedures are revised due to new equipment or techniques. This ensures the safety of both employees and the community.

The following training was undertaken by members of the recycled water teams during 2010/11:

- Anaerobic Processes
- Confined Space Entry
- Fire Extinguisher
- Fire Warden
- First Aid & CPR
- Integrated Management System
- Leadership
- Management
- Occupation Health & Safety
- Traffic Management
- Wastewater Treatment

8. COMMUNITY INVOLVEMENT & AWARENESS

Western Water provides free tours of the recycled water plants to schools, community groups and visiting industry representatives.



Community Involvement & Awareness

8.1 Community Involvement

8.1.1 Recycled Water Plant Tours

Western Water provides free tours of the recycled water plants to schools, community groups and visiting industry representatives at our largest recycled water plants at Sunbury and Melton. In 2010/11 there was a significant increase in plant tours with 30 separate educational tours conducted for a range of groups.

The education facilities at both Melton and Sunbury are in the process of being upgraded with a custom designed information video of the treatment process at Melton being developed for demonstration to tours and on the website.

8.1.2 Education Programs

Western Water recognises that educating young people on crucial issues such as climate variability and water conservation creates a ripple effect far beyond the classroom. To this end, presentations, programs and teacher resources for children are offered free to the region's preschool, prep, primary and secondary schools. Free presentations are also available for community groups on request.

8.1.3 Enhancing the Environment

Western Water has partnered with a number of local environment groups to enhance the biodiversity at our recycled water plants. In particular, a longstanding partnership with the Pinkerton Landcare and Environment Group has been recognised with awards for the works completed along the Werribee River and in Pinkerton Forest which are at the site for Melton Recycled Water Plant.

Western Water works with other environment groups including Deep Creek Landcare, Parwan Landcare, and Greencorp in the local region.

8.2 Community Awareness & Consultation

Western Water undertakes a range of community education programs to ensure the public and stakeholders are well informed on all aspects of recycled water including treatment, delivery and application. Signage is also provided to all recycled water customer sites and storage facilities.

During the reporting period, recycled water information sessions were provided for Hume City Council operational staff, Sunbury Primary School, Melton Community Reference Group, the Eynesbury Golf Club maintenance team and new customers on Gisborne Recycled Water Scheme (GROWS). The presentations covered the acceptable use of recycled water, irrigation regimes, environmental risk management and OH&S aspects.

Other community engagement activities include:

- recycled water customer group meetings which are conducted three times per year
- recycled water inductions provided to all new customers
- distribution of *Recycled Water News* every 4 months to recycled water customers and interested parties
- the provision of brochures and updates on the website.

Sustainable Superheroes

Western Water also utilises the services of Recycled Water Man and Woman to increase the profile of and educate the public about recycled water.

The Superheroes of Sustainability - Recycled Water Man and Woman program aims to educate students and the general public about the value of and uses for recycled water.

Initially aimed at students in Years 4 to 8, the program involves a fun, interactive session in which Recycled Water Man or Woman discuss the scientific principles behind recycling water as well as how it is currently used in the Western Water region.

In 2010/11, 14 Recycled Water Superhero presentations were made to school and community groups.



Recycled Water Man

9. RESEARCH & DEVELOPMENT

Western Water is committed to pursuing innovative water recycling solutions that provide customers with a reliable source of high quality alternative water.



Research & Development

9.1 Research

Class A Recycled Water for washing machines

The use of Class A recycled water in clothes washing machines is currently being assessed as an option to further reduce drinking water demand in new residential housing developments.

Washing machines account for almost quarter of total household water usage. This suggests that providing Class A recycled water for clothes washing could save an average of 45 litres of drinking water per person per day.

Implementation of this new use for recycled water would be a significant step towards the goal of reducing drinking water consumption in new housing developments by at least 50% when compared to traditionally serviced housing developments.

Feasibility research is underway with material testing, further analysis and community engagement to be undertaken in 2011/12.



9.2 Developing Recycled Water Supply Schemes

9.2.1 Gisborne Recycled Water Scheme (GRoWS)

Western Water recently secured significant funding to construct the Gisborne Recycled Water Scheme (GRoWS) to support horticultural and tourism initiatives in Gisborne South.

The State Government, will contribute \$1.3 million, Western Water will provide \$2.7 million and local business and the community will contribute a further \$278,000 to the project.

