Final Project Report

Review of the regulatory framework for alternative urban water supplies

November 2009

Our Water Our Future
A Victorian Government initiative

Victoria
The Place To Be

Department of Sustainability and Environment
Department of Health

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1 Executive summary

This report details the outcomes of the review of the public health and environmental framework supporting the use of alternative water supplies conducted by EPA Victoria (EPA) and the Department of Human Services (DHS) under the Victorian Government White Paper, *Our Water Our Future* Actions 5.42 and 5.43.

The framework was reviewed in response to increased pressure on reticulated water supplies as a result of the drought and increased usage of alternative water supplies by the residential, commercial and industrial sectors.

The review aimed to create a framework which primarily: protects public and environmental health; facilitates safe and sustainable use of appropriate alternative water supplies; and is easy to understand and navigate.

The alternative water supplies assessed in the review were:

- Rainwater
- Stormwater
- Greywater
- Sewage
- Industrial water
- Managed aquifer recharge (MAR)

The review assessed the use of the above water supplies at residential, commercial and industrial sites for:

- Drinking
- Food preparation
- Personal washing
- Swimming or spa pool
- Laundry trough
- Clothes washing machine
- Outdoor use
- Heating/cooling
- Fire protection
- Food crop/vegetable irrigation
- Garden watering (surface)
- Garden watering (sub-surface)
- Toilet flushing
- Construction
- Dust suppression
- Non-food crop irrigation
- Industrial process

The review process

The review process included the establishment of three working groups responsible for undertaking a qualitative risk assessment of each water source, development of technical reports reviewing existing legislation, development of three discussion papers, and a thorough consultation process.

The framework recognises that Victoria has well-established regulatory controls and guidance to manage wastewater founded on environment protection principles and adjusts these arrangements in some areas to better match the level of controls with the level of risk.

The new framework includes a spectrum of controls from education based guidance to support low risk applications to explicit regulation to control higher risk activities.

Principles guiding the review

In reviewing the framework, EPA and DHS were committed to:

- Facilitating widespread use of safe and sustainable alternative water supplies;
- Ensuring public health and the environment are protected and community confidence is maintained;
- Providing Victorians with access to comprehensive information and education about safe and sustainable alternative urban water supplies;
- Creating a system which is easy for individuals to navigate and participate in; and
- Balancing the level of risk with appropriate control mechanisms ranging from education and guidance through to regulation.

Outcomes of the review

Below is a summary of the outcomes of the review for each water source. More detail for each water source is provided in subsequent sections.

Rainwater – Key outcomes

The outcomes for rainwater are summarised below.

1. For single residential sites (e.g. homes), guidelines for collection and use of rainwater have been published.
2. For commercial, industrial or multi-residential sites (e.g. apartment blocks), guidelines for collection and use of rainwater have been published.
3. Practice notes for plumbers, which address key installation matters relating to rainwater, have been developed by the Plumbing Industry Commission and were informed by this review.

Further detail about the outcomes for rainwater is provided in section 5.

Stormwater – Key outcomes

The outcomes for stormwater are summarised below.

4. For single residential sites (e.g. homes), the guidelines for the collection and use of rainwater (refer above) also apply to the collection and use of stormwater.
5. For commercial, industrial or multi-residential sites (e.g. apartment blocks), the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Stormwater Harvesting and Reuse,* 2009 informed this review and have been adopted as appropriate guidance for Victorian stormwater schemes.
6. Policy for the management of health and environmental risk associated with the collection and use of stormwater will be explored at the time of review of the *State environment protection policy (Waters of Victoria).*

Further detail about the outcomes for stormwater is provided in section 6.

Greywater – Key outcomes

The outcomes for greywater are summarised below.

7. For single residential sites (e.g. homes), the *Greywater Use Around the Home* guidance brochure for collection and use of untreated greywater has been published.
8. For single residential sites (e.g. homes), the *Guidelines for Environmental Management: Code of Practice – Onsite Wastewater Management* ("the Code") has been updated to enable greywater recycling for garden irrigation, toilet flushing and washing machine use.
9. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated greywater per day, the Code has been updated to enable greywater recycling for garden irrigation. EPA and DHS have agreed to review the existing 'certificate of approval' process to assess whether it can be aligned with the principles of the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)* and whether currently excluded uses (e.g. toilet flushing and washing machine use) could be included in the Code in the future. A critical part of this review will be to consider necessary governance arrangements for these types of schemes, similar to arrangements detailed for >5,000 litre/day schemes in EPA publications 464.2 and 1015.
10. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated greywater per day, EPA and DHS have agreed to review the framework to manage health and environmental risk as part of the *Onsite Domestic Wastewater and Regulatory Review Project.*

11. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing more than 5,000 litres of treated greywater per day, EPA and DHS have agreed to review the existing guidance and framework to ensure public health is protected when recycling greywater for toilet flushing and washing machine use. Currently, closed-loop greywater recycling schemes, for example toilet flushing with no irrigation component, are not covered under EPA's regulatory framework and hence pose a potential health risk. EPA and DHS have agreed to address this risk through the current Recycled Water Guidance Review project.

