Government of **Western Australia**
Department of **Water and Environmental Regulation**

Policy

Water conservation/efficiency plan

Achieving water use efficiency gains through water licensing

Formerly operational policy 1.02

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The Department of Water and Environmental Regulation (the department) has implemented a policy framework across all of its regulatory documents. The framework provides a clear and structured document hierarchy, which details how the department and its stakeholders should apply the different types of documents within the hierarchy.

As part of the implementation of this framework, this document has been updated with a new format to show how the document is classified within the framework.

The content of the document has not been changed and remains the department's position.

For more information on the policy framework refer to the department's website here: *www.dwer.wa.gov.au.*

This document was previously published in October 2019.

Summary

Water resources are a critical asset to the people of Western Australia (WA), supporting the environment; our towns and cities; our economy; and social amenities. As our population grows and our economy expands, the demand for accessing our water resources will increase.

To ensure opportunities of future generations are not limited, we must all use our valuable water more efficiently. This is best achieved by combining several approaches such as raising community awareness, regulation, market mechanisms to achieve greater recognition of the true value of water, and financial incentives/assistance to facilitate change.

In February 2003, the Government of Western Australia (State Government) released the State water strategy, providing guidance and direction towards a sustainable water future. The strategy emphasised the need to achieve permanent and cost-effective water use efficiency gains across all water use sectors.

The State water strategy introduced the concept of water users developing and implementing water conservation plans as part of the water licensing process undertaken by the Department of Water and Environmental Regulation (the department) and integrating water use efficiency measures into water users' daily operations. In this policy, the plans will be referred to as water conservation/efficiency plans (WCEPs).

WCEPs enable licensees to obtain a thorough knowledge of their water use and provide details of a water efficiency implementation program to achieve improved water use efficiency. The framework in Appendix A provides a step-by-step guide for developing these plans.

The level of detail to be included in WCEPs increases depending on the volume of the water entitlement and the level of competition for accessing the water resource.

Initially, these plans will be required for licensees who hold large water entitlements and specifically for those that need an operating strategy, and will normally be part of the operating strategy. The department will also review the water use efficiency of other licensees, particularly in areas where all of the available water resources have been allocated.

Water savings demonstrated to have been achieved as a result of water use efficiency initiatives have the potential to be used by licensees to expand production or to sell the entitlement to another enterprise.

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1. Policy statement

1.1 Policy position

The department will seek to ensure that water licensees use their water entitlement in an efficient manner. To that effect, the department will require certain licensees to develop and implement water WCEPs as part of the licensing process.

Where there is a requirement to draft and implement an operating strategy as part of granting a licence, the department will require the inclusion of a WCEP as part of that strategy.

The department may also request licence applicants who are not required to draft and implement an operating strategy, and who are located in areas of high water demand, to demonstrate the adoption of water use efficiency measures or practices by developing a WCEP, before a licence is granted or renewed.

WCEPs are intended to pursue the most efficient use of an available water entitlement and document a water efficiency implementation program ensuring that the licensee has appropriate knowledge, systems and infrastructure in place to minimise their water use.

The WCEP is prepared by licence applicants and licensees seeking to renew their licence. The requirement to prepare a WCEP will increase the licensee's participation in water resources management raise awareness and develop the licensee's knowledge of local and industry issues and water efficiency measures for implementation. The WCEP deals with the specific circumstances of a licensee's operation, is prepared at the licensee's expense and may be prepared with professional input.

A WCEP will generally be required where the licence has an operating strategy. The WCEP would normally be incorporated as part of the operating strategy, rather than requiring a separate document. A condition will be included in the licence requiring the licensee to comply with the water use efficiency commitments made in the operating strategy or WCEP. Where systems and infrastructure need upgrading, the operating strategy will contain commitments to upgrade these to an agreed schedule.

1.2 Policy principles

Water use efficiency planning can produce permanent and significant water savings leading to future development opportunities. The department's guiding principles are:

1. The objective of water use efficiency is to achieve the best return from the available water entitlement (that is, to maximise productivity). The best return may entail using less water to achieve the original purpose, or increasing productivity using the same volume of water.
2. System design and management should consider the water conservation hierarchy:

- avoid – use options not requiring water where possible
- reduce – use suitable equipment, technology and systems to reduce the amount of water used
- recycle – recycle water to minimise the need to use more water
- fit-for-purpose – use lower quality water that is fit-for-purpose where possible.