The GRoWS scheme will involve the construction of 19km of pipeline from the Gisborne Recycled Water Plant. The pipeline will provide up to 250 million litres a year of Class B recycled water to an initial customer base of seven businesses and six private land-holders in the Gisborne South precinct.

Construction of the scheme, scheduled to commence in late 2011, will ensure a secure supply of irrigation water to enable business investment and economic growth for the region.

9.2.2 Class A Recycled Water Supply Network - Toolern

With the announcement of Melbourne @ 5 Million, Western Water took the opportunity to engage in the development of the new Toolern Precinct Structure Plan.

Working with other stakeholders, Western Water achieved the inclusion of a requirement to use 50% less water than traditionally serviced developments through supporting the use of recycled water in Toolern.

Class A recycled water is now well established in the township of Eynesbury where it is used for garden watering, toilet flushing and other approved activities.

The next development supplied with Class A recycled water and first in the Toolern precinct is Waterford where house construction is likely to commence in December 2011.

Western Water's practices and procedures are being updated to enable EPA and Department of Health endorsement of Class A supply to the Toolern region.

As part of the Toolern development, investigations are also being undertaken to harvest and reuse stormwater for fit for purpose uses.

Investigations are also in progress into the feasibility of supplying class A recycled water for dual pipe networks in the new growth areas around Diggers Rest..

10. DOCUMENTATION AND REPORTING

Reporting recycled water quality data and performance is an integral component of Western Water's water quality management system.



Documentation and Reporting

10.1 Management of Documentation and Reporting

Reporting recycled water quality data and performance is an integral component of Western Water's water quality management system.

All documentation is regularly reviewed and updated in line with the Regional Environmental Improvement Plan and the Health and Environmental Management Plan for recycled water supply systems. This is part of our Integrated Management System.

During 2010/11, an internal audit of the Class A HACCP was undertaken. This audit will lead to all relevant documentation being reviewed and/or rewritten over 2011/12. This includes Critical Control Points, Quality Control Points, Flow Diagrams and Hazard Analysis.

Western Water's centralised water quality database is provided by the Water Information Management System (WIMS). This system ensures automated data storage and generates automated emails advising of any water quality exceedances.

10.2 Reporting

Western Water uses the Balanced Scorecard (BSC) to manage and report on strategic business performance and ensure the business is progressing toward its vision "to be a leading service provider working with our community towards a sustainable future".

Through BSC reporting, objectives and actions are monitored by the Board and Management on a monthly basis.

EPA compliance is a key objective of the BSC with actions including recycled water plant upgrades, water balance assessments, winter storage upgrades and pipeline extensions.

Annual reporting is undertaken by Western Water to:

- Department of Sustainability and Environment
- Environmental Protection Authority
- Department of Health
- Essential Services Commission and
- Water Services Association of Australia

Other reporting occurs on an as needs basis including incident reporting to Environmental Protection Authority and Department of Health.



11. EVALUATION AND AUDIT

Evaluating and auditing recycled water quality management systems ensures the successful management of public, livestock and environmental risks.



Evaluation and Audit

In addition to managing health, livestock and environmental risks successfully, evaluating and auditing recycled water quality management systems also ensures that the correct processes are in place to reduce the risks associated with recycled water use. This report is an integral part of the review and evaluation process.

11.1 Long Term Evaluation

Recycled water quality and customer site data have been collected from various schemes for over 10 years. Collected data includes information about treatment plants, supply systems, standpipes, customer taps and customer properties.

This information is then used to develop trends of long term changes to recycled water quality and sustainable recycled water use, which is essential to identify and understand risks and identify possible solutions.

11.2 Audit of Recycled Water Management

Audits ensure that operational procedures and processes are in place so that accurate recycled water quality and customer recycled water use data is collected and appropriate management systems are maintained.

11.2.1 Class A Recycled Water Audit

An audit of Class A recycled water at Eynesbury included soil samples at various sites and water samples of stormwater runoff from the Eynesbury township. At the time of this report, final analysis of these samples had not been finalised.

The Eynesbury Class A Health and Environmental Management Plan (HEMP) is currently under extensive review to ensure it provides for risk reduction and recycled water management - as required by DH and EPA Victoria - and to ensure public safety.

An EPA Class A audit was conducted at Eynesbury during the reporting period addressing supply, reticulation and use of Class A recycled water, as well as an assessment of the quality of the water supplied.