Further detail about the outcomes for greywater is provided in section 7.

Sewage – Key outcomes

The outcomes for treated sewage are summarised below.

12. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated sewage per day, the *Guidelines for Environmental Management: Code of Practice – Onsite Wastewater Management* have been reviewed to manage the health and environmental risk associated with its use.
13. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated sewage per day, EPA and DHS have agreed to review the framework to manage health and environmental risk as part of the *Onsite Domestic Wastewater and Regulatory Review Project.*
14. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing more than 5,000 litres of treated sewage per day, EPA and DHS have agreed to review the existing guidance and framework to ensure public health is protected when recycling sewage for toilet flushing and washing machine use. Currently, closed-loop sewage recycling schemes, for example toilet flushing with no irrigation component, are not covered under EPA's regulatory framework and hence pose a potential health risk. EPA and DHS have agreed to address this risk through the current Recycled Water Guidance Review project.

Further detail about the outcomes for sewage is provided in section 8.

Industrial Water – Key outcomes

15. EPA has developed *Industrial Water Reuse Guidelines* as part of the *Industrial Waste Resource Guidelines.*
16. The *Environment Protection (Scheduled Premises and Exemptions) Regulations 2007* were informed by this review and make provision for managing the health and environmental risk associated with the reuse of industrial water.
17. EPA has incorporated a definition of industrial water and provision for its reuse in the *Environment Protection (Industrial Waste Resource) Regulations 2009.*

Further detail about the outcomes for industrial water is provided in section 9.

Managed Aquifer Recharge – Key outcomes

18. The *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Managed Aquifer Recharge* informed this review. The *Victorian Guidelines for Managed Aquifer Recharge (MAR) – Health and Environmental Risk Management* have been published, which adopt the national approach and set out the roles, responsibilities and regulatory framework for Victorian schemes.

19. DSE has agreed to consider issues specific to MAR, such as the regulatory process for proposed MAR schemes, referral of applications to the public health and environmental regulators, water volume entitlements and allocation limits, when amendment of the relevant water legislation is proposed.

Further detail about the outcomes for MAR is provided in section 10.

Additional outcomes

20. The *Our Water Our Future* website has been updated with appropriate links to the EPA and DHS websites and guidelines, and overarching guidance on the risk-based hierarchy approach to using alternative water supplies. This approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

21. An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and facilitate increased uptake of urban alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff.

As a result of the review, EPA and DHS are confident public and environmental health will be appropriately protected as the safe and sustainable use of alternative water supplies at both residential and business premises becomes more widespread.

2 The need for a review

Victoria's prosperity depends on secure water supplies for our homes, farms, environment and industry.

Population growth, climate change and degrading river systems are all factors that contribute to why the State needs new and better ways to secure water for the future.

Reducing the amount of water we use is one way to protect the State's water supplies; another way is by collecting and recycling alternative urban water supplies such as rainwater, stormwater, greywater, sewage and industrial water. An increasing number of Victorians in urban areas, who have access to reticulated drinking water and sewerage, have shown interest or are already using one or more of these alternative water supplies.

As a result, the regulatory framework needed to be reviewed to:

- facilitate more widespread use of safe and sustainable alternative urban water supplies;
- ensure public health and the environment are protected and community confidence is maintained;
- provide Victorians access to comprehensive information about safe and sustainable alternative urban water supplies;
- create a system which is easy for Victorians to navigate and participate in; and
- balance the level of risk with appropriate control mechanisms ranging from education and guidance through to regulation.

The Victorian Government's White Paper, *Our Water Our Future,* is an action plan to enable smarter water use and management across the State. Actions 5.42 and 5.43 required EPA, in partnership with the DHS, to review the public health and environmental framework supporting alternative urban water supplies.

3 The review process

The review was conducted in two phases: the first phase considered rainwater, stormwater, greywater and sewage; and the second phase considered industrial water and managed aquifer recharge (MAR).

Each phase consisted of five main steps as summarised in Figure 1.

Working Group

Composition

Three working groups were established to contribute technical and policy expertise to a Detailed Risk Assessment of each water source, and to provide guidance and act as a preliminary round of consultation with key external stakeholders. The table below identifies the organisations represented on each working group.