3. A diversified approach to water use efficiency planning is more likely to optimise results by considering all options likely to influence efficiency, including system and behavioural changes (refer to Table 1).
4. Water use efficiency planning should be considered at all project stages: planning, design, construction, operation and maintenance. New and upgraded water use systems should incorporate industry best practice (that is practically and economically feasible). Existing systems should move towards best practice, while acknowledging the constraints of existing infrastructure.
5. Water use efficiency planning should follow the management cycle: plan, implement, monitor and review. This approach will include adaptive management to continually improve water use efficiency performance towards best practice. Water use efficiency planning must recognise that technology and standards will change over time (refer to Figure 1).
6. Measuring and recording water use allows the effectiveness of water efficiency initiatives to be quantified. Water use information is a valuable management tool for most enterprises.
7. Water use efficiency planning should be integrated into the water licensing process where practical to minimise additional requirements on licensees. These requirements should be focused initially on high volume water users and in areas where competition for accessing the water resources is significant.
8. Costs and benefits should both be considered when assessing water use efficiency options (refer to Figure 2). The cost of water use efficiency will increase as the level of efficiency achieved increases (top chart). There will be cost savings (or increased production) from improved water use efficiency; however, these savings will plateau as the level of water use efficiency increases (middle chart). The difference between the cost and benefits of improved water use efficiency is the profit from water use efficiency investments (bottom chart), which will have a maximum level. This is the optimal level of water use efficiency investment.

Table 1: A diversified approach to water use efficiency

System ← → Behavioural

Infrastructure	Recycling	Retrofit	Improved control	Management	Education
System optimisation and design Suitable operating procedures	Use of water from dewatering operations as process water or for dust suppression Use of water that is 'fit for purpose'	Water saving appliances and infrastructure New technology during upgrades/ replacement	Soil moisture sensors Metering of water use points/subsystems Proper design	Irrigation in the cool time of the day where appropriate Reduction of water use when the weather allows	Licensee and employee awareness and education programs Signage

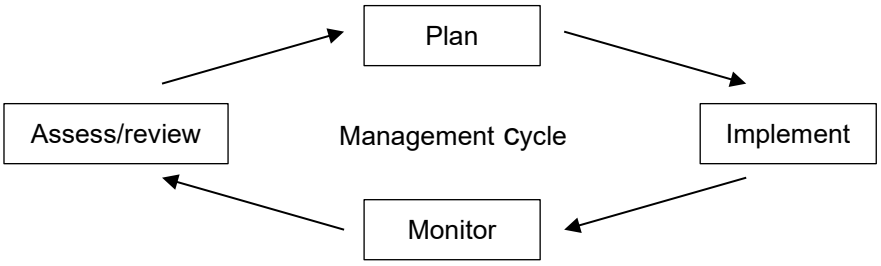

Figure 1: Planning management cycle

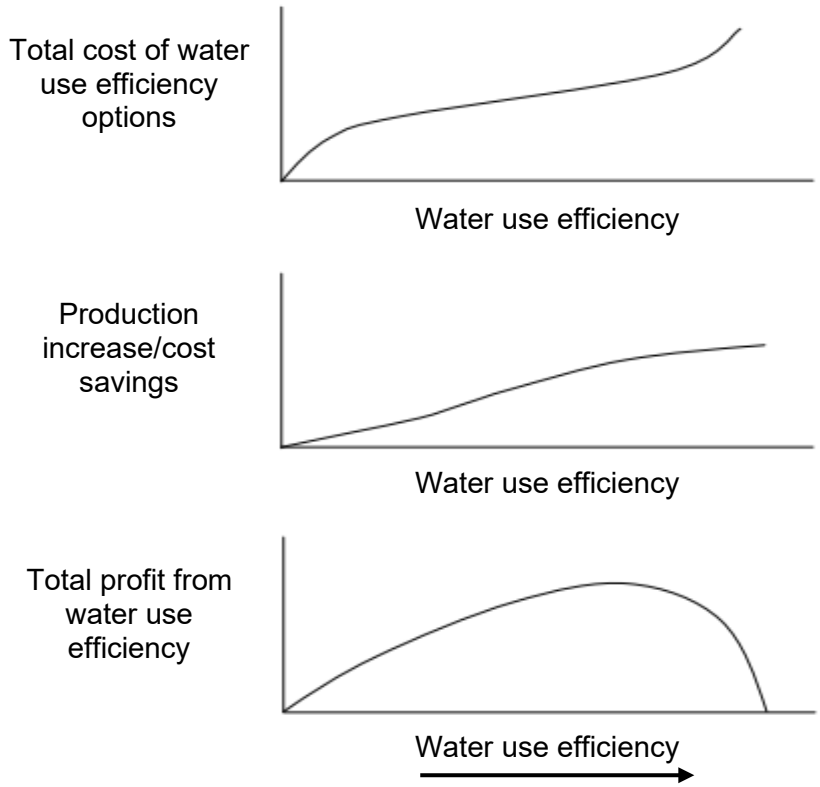

Figure 2: Costs and benefits of water use efficiency

1.3 Policy outcomes

By ensuring that certain licensees produce and implement water conservation/ efficiency plans, the department will encourage more efficient use of water.