The objective of the audit was to establish the risk of harm to the environment from the operation of the scheme. The following were audited:

- that the provisions of the HEMP were implemented
- that the recycled water system is monitored and managed so compliance & performance can be assessed
- issues identified in monitoring or reviews of the system that may impact on compliance or performance
- a preventative risk management system is in place and that it appropriately addresses risk identification, assessment and management.

The result of the audit concluded “that the use of Class A recycled water at Eynesbury has been implemented in accordance with the HEMP and there is no significant risk to beneficial uses of the aquatic environment”.



12. REVIEW & CONTINUAL IMPROVEMENT

Western Water has an extensive recycled water management system in place to ensure continual improvement measures.



Review & Continual Improvement

12.1 Management Reviews

The sustainable use of recycled water is viewed as a vital performance issue for Western Water at the most senior level.

The performance of the recycled water schemes against the Recycled Water Strategy is reviewed annually by the management team which includes the Managing Director and three General Managers. An update is then provided to the Board. All audit outcomes are assessed and resources allocated as necessary to resolve critical issues.

General Managers are aware of all incidents and all recycled water complaints are assigned to relevant staff member who then follow the complaint from receipt to resolution in accordance with Western Water's Correspondence and Complaints Management Procedure.

Should the customer be dissatisfied with the initial outcome, an internal dispute resolution process is introduced whereby the complaint is reviewed by management with appropriate action taken as necessary.

As the strategic reporting system, the Balanced Scorecard identifies key recycled water reporting indicators to the Board, management and staff.

12.2 Recycled Water Quality Management Improvement Plan

Western Water already has in place an extensive recycled water management system to ensure continual improvement measures are identified and strengths and weaknesses in recycled water risk management are well understood by the Board, management and staff.

Over the next 12 months, Western Water will continue to expand the recycled water supply network through a range of activities. Key activities to be undertaken are detailed below.

12.2.1 Class A Recycled Water Supply

The number of residential customers continues to grow at the Eynesbury township, the site of Western Water's first dual reticulation scheme. There are now 254 homes occupied since the scheme was commissioned.

Eynesbury residents achieved a 55% reduction in drinking water consumption for 2010/11 exceeding the expected 50% drinking water savings.

Western Water will continue to assess the viability of Class A recycled water schemes and alternative recycled water markets throughout the region and particularly in growth areas to ensure liveable, sustainable and productive communities.

In addition (in accordance with the Toolern Precinct Structure Plan), new developments in Melton South and Toolern will be supplied with recycled water for appropriate uses.

Recycled water infrastructure projects include the construction of the recycled water main to supply the new Waterford development in Melton South.

12.2.2 Bacchus Marsh Recycled Water Plant Strategy

A Bacchus Marsh Recycled Water Plant Servicing Strategy has also commenced to identify options and associated costs for managing future recycled water flows and identify emergency discharge options during high rainfall events.

This will include assessment of treatment plant upgrade options and a recycled water market assessment and development strategy.

12.2.3 Romsey Farm Lease

The Romsey Farm Lease is currently being tendered. Tenders have been publicly advertised for the 206 hectare property owned by Western Water, with an attached 180ML minimum recycled water entitlement.

The recycled water entitlement is Class C which is suitable for cropping and grazing in accordance with EPAV guidance. The new lessee is expected to commence in October 2011.

A review of the Romsey Farm has also been undertaken to provide advice on any improvements required to the property from an infrastructure as well as regulatory compliance perspective.

12.2.4 Water Balance Assessments

Water balance assessments are being undertaken at Melton, Bacchus Marsh, Riddells Creek and Romsey to determine the storage volume required to maintain sustainable recycled water schemes, as well as how much more water can be made available to customers.

Concurrently, new customers are being sought and we are working with local councils and landholders in the region to identify further opportunities.

12.3 Recycled Water Treatment & Supply – Capital Works Improvement

Significant recycled water supply works undertaken in the past year include completion of the \$13.7 million Stage 2 Upgrade of Melton Recycled Water Plant and the continuation of the \$1.8 million upgrade of Gisborne Recycled Water Plant.

Major new projects for the coming year include the \$2.5 million upgrade of Bacchus Marsh Recycled Water Plant.

Western Water will also be commencing major infrastructure works to extend recycled water networks including construction of the \$4.3 million GROWS recycled water supply scheme described below.