Figure 1: The review process

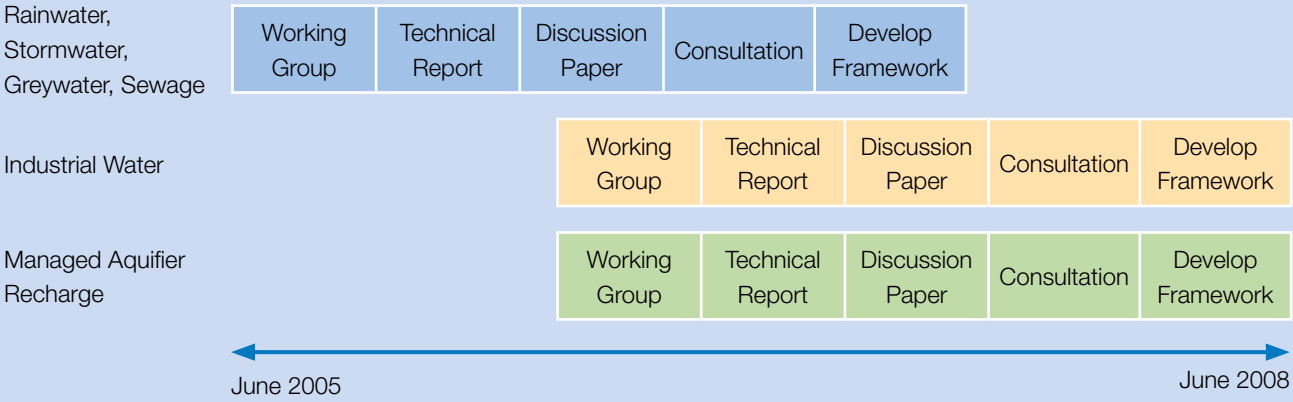


Table 1: Working Group participants

Rainwater, stormwater, greywater and sewage Working Group	Industrial water Working Group	Managed aquifer recharge Working Group
EPA Victoria	EPA Victoria	EPA Victoria
Department of Human Services	Department of Human Services	Department of Human Services
Department of Sustainability and Environment	Department of Sustainability and Environment	Department of Sustainability and Environment
Melbourne Water	Melbourne Water	Melbourne Water
South East Water	City West Water	Goulburn Murray Water
Stormwater Industry Association Victoria	Water Futures	Stormwater Industry Association Victoria
Barwon Region Water Authority	Qenos Pty Ltd	Southern Rural Water
CSIRO	Carlton United Brewery	City of Kingston
University of Newcastle	Ecos Environmental Pty Ltd	EPA (South Australia)
Alternative Technology Association		
Plumbing Industry Commission		
Urban Development Institute of Australian (UDIA)		

Detailed Risk Assessment

Each Working Group completed a Detailed Risk Assessment of its allocated water source(s).

The information was used to inform a Technical Report for each water source.

Technical Report

In developing each Technical Report, the current regulatory framework guiding the use of alternative water supplies was assessed against the outcomes of the Detailed Risk Assessment.

This enabled the Project Team to identify where changes to the existing regulatory framework are required to ensure use of alternative water supplies is safe and sustainable, and that users of alternative water supplies are able to access consistent information from a variety of sources.

In recommending new regulatory tools, the following approach was adopted.

Although it is technically possible to treat an alternative water supply for almost any end use, the health consequences of treatment failures (and likelihood of failure) present significant risks and constraints. In addition it is often not cost effective to consistently treat these source waters to an acceptable standard for the identified uses.

The technical reports formed the basis of discussion papers which were used to consult with stakeholders about the proposed framework.

Discussion Paper

It was important to discuss the recommended framework and any potential changes to the existing regulatory framework with current and potential users of alternative water supplies, as well as those organisations responsible for implementing the framework.

A Discussion Paper was prepared for each Technical Report to present the information in a way which was easy to understand and would elicit meaningful feedback.

Table 2: Regulatory approaches for each risk level

Scenario	Approach
Low potential risk to public and/or environmental health	• Education based guidance
Medium potential risk to public and/or environmental health which can be reliably reduced to a low risk scenario	• Explicit regulation supported by comprehensive guidance to help stakeholders understand the hazards and risk management activities. • Risk assessment to determine water quality standards • System approval for treatment technology and design • Site permit and registration • Installation approval • Management plan for operation and maintenance
Medium potential risk to public and/or environmental health which can not be reliably reduced to a low risk scenario	• Deterrence through regulation
High potential risk to public and/or environmental health	• Deterrence through regulation

Consultation

The consultation process was open to all Victorians. It was advertised in major metropolitan and regional papers and information was sent to many organisations for distribution to their employees or members.