Conservation measures may reduce the amount of water being used by licensees and free-up water to be used for other purposes, such as trading, leasing or return to the consumptive pool.

As our climate dries and demand for water increases, more efficient and effective use of water can help maximise the social and economic benefits of water use, while reducing pressure on the environment.

2. Background

2.1 Issues

The availability of water is essential for the economic and social development of the state. The location of adequate supplies of water for domestic and commercial use has shaped the geographic distribution of the population, its quality of life and culture. Water of adequate quantity and quality is also central to the integrity of the environment and the maintenance of ecosystems.

As the state's population grows and industries such as mining, agriculture and horticulture expand, the competition for accessing our water resources will increase. Demand for our water resources doubled over the past 20 years and is expected to double again by 2020 (Water and Rivers Commission 2000a). To maximise the benefits our state derives from the use of water, all water users must implement water efficiency measures.

The state water strategy identified the need to focus on water use efficiency. The Government of Western Australia released the strategy in 2003 to provide guidance and direction towards a sustainable water future. The government recognised that a combination of water source development and water demand management was paramount to achieving a secure water future for Western Australia. The State water strategy reflects community expectations that our water resources should not be wasted.

The strategy recommended incorporating water conservation plans into the water licensing process, linking water use efficiency with water resource access rights. The term WCEPs will be used in this document, as this better reflects the intent of the plans and provides consistency with the National Water Initiative (NWI) requirements for policy setting which facilitate water use efficiency. Western Australia became a signatory to the NWI in 2006.

WCEPs enable licensees to obtain a thorough knowledge of their water use and then provide details of a water efficiency implementation program to achieve improved water use efficiency.

Water licences are currently issued under the *Rights in Water and Irrigation Act 1914* (RIWI Act), granting the right to access the state's water resources. Water licences contain terms and conditions detailing the licensee's responsibilities for using and managing the water resources allocated to them. However, individual licence conditions cannot adequately address water use efficiency issues in many situations. Therefore, WCEPs are beneficial to detail water efficiency measures and commitments.

Improvements in water use efficiency usually bring costs as well as benefits. For example, in the Swan groundwater area, the department encouraged the use of trickle systems with drippers for horticulture. Although the initial outlay for these systems was expensive, longer term benefits (such as less weeds and herbicide use,

ability to use smaller pumps, and feeding only the crop's root zone) led to acceptance of the changes.

Many individuals in a variety of water use sectors have voluntarily adopted water use efficiency strategies successfully decreasing the volume of water they require. The introduction of more advanced practices and technologies will further assist them in reducing their water requirements.

A holistic approach can be used to further improve water use efficiency. An integrated strategy involving education (to raise awareness and promote new behaviours); regulation (water licensing and minimum water use efficiency standards); economic tools (subsidies/incentives and a water market to show the economic value of water); and applied research is needed to achieve optimal results. The state water strategy irrigation review (Irrigation Review Steering Committee 2005) recommended that the economic value of water become more apparent.

The state water plan recommended that industry sectors improve water use efficiency by 20 per cent. The introduction of WCEPs will help optimise the use of our water resources. Benefits include allowing new development opportunities to proceed, improving productivity and minimising the overall cost of accessing water.

2.2 Intent

The intent of this policy is to:

- use the water allocation licensing process to achieve improved water use efficiency across the state by:
    - integrating water use efficiency planning into the water allocation licensing process – increasing licensees' awareness of their responsibilities relating to water use efficiency, including the preparation of WCEPs
    - empowering licensees to use their knowledge of the local area and their industry to address site specific and operational issues to increase water use efficiency.
- enhance knowledge of water efficiency planning and techniques through a learning-by-doing approach
- convey a clear message that the government and the department see water use efficiency as an increasingly important area
- initially focus these requirements on high volume water users and in areas where competition for accessing the water resources is significant.

The requirement for developing WCEPs and implementing the agreed actions may be extended to a broader range of water licensees in the future.

2.3 Policy links

This document was previously known as Statewide policy no. 16.

This policy relates closely to *Policy: Use of operating strategies in the water licensing process* (the department, 2020). The scope of the 'Water use efficiency' section in

the operating strategy policy is expanded on in scope and detail in this *Policy: Water conservation /efficiency plans*.

2.4 Legislation

Water resources in Western Australia are primarily managed under the RIWI Act. The Act vests in the Crown the right to the use, flow, and control of any water in a watercourse, wetland or underground water source. Currently, the department is responsible for administering the RIWI Act.