12.3.1 Class A Recycled Water Supply at Toolern

Western Water has worked in consultation with local government and developers on the Precinct Structure Plan for the new Toolern area in Melton South. As a result, the plan includes a requirement to use 50% less water than traditionally serviced developments. This requirement supports the use of recycled water in Toolern.

The first stage of Toolern is well underway and Western Water is working closely with the developers to maximise the beneficial

use of recycled water whilst ensuring the necessary regulatory requirements for Class A recycled water are being met.

Development is occurring on many fronts and will result in significant growth in customer numbers in coming years.

12.3.2 New Customers and Pipeline Extensions

Sunbury Primary School was connected to the Sunbury Melton Recycled Water Scheme during 2010/11 to utilise Class B recycled water for irrigation of sporting grounds.

An investigation and design for a pipeline extension has been completed and the extension is planned for 2011/12 after finalisation of contractual agreements with new customers.

The Riddells Creek Recycled Water Scheme secured two new customers on the existing pipeline route in 2011 in accordance with the Board's allocation principles.

Western Water is also working with the local Pony Club to supply recycled water under a short term contract through a sponsorship arrangement to maximise the beneficial use of recycled water.

A pipeline extension is underway from the Bacchus Marsh Recycled Water Plant to a neighbouring property. A temporary supply contract has been finalised for the short term supply of recycled water whilst excess recycled water is available.

Gisborne Recycled Water Scheme (GROWS)

The GROWS scheme will develop infrastructure to supply agribusiness customers in Gisborne South with recycled water. The project aims to support agricultural and tourism initiatives in the Couangalt Food Hub by providing a secure supply of irrigation water to allow for business growth.

During the reporting period, \$1.3 million of funding was secured to construct the scheme through Regional Development Victoria (RDV) as part of the Victorian Government's Regional Infrastructure Development Fund. Western Water will contribute \$2.7 million to the scheme and local businesses and the community will contribute a further \$278,000.

The GROWS scheme will provide up to 250 million litres of Class B recycled water each year via 19km of pipeline from the Gisborne Recycled Water Plant to an initial customer base of seven businesses, six private landholders and one school in Gisborne South. Construction for GROWS is scheduled to commence in late 2011.



Olive Grower, Sam Pitruzzello, Minister for Water, the Hon Peter Walsh MP, Chairman Terry Larkins, Joanne Duncan MP, and Managing Director, John Wilkinson at the launch of GROWS.



APPENDICES



Appendix 1: Western Water's Regulatory and Formal Requirements for Recycled Water

The following lists Western Water's regulatory and formal requirements with respect to the production and supply of recycled water.

- *Environmental Protection Act 1970*
- WSA 03-2002 Water Supply Code of Australia (WSAA)
- AS/NZS 3500.1 National Plumbing & Drainage Code
- State Environment Protection Policy (SEPP) guidelines
- Western Water's Integrated Management Systems Manual (IMS)
- Environmental Policy and Recycled Water Policy
- EPA Corporate Licence No. CL62130 (date first issued 21 May 2008)
- RWP Operation and Maintenance Manuals and Depot Operations Manuals
- Western Water's Emergency Response Plans (2008)
- Western Water's Emergency Response Procedure
- Algae Response Plan
- Water Plan 2008 - 2013 (Western Water 2008)
- Water Supply Demand Strategy 2006 to 2055 (Western Water & SKM 2007)
- Western Water Strategic Business and Corporate Plans (2009)
- Environmental Policy and Recycled Water Policy
- EPA Corporate Licence No. CL62130 (date first issued 21 May 2008)
- Western Water's Integrated Management System
- Water Plan 2008 - 2013 (Western Water 2008)
- Water Supply Demand Strategy 2006 to 2055 (Western Water & SKM 2007)
- Western Water Corporate Plan (2011- 2016)
- NWQMS Australian Guidelines for Water Recycling: Managing Health and Environmental Risks - Nov 2006
- Guidelines for Wastewater Irrigation (1983) Publication 168

Appendix 1: Western Water's Regulatory and Formal Requirements for Recycled Water cont.