To ensure participation, a range of stakeholders were specifically invited to participate including:

- Individuals or organisations who are current or potential users of alternative water supplies;
- Designers, installers and maintainers of alternative water source schemes and systems;
- Regulators and authorities responsible for overseeing the use of alternative water supplies; and
- Environmental peak bodies and environmental and community interest groups.

Each consultation period went for 4–6 weeks during which time individuals and organisations could provide feedback in three ways:

- Through a written submission;
- By attending feedback sessions which were held in metropolitan and regional areas, independently facilitated and included a panel representing EPA, DHS and DSE; and/or
- By phoning a dedicated feedback and information line.

The following table outlines further information about the consultation process for each water source, including the timing and number of feedback sessions held, participants, and written submissions.

A list of organisations which participated in each consultation period is contained in Appendix 1 and a feedback report was prepared for each period.

Framework development post consultation

The feedback from the consultation process was used to inform the changes and initiatives captured in this report.

Table 3: Consultation process information

	Rainwater, stormwater, greywater and sewage	Industrial water	Managed aquifer recharge
Number of feedback sessions	11	2	2
Timing of feedback sessions	March/April 2006	February 2007	February 2007
Number of individuals/ organisations invited to attend	97	270	270
Number of attendees	58	36	42
Number of written submissions received	31	9	16

4 Principles guiding the review

It was important that the review recognised Victoria already has well-established regulatory controls and guidance to manage wastewater. These include legislation and regulations, policies, codes, standards and guidelines.

The role of the review was to determine if the current arrangements are adequate in the context of greater uptake of alternative urban water supplies, or if the current arrangements need to be adjusted to enable uptake and ensure the health of Victorians and the environment is protected in the years ahead.

In particular, the Project Team sought to review current arrangements to ensure Victoria has a regulatory framework which:

- protects public and environmental health;
- supports greater uptake of safe and sustainable alternative urban water supplies;
- ensures regulatory tools (guidance and education through to explicit regulation) are commensurate with the level of risk;
- provides for clear roles and responsibilities;
- maintains and enhances community confidence in alternative urban water supplies;
- is integrated across water supplies and avoids overlap and duplication;
- enables Victorians to access consistent information about safe and sustainable alternative urban water supplies;
- is consistent with national initiatives and is informed by best practice nationally and internationally;
- is flexible enough to adapt to emerging technologies and community behaviour; and
- provides for periodic reviews to ensure it continues to meet the needs of Victorians.

5 Rainwater in more detail

About rainwater

Rainwater is considered the lowest risk alternative source of water. It provides a readily accessible and reasonably reliable water supply.

Rainwater tanks are becoming increasingly popular in urban areas. Government agencies and water authorities receive many enquiries from the community about supplementing drinking water with rainwater.

Summary of the existing framework

As rainwater does not pose significant environmental and health risks it is not regulated in Victoria, hence there are no specific regulatory approval requirements for its use.

However, under the *Building Act* 1993, the connection of rainwater tanks to a household water supply reticulation system, gutters and/or stormwater overflow, may only be done by plumbers who are licensed by the Plumbing Industry Commission. The potential health risk associated with cross connection between the rainwater supply and drinking water pipework is addressed through the provisions of AS/NZS 3500:2003 *National Plumbing and Drainage Code* and the *Plumbing Regulations* 1998.

Outcomes of the review

Uses

The following table summarises the recommended uses for rainwater as a result of the review.

Framework

The review of the framework supporting rainwater resulted in the outcomes below.

1. For single residential sites (e.g. homes), the *Rainwater Use In and Around the Home* guidance brochure for collection and use of rainwater has been published.
2. For commercial, industrial or multi-residential sites (e.g. apartment blocks), the *Rainwater Use In Urban Communities* guideline for collection and use of rainwater has been published.
3. Practice notes for plumbers which address key installation matters relating to rainwater have been developed by the Plumbing Industry Commission and were informed by this review.

No regulatory changes or additions to the legislation, regulation and policies were made for rainwater. However while use of rainwater is not regulated, businesses adopting rainwater systems have a duty of care to ensure rainwater is safe for its intended use.

Table 4: Recommended uses for rainwater

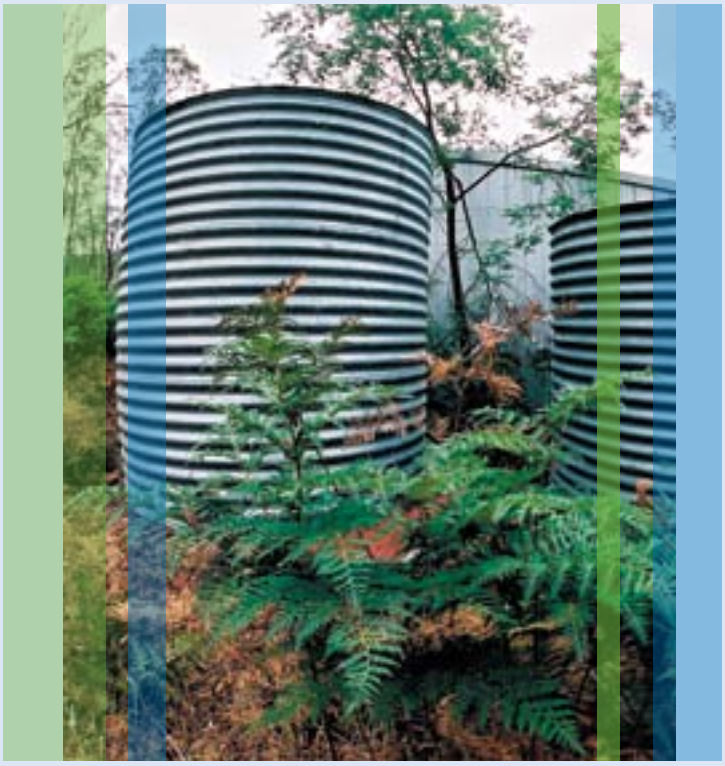
	Drinking	Food preparation	Personal washing	Swimming or spa pool	Food crop/vegetable irrigation	Laundry trough	Clothes washing machine	Outdoor use	Heating/cooling	Fire protection	Garden watering (surface)	Garden watering (sub-surface)	Toilet flushing	Non-food crop irrigation	Industrial process
House	*	*												N/A	N/A
Commercial, industrial or multi-residential (e.g. apartment block)	*	*													

Recommended Recommended with controls Not recommended N/A Not applicable

* Where reticulated drinking water is supplied, it is recommended it be used for drinking and food preparation.

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and facilitate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.



6 Stormwater in more detail

About stormwater

Following rainfall events, a significant volume of water flows down stormwater drains, and generally discharges to waterways. By capturing and using stormwater we can not only conserve our precious drinking water supplies, but importantly reduce the impact of this runoff on our waterways and minimise the need for extensive stormwater infrastructure.

Stormwater options can be particularly effective on a household property scale or where large storage areas exist. Unless large storage is available, the use of stormwater in established areas is likely to be limited to small-localised projects where it can be stored in wetlands and lakes in open space corridors for opportunistic reuse, for example irrigation of adjacent parkland and sports fields.

Summary of the existing framework

The use of stormwater is not currently regulated however it is supported by the *Urban Stormwater Best Practice Environmental Management Guidelines,* the *Australian Runoff Quality Manual,* and the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Stormwater Harvesting and Reuse.*

Outcomes of the review

The review of stormwater reuse found increased risk to public health and the environment when compared to rainwater reuse.

Uses

The following table summarises the recommended uses for stormwater as a result of the review.

Table 5: Recommended uses for stormwater

	Drinking	Food preparation	Personal washing	Swimming or spa pool	Food crop/vegetable irrigation	Laundry trough	Clothes washing machine	Outdoor use	Heating/cooling	Fire protection	Garden watering (surface)	Garden watering (sub-surface)	Toilet flushing	Non-food crop irrigation	Industrial process
House														N/A	N/A
Commercial, industrial or multi-residential (e.g. apartment block)															

Recommended Recommended with controls Not recommended N/A Not applicable

Framework

The review of the framework supporting stormwater resulted in the outcomes below.

4. For single residential sites (e.g. homes), the *Rainwater Use In and Around the Home* guidance brochure for the collection and use of rainwater (refer above) also applies to the collection and use of stormwater.
5. For commercial, industrial or multi-residential sites (e.g. apartment blocks), the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Stormwater Harvesting and Reuse* informed this review and have been adopted as appropriate guidance for Victorian stormwater schemes.
6. Policy for the management of health and environmental risk associated with the collection and use of stormwater will be explored at the time of review of the *State environment protection policy (Waters of Victoria).*

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and faciltate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

7 Greywater in more detail

About greywater

Many commercial and industrial sites do not generate sufficient quantities of greywater to justify its reuse. However, residential sites and apartment blocks do and there is significant anecdotal evidence to suggest widespread adoption of informal reuse of untreated greywater to water gardens. As greywater has a lower risk profile than sewage it is anticipated that a significant number of multi-residential site developers will adopt greywater treatment and recycling to meet sustainability requirements.