- Use of Reclaimed Water EPA Guidelines (2003) Publication 464
- Dual Pipe water recycling schemes- health and environmental risk management (2005) Publication 1015
- Guidelines - Identification of Street Hydrants for Firefighting Purposes (CFA, MFB, DSE) (DSE 1999)
- Recycled Water Plumbing Guide (Plumbing Industry Commission) (PIC 2010)
- Western Water Dual Water System Schemes Design & Construction Standards
- Customer Service Charter
- Asset Management Plan - Recycled Water
- Health and Environmental Management Plan (HEMP)
- Recycled Water Quality Management Plan (RWQMP)
- HACCP Principles & Systems Procedures
- Integrated Management System Procedures
- All relevant policies contained in the Policy Manual
- Recycled Water Health Management Plan
- Recycled Water Land Capability Assessment

Appendix 2: Recycled Water Customers

Customer	Customer address	Crop/ Use	Area irrigated (ha)	Volume under contract (ML)	Total volume used (ML) (2010/11)	Application Method
Customer 1	Riddell Rd, Sunbury	Bowling greens	0.75	5	0.570	pop up sprinklers
Customer 2	Riddell Rd, Sunbury	Sports Oval	2.4	12	5.067	Pop up sprinklers
Customer 3	Racecourse Rd, Sunbury	Sports Oval	3.23	6	1.338	Pop up sprinklers
Customer 4	Macedon St, Sunbury	Sports Oval & Garden	9	45	19.171	Automated spray, drip and pop-up irrigation
Customer 5	Vaughan St, Sunbury	Wash Down	N/A	2	0.096	Hand held hose
Customer 6	Sunbury Rd, Sunbury	Vines	4.85	2	0.001	Drip irrigation
Customer 7	Francis Boulevard, Sunbury	Golf Course	32	110	44.539	Pop up sprinklers
Customer 8	Sunbury Rd, Sunbury	Walnuts & Lavender	1	10	0.307	Drip irrigation
Customer 9	Sunbury Rd, Sunbury	Vines	3.6	6	0.954	Drip irrigation and sprinklers
Customer 10	Sunbury Rd, Sunbury	Vines & Stock	3.2	4	0.037	Dripper system
Customer 11	Shepherds Lane, Sunbury	Olives	4	7	0.511	Automatic spray
Customer 12	Redstone Hill Rd, Sunbury	Vines	25	12	4.641	Drip irrigation
Customer 13	Sunbury Rd, Sunbury	Gardens & Trees	2	3	0.314	Drip irrigation
Customer 14	Jacksons Hill, Sunbury	Vines	2.02	4	0.00	Drip irrigation
Customer 15	Mitchells Lane, Sunbury	Soccer Grounds	5.3	19	8.114	Automatic pop-up sprinkler
Customer 16	Mitchells Lane, Sunbury	Sports Ovals	4.3	15	8.271	Automatic pop-up sprinkler
Customer 17	Vineyard Rd, Sunbury	Vines	2	2	0.296	Drip Irrigation
Customer 18	Vineyard Rd, Sunbury	Vines & Garden	2	2	1.004	Automatic pop-up sprinkler
Customer 19	Vineyard Rd, Sunbury	Vines	6.47	10	0.002	Drip irrigation

Appendix 2: Recycled Water Customers cont.

Customer	Customer address	Crop/ Use	Area irrigated (ha)	Volume under contract (ML)	Total volume used (ML) (2010/11)	Application Method
Customer 20	Old Vineyard Rd, Sunbury	Gardens	1	6	0.369	Manual watering system
Customer 21	Old Vineyard Rd, Sunbury	Gardens	1	1	0.106	Drip irrigation
Customer 22	Watsons Rd, Diggers Rest	Garden	1	1	0.003	Automatic sprays
Customer 23	Watsons Rd, Diggers Rest	Gardens	0.4	2	0.042	Automatic sprinklers
Customer 24	Watsons Rd, Diggers Rest	Gardens & Vines	0.4	3	0.156	Drip irrigation
Customer 25	Plumpton Rd, Diggers Rest	Sports Oval	3.65	32	9.287	Automatic pop-up sprinkler
Customer 26	Plumpton Rd, Diggers Rest	Sports Oval	1.6	4	1.320	Automatic pop-up sprinkler
Customer 27	Plumpton Rd, Diggers Rest	Fodder crops	1.6	1	0.090	Impact sprinklers
Customer 28	Holden Rd, Diggers Rest	Olives	5	1	1.226	Drip irrigation system
Customer 29	Holden Rd, Diggers Rest	Vines & Olives	6	16	1.454	Drip irrigation system
Customer 30	Holden Rd, Plumpton	Vines & Garden	4.9	3	0.000	Drip irrigation and low rise sprinklers
Customer 31	Leakes Rd, Rockbank	Olives	1	1	0.524	Manual watering system
Customer 32	Leakes Rd, Rockbank	Olives, Vines & Garden	1	5	0.101	Drippers and sprinklers
Customer 33	Leakes Rd, Rockbank	Trees & Grazing	8	24	9.897	Drip irrigation
Customer 34	Leakes Rd, Rockbank	Garden & Trees	2	1	0.220	Drip irrigation
Customer 35	Leakes Rd, Rockbank	Vines & Olives	2	4	1.223	Manual watering system
Customer 36	Melton Hwy, Rockbank	Nursery	30	30	16.729	Sprinklers and drip irrigation
Customer 37	Melton Hwy, Rockbank	Vines	2	3	1.586	Drip irrigation system
Customer 38	Melton Hwy, Rockbank	Vines	41	120	84.132	Drip, sprinklers and micro spray