Summary of the existing framework

The use of treated greywater (included in the definition of sewage effluent) is actively regulated under the *Environment Protection Act* 1970 and the *Environment Protection (Scheduled Premises and Exemptions) Regulations* 2007. The regulatory framework depends on the design or actual flow rate of the system and whether there is a discharge or deposit to the environment. Premises on, or from, which sewage effluent (including greywater) is discharged or deposited to the environment, are regulated as follows:

- If the design or actual flow rate is greater than 5,000 litres per day, they are subject to the works approval and licensing provisions of this Act.
- If the design or actual flow rate is less than 5,000 litres per day, they are subject to the septic tank provisions (Part IXB) under this Act, which govern the approval of treatment and recycling systems. Local council provides permits for the installation of these systems.

The Act and Regulations do not address:

- greywater that is reused within buildings and is therefore not discharged to the environment; or
- untreated greywater diverted and retained within the property boundary.

Outcomes of the review

Uses

The following table summarises the recommended uses for greywater as a result of the review.

Table 6: Recommended uses for greywater

	Drinking	Food preparation	Personal washing	Swimming or spa pool	Food crop/vegetable irrigation	Laundry trough	Clothes washing machine	Outdoor use	Heating/cooling	Fire protection	Garden watering (surface)	Garden watering (sub-surface)	Toilet flushing	Non-food crop irrigation	Industrial process
House														N/A	N/A
Commercial, industrial or multi-residential (e.g. apartment block), <5,000 L/day															
Commercial, industrial or multi-residential (e.g. apartment block), >5,000 L/day															

Recommended Recommended with controls Not recommended N/A Not applicable

Framework

The review of the framework supporting greywater resulted in the outcomes below.

7. For single residential sites (e.g. homes), *Greywater Use Around the Home* guidance brochure for collection and use of untreated greywater has been published.
8. For single residential sites (e.g. homes), the *Guidelines for Environmental Management: Code of Practice – Onsite Wastewater Management* ("the Code") has been updated to enable greywater recycling for garden irrigation, toilet flushing and washing machine use.
9. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated greywater per day, the Code has been updated to enable greywater recycling for garden irrigation. EPA and DHS have agreed to review the existing system approval process to align it with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)* and to assess whether currently excluded uses (e.g. toilet flushing and washing machine use) could be included in the Code in the future. A critical part of this review will be to consider necessary governance arrangements for these types of schemes, similar to arrangements detailed for >5,000 litre/day schemes in EPA Publications 464.2 and 1015.
10. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated greywater per day, EPA and DHS have agreed to review the framework to manage health and environmental risk as part of the Onsite Domestic Wastewater and Regulatory Review Project.
11. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing more than 5,000 litres of treated greywater per day, EPA and DHS have agreed to review the existing guidance and framework to ensure public health is protected when recycling greywater for uses such as toilet flushing and washing machine use. Currently, closed-loop greywater recycling schemes, for example toilet flushing with no irrigation component, are not covered under EPA's regulatory framework and hence pose a potential health risk. EPA and DHS have agreed to address this risk through the current Recycled Water Guidance Review Project.

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and faciltate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

EPA and DHS have agreed to address the public health risk for greywater recycling schemes with no discharge to the environment, (for example, toilet flushing only schemes with no irrigation component) through the current Recycled Water Guidance Review Project. This project also aims to align guidance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1),* and streamline the approvals process and number of guidance documents.

8 Sewage in more detail

About sewage

With increasing legislative and community expectations for sustainable development, urban developers are showing increased interest in treating and recycling sewage for non-human contact uses, such as toilet flushing, ornamental features (box gardens and water features), fire protection and heating/cooling systems in commercial developments.

Summary of the existing framework

The use of treated sewage (recycled water) is actively regulated under the *Environment Protection Act* 1970 and the *Environment Protection (Scheduled Premises and Exemptions) Regulations* 2007. The regulatory framework depends on the design or actual flow rate of the system and whether there is a discharge or deposit to the environment. Premises on, or from, which sewage effluent is discharged or deposited to the environment, are regulated as follows:

- If the design or actual flow rate is greater than 5,000 litres per day, they are subject to the works approval and licensing provisions of this Act. An exemption applies for an effluent reuse scheme which meets discharge, deposit and operating specifications acceptable to the Authority.
- If the design or actual flow rate is less than 5,000 litres per day, they are subject to the septic tank provisions under this Act.

Outcomes of the review

Uses

The following table summarises the recommended uses for treated sewage in urban areas (with reticulated sewerage provided) as a result of the review.