Appendix 2: Recycled Water Customers cont.

Customer	Customer address	Crop/ Use	Area irrigated (ha)	Volume under contract (ML)	Total volume used (ML) (2010/11)	Application Method
Customer 39	Leakes Rd, Rockbank	Gardens	2.4	11	2.778	Pop-up sprinklers and drip irrigation
Customer 40	Leakes Rd, Rockbank	Vines	20	100	39.523	Drip, sprinklers and micro spray
Customer 41	Melton Hwy, Melton	Garden & Trees	4	2	0.979	Auto spray irrigation
Customer 42	Melton Hwy, Melton	Garden & Trees	0.8	1	0.682	Drip and spray irrigation
Customer 43	Highett Rd, Melton	Golf Range	2	1	0.145	Pop-up sprinklers
Customer 44	Killarney Drive, Melton	Grounds & Oval	0.4	1	0.021	Drip and spray irrigation
Customer 45	Melton Valley Dve, Melton	Golf Course	18	100	61.353	Pop-up sprinklers
Customer 46	High St, Melton	Municipal	1.6	14	3.000	Automatic pop-up irrigation
Customer 47	Nixon St, Melton	Historic Homestead	0.7	5	1.000	Automatic pop-up irrigation
Customer 48	Reserve Rd, Melton	Sports Oval	1.8	14	3.320	Automatic pop-up irrigation
Customer 49	Davis Rd, Diggers Rest	Gardens	1	1	0.034	Spray irrigation
Customer 50	Blackhill Rd, Toolern Vale	Crops & Stock	16	30	8.699	Travelling irrigator, drip irrigator and pop-up sprinklers
Customer 51	Blackhill Rd, Toolern Vale	Vines	21	1	0.000	Drip Irrigation
Customer 52	Ryans Lane, Toolern Vale	Crops & Stock	5	2	0.301	Sprinklers and drip irrigation
Customer 53	Ryans Lane, Toolern Vale	Crops & Stock	15.84	2	3.930	Spray and drip lines
Customer 54	Blackhill Rd, Toolern Vale	Vines	16	5	0.000	Spray Irrigation
Customer 55	Ryans Lane, Toolern Vale	Stock, vines and garden	22.3	8	0.000	Spray & drip irrigation
Customer 56	Ryans Lane, Toolern Vale	Stock and garden	25.86	8	0.000	Spray & drip irrigation

Appendix 2: Recycled Water Customers cont.

Customer	Customer address	Crop/ Use	Area irrigated (ha)	Volume under contract (ML)	Total volume used (ML) (2010/11)	Application Method
Customer 57	Townships Rd, Sunbury	Pastures & Trees	30	10	0.436	Flood and Spray
Customer 58	Townships Rd, Sunbury	Pasture & Trees	16	1	0.173	Drip and spray irrigation
Customer 59**	Butlers Rd, Melton	Lucerne	450	1,805	1,805.000	Flood & travelling irrigator
Customer 60	Eynesbury Rd, Eynesbury	Golf Course	82	308*	81.830	Pop up sprinklers
Customer 61	Eynesbury	Equine Centre	14	65	10.975	Travelling irrigator
Customer 62	Ferris Rd, Melton South	Dust suppression, Gardens & Toilet flushing	1.05	20*	8.674	Truck dribble bar and pop-up sprinklers
Customer 63	Butlers Rd, Metlon South	Nursery	2.25	25	11.335	Sprinklers and drip irrigation
Customer 64	Stokes Lane, East Riddells Creek	Agricultural use, pasture, tree lines	5.4	5	4.395	Travelling irrigator and dripper system
Customer 65	Stokes Lane, East Riddells Creek	Agricultural use, pasture	5.5	5	9.669	Travelling irrigator and dripper system
Customer 66	Stokes Lane, East Riddells Creek	Pasture	8.1	40	1.336	Sprinklers and soaker hose
Customer 67	Sutherlands Rd, Riddells Creek	Sports Ovals	3.2	15	3.342	Pop-up sprinklers
Customer 68**	Parwan South Rd, Parwan	Lucerne & Barley	95	400	400.000	Centre pivot irrigators
Customer 69	Greens Lane, Romsey	Turf Racetrack	2.8	30	12.618	Sprinklers
Customer 70**	Portingales Lane, Romsey	Grain and pasture crops	78	230	88.395	Centre pivot irrigator, Flood

Appendix 2: Recycled Water Customers cont.

Customer	Customer address	Crop/ Use	Area irrigated (ha)	Volume under contract (ML)	Total volume used (ML) (2010/11)	Application Method
Customer 71	Johnston Court, Romsey	Roadworks		1	0.001	Truck dribble bar
Customer 72	Davy St, Woodend	Golf course	16	60	0.000	Pop-up sprinklers
Customer 73	Forest St, Woodend	Sports Ovals	1.2	6	0.983	Pop-up sprinklers
Customer 74	Davy St, Woodend	Sports Ovals	1	5	0.397	Pop-up sprinklers
Customer 75	Kilmore Rd, Gisborne	Bowling Greens	0.25	1	0.526	Pop-up sprinklers
Customer 76	Aitken St, Gisborne	Sports Ovals	1.5	6	0.748	Pop-up sprinklers
Customer 77	Station St, Gisborne	Sports Ovals	1.3	6	0.507	Pop-up sprinklers
Customer 78	Robertson Road, Gisborne	Gardens	1	4	0.000	Sub surface drip system
Customer 79	Robertson Road, Gisborne	Sports Ovals	3	6	1.357	Pop-up sprinklers, subsurface irrigation
Customer 80	Daly St, Gisborne	Golf course	12.5	60	30.386	Pop-up sprinklers

**Class A major customers*

***As part of the existing Lease agreement*

These tables do not include a breakdown of individual residential properties connected to Class A recycled water at Eynesbury.

Note: Table excludes temporary trucking permit customers.

Glossary of Recycled Water Quality Terminology

Anaerobic Digestion A process which takes place in the sludge digester whereby microorganisms break down the organic waste in a low oxygen environment.

Biosolids A nutrient rich, organic material produced during the treatment of recycled water. They can be used for a range of functions including as a soil conditioner and fertiliser.

BOD (Biological Oxygen Demand) The amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present.

Chloramination A long lasting form of disinfection for water supplies whereby chlorine is added to the water and reacts with small amounts of ammonia to form chloramine.

Coagulation A process whereby a coagulant (such as Ferric Chloride) is added to the water, causing any dirt in the water to stick together in lumps called floc which are then able to be sieved out of the water.

DH Department of Health (Victorian Government)

DSE Department of Sustainability and Environment (Victorian Government)

DTF Department of Treasury and Finance (Victorian Government)

EMS Environmental Management System

EPA Vic Environment Protection Authority Victoria

ESC Essential Services Commission

Filtration A screening process for water which removes objects and grit and other particles in the water.

GRoWS Gisborne Recycled Water Scheme.

HACCP Hazard Analysis and Critical Control Points

IMS Integrated Management System

IWCM Integrated Water Cycle Management

Microfiltration A filtration process which removes contaminants from water by passage through a microporous membrane.

QMS Quality Management System

Recycled Water Former wastewater (sewage) that is treated to remove solids and certain impurities and can be treated for use for various purposes.

RWP Recycled Water Plant

Sedimentation A water treatment process used to settle out suspended solids in water under the influence of gravity.

Sludge Residual, semi-solid material left from sewage treatment processes.

SMP Site Management Plan

Standpipe An external freestanding pipe which provides access to recycled water for customers with no other supply.

Ultraviolet (UV) Light A disinfection method that uses ultraviolet light at a sufficiently short wavelength to break down microorganisms in water.

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