Table 7: Recommended uses for treated sewage

	Drinking	Food preparation	Personal washing	Swimming or spa pool	Food crop/vegetable irrigation	Laundry trough	Clothes washing machine	Outdoor use	Heating/cooling	Fire protection	Garden watering (surface)	Garden watering (sub-surface)	Toilet flushing	Non-food crop irrigation	Industrial process
House														N/A	N/A
Commercial, industrial or multi-residential (e.g. apartment block), <5,000 L/day															
Commercial, industrial or multi-residential (e.g. apartment block), >5,000 L/day															

Recommended Recommended with controls Not recommended N/A Not applicable

Framework

The review of the framework supporting sewage resulted in the outcomes below.

12. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated sewage per day, the *Code of Practice Onsite Wastewater Management* has been reviewed to manage the health and environmental risk associated with its use.
13. For single residential sites (e.g. homes) and commercial, industrial or multi-residential sites (e.g. apartment blocks) producing less than 5,000 litres of treated sewage per day, EPA and DHS have agreed to review the framework to manage health and environmental risk as part of the Onsite Domestic Wastewater and Regulatory Review Project.
14. For commercial, industrial or multi-residential sites (e.g. apartment blocks) producing more than 5,000 litres of treated sewage per day, EPA and DHS have agreed to review the existing guidance and framework to ensure public health is protected when recycling sewage for uses such as toilet flushing and washing machine use. Currently, closed-loop sewage recycling schemes, for example toilet flushing with no irrigation component, are not covered under EPA's regulatory framework and hence pose a potential health risk. EPA and DHS have agreed to address this risk through the current Recycled Water Guidance Review project.

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and faciltate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

EPA and DHS have agreed to address the public health risk for sewage recycling schemes with no discharge to the environment, (for example, toilet flushing only schemes with no irrigation component) through the current Recycled Water Guidance Review Project. This project also aims to align guidance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1),* and streamline the approvals process and number of guidance documents.

9 Industrial water in more detail

About industrial water

Industrial and commercial sites use 23%[i] of water consumed in urban communities. The primary source of water for most Victorian industries is reticulated drinking water. Once the supply water is used in an industrial process or in association with an industrial process, it becomes industrial water.

Many industries are seeking to re-use industrial water for industrial uses (e.g. material and plant washing, process rinse water, industrial fire protection, boiler or cooling tower feed water etc) and also non-industrial uses (e.g. crop irrigation, landscape irrigation, construction, dust suppression, fire protection, toilet flushing, heating/cooling etc).

The quality and quantity of industrial water produced can vary dramatically depending upon a range of factors:

- The temperature of the water.
- The type of industrial process that generates the water.
- The number of times the water has been reused which can impact on contaminant concentration.
- The characteristics of products and surfaces the water contacts.
- Reactions that occur during industrial processes.
- The variety of potential hazards resulting from industrial processes such as additives (e.g. biocides, antiscalants and pH adjusters), pathogenic organisms, nutrients (e.g. nitrogen and phosphorus), biodegradable organics (composed principally of proteins, carbohydrates and fats), refractory organics (which tend to resist conventional methods of wastewater treatment), treatments (e.g. phenols and agricultural pesticides), dissolved inorganics (e.g. calcium and sodium salts), metals (e.g. arsenic, cadmium, chromium, lead, mercury and silver), suspended solids and organic and inorganic compounds with toxicity.

Summary of the existing framework

The discharge of industrial wastewater including industrial water (as defined within this document) is actively regulated under the *Environment Protection Act 1970.* Premises that discharge or deposit industrial water to the environment, with a designed or actual flow rate of greater than 5,000 litres per day, are subject to the works approval and licensing provisions of the Act. An exemption applies for reuse schemes which meet discharge deposit and operating specifications acceptable to EPA Victoria.

The Act does not address industrial water reuse onsite.

Outcomes of the review

Uses

Given the extremely variable nature of industrial water, the risk associated with each potential use needs to be assessed on a case by case basis. As noted in the section below, guidance has been developed to assist proponents of industrial water reuse schemes to assess water quality and appropriate uses.

Framework

The review of the framework supporting industrial water resulted in the outcomes below.

15. EPA has developed the *Industrial Water Reuse Guidelines* as part of the *Industrial Waste Resource Guidelines.*
16. The *Environment Protection (Scheduled Premises and Exemptions) Regulations 2007* were informed by this review and provide for managing the health and environmental risk associated with the reuse of industrial water.
17. EPA has incorporated a definition of industrial water and provision for its reuse in the *Environment Protection (Industrial Waste Resource) Regulations 2009.*

i Water Services Association of Australia, Position Paper No. 1, October 2005. Urban water in our growing cities: the risks, challenges, innovation and planning. Reported that urban water consumption in Australia was 62% domestic, 23% industrial and commercial, 8% system loss, 5% local government and fire fighting, and 2% error.

In addition, the definitions of “industrial waste”, “trade waste”, “prescribed industrial waste” and “industrial water” have been clarified where necessary.

Some industrial water reuse schemes will require EPA approval to gain exemption from works approval and licensing under the *Environment Protection (Scheduled Premises and Exemptions) Regulations 2007.* The regulatory and environmental and public health risk management requirements are set out in the guidelines.

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and faciltate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

10 Managed aquifer recharge in more detail

About managed aquifer recharge

Water can be extracted from an aquifer and used in many ways depending on the availability and quality of the water. Aquifers can have high quality water due to naturally occurring filtration caused by the rock materials in the aquifer structure.

In urban areas where there is insufficient surface water storage options, aquifers provide a way to store excess water when it is available until such time that it is needed, for example the capture of stormwater from urban drains for irrigating parks and gardens during drier seasons.

The process of intentionally injecting or infiltrating water into an aquifer, and then extracting the water for use at a later date is known as Managed Aquifer Recharge (MAR).

During storage water quality may improve as a result of attenuation.

There are many types of MAR schemes as detailed in the table below.

It is possible to recharge an aquifer with rainwater, stormwater, greywater, sewage or industrial water however there are many potential risks which need to be assessed and will vary considerably between potential MAR schemes.

Summary of the existing framework

As MAR schemes are a relatively new concept, there are currently no specific regulatory frameworks to manage the public health or environmental risks associated with such schemes. However, any disposal to an aquifer needs to comply with Clause 20 of the *State Environment Protection Policy (Groundwaters of Victoria)* and where groundwater is extracted from an aquifer for use, then the licensing provisions of the *Water Act* 1989 apply, as well as the requirements of the *State Environment Protection Policy (Waters of Victoria),* which provides water quality objectives for surface waters.

Outcomes of the review

Uses

Given the extremely variable nature of potential MAR schemes, the risk associated with potential end uses needs to be assessed on a case by case basis. However, potential applications of MAR schemes include:

- sustaining community facilities such as sporting grounds, parks, gardens etc through harvesting of stormwater for storage in aquifers; and
- restoring groundwater levels in areas where these levels have lowered. This activity can potentially result in restoration of the environmental values of surface water systems.

Aquifer Storage and Recovery (ASR):	The injection of water into a well for storage and recovery from the same well.
Aquifer Storage Transfer and Recovery (ASTR):	The injection of water into a well for storage and recovery from a different well. The aquifer can provide additional treatment of injected water in suitable circumstances where sustainability can be ensured.
Infiltration Ponds:	Ponds constructed usually off-stream where surface water is diverted and allowed to infiltrate (generally through an unsaturated zone) to the underlying unconfined aquifer.
Rainwater Harvesting:	Roof runoff diverted into a well or a trench filled with sand or gravel and allowed to percolate to the water-table where it is collected by pumping from a well.
Percolation Tanks:	Harvesting of water in storages built in temporary basins where water is detained and infiltrates through the base to enhance storage in unconfined aquifers and is extracted down-valley for town water supply or irrigation.

As noted in the section below, guidance has been developed to assist proponents of MAR schemes to assess water quality.

Framework

The review of the framework supporting managed aquifer recharge resulted in the outcomes below.

18. The *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Managed Aquifer Recharge* informed this review. The Victorian *Guidelines for Managed Aquifer Recharge (MAR) – Health and Environmental Risk Management* have been published, which adopt the national approach and set out the roles, responsibilities and regulatory framework for Victorian schemes.
19. DSE has agreed to consider issues specific to MAR, such as the regulatory process for proposed MAR schemes, referral of applications to the public health and environmental regulators, water volume entitlements and allocation limits when amendment of the relevant water legislation is proposed.

Next steps and recommendations

An alternative urban water supply awareness and education program will be undertaken to increase community and industry understanding, confidence and faciltate increased uptake of alternative water supplies in a safe and sustainable way. This program will involve general and targeted information sessions and the use of the *Our Water Our Future* website to help describe the risk-based hierarchy approach, relevant guidance documents and regulatory framework for using alternative urban water supplies. This program will help reduce the amount of queries and current workload for EPA, DHS and DSE staff. The risk-based hierarchy approach promotes water conservation, followed by choosing the most appropriate alternative water supply with the lowest risk, and lowest use of energy and resources for each situation.

11 Impact

It is expected that the developments outlined in this report will:

- facilitate more widespread use of safe and sustainable alternative urban water supplies at both residential and business premises;
- ensure public health and the environment are protected and community confidence maintained;
- provide Victorians with access to comprehensive information and education about safe and sustainable alternative urban water supplies;
- provide a system which is easy for Victorians to navigate and participate in; and
- facilitate the potential for greater recycling of safe and sustainable alternative water supplies in urban environments.