One of the Act's objectives is to: "Promote the orderly, equitable and efficient use of water resources," – section 4(1)(b).

The RIWI Act requires people to hold a licence to take water from any artesian well throughout the state, from non-artesian wells located within proclaimed groundwater areas, and from watercourses or wetlands within proclaimed surface water areas or irrigation districts. Licences are not required for riparian use of surface water or where an exemption applies (for example, bores used for watering domestic lawns and gardens, or for stock watering purposes).

Each licence contains terms, conditions or restrictions relating to the taking, using, managing, protecting and enhancing of any water resource and its ecosystem or the local environment. These terms and conditions may refer to other documents, such as operating strategies or WCEPs, and must be complied with if access and use of the water is to be maintained. As with commitments in an operating strategy, water use efficiency commitments are licence conditions and need to be complied with.

3. Implementation

3.1 Application

This policy applies statewide to all applicants and licensees who have applied for or hold a licence to take and use groundwater or surface water under section 5C of the RIWI Act. Initially, the policy will affect those licensees with operating strategies and those in fully-allocated water resource management areas (subareas).

Where a groundwater or surface water management plan exists, the principles and strategies in that plan take precedence over this policy, to the extent of any inconsistency between this policy and the management plan.

3.2 What plan will be required

The department will require the preparation of a WCEP for licences that are subject to an operating strategy. The WCEP would normally be part of an operating strategy. There may be some occasions where the department will request the preparation of a WCEP for licences that do not require the development of an operating strategy if the department considers:

- that the licensee is needlessly wasting water
- there is an urgent need to improve water use efficiency
- that a water entitlement transfer is likely to result in significant water wastage
- that all of the available water in a water resource management unit (see glossary for definition) has been allocated or the water resource is under stress.

A WCEP would normally be required when applicants meeting the above criteria seek a licence to take and use water or seek to renew or significantly amend an existing licence.

Water uses that are exempt from licensing (such as domestic or stock uses) will not require a WCEP.

Where a groundwater or surface water management plan exists, the principles and strategies in that plan take precedence over this policy, to the extent of any inconsistency between this policy and the management plan.

It is noted that special cases may arise, where decreasing the volume of water taken may not be appropriate due to safety considerations. Examples include dewatering for construction or mining purposes or discharge of tailings. In these cases, water efficiency measures may take other forms, which may involve using fit-for-purpose water, such as using recycled water to discharge with tailings where it is available or recycling water from dewatering activities for other beneficial uses.

3.3 Level of plan required

The volume of the water entitlement and the level of competition for accessing the water resource generally determine the level of detail required in a WCEP.

As competition for water increases, a higher level of efficiency is necessary to maximise the productive use of water. The level of allocation within the relevant water resource management area (subarea) will be used as an indicator of the level of competition, unless the department accepts that other criteria override this indicator (for example, fractured rock aquifers in remote areas). The level of allocation in a water management subarea is the volume of water licensed compared to the subarea's allocation limit.

The potential for water savings through efficiency initiatives increases as the volume of water that licensees use increases. There are opportunities for water use efficiency options to be economically justifiable due to the economies of scale that may not be available for a smaller operation.

Table 2 shows the criteria that will be used to guide the level of WCEP required. These levels of detail relate to the requirements in Appendix B. All levels will require the preparation of a written plan. For advanced plans, a greater awareness of water use efficiency is required, and a wider range of efficiency measures needs to be considered, in comparison to the basic or intermediate levels.

Table 2 : Criteria guiding the level of water conservation/efficiency plan required

Criteria	**Level of allocation in management area**			
	<30%	**30-<70%**	**70-<100%**	**≥100%**
Allocations < 500 000 kL/yr in areas fully-allocated or under stress	—	—	—	Basic
Allocations < 500 000 kL/yr requiring an operating strategy	Basic	Basic	Basic	Intermediate
All allocations ≥ 500 000 kL/yr	Intermediate	Intermediate	Advanced	Advanced

The department may request a higher or lower level of WCEP depending on the local issues and water demand. Additional issues considered when determining the level of WCEP required include:

- ensuring that licensees are treated equitably
- anticipating expected changes in the level of competition for the resource
- determining an operation's current level of efficiency

- determining the level of water use efficiency desired to ensure maximum benefit from the water resource
- taking into account a water resource advisory or management committee's recommendation that is suitably justified.

Where practical, multiple licences will be considered holistically to take advantage of economies of scale. For example, a holistic view of a local government's parks and gardens may provide a better outcome than considering each park in isolation. The commitments of various licences operated by the same licensee are usually combined through operating strategies.

3.4 Preparation of plans

The department has prepared a water conservation/efficiency plan framework (Appendix A) that provides a step-by-step process for developing WCEPs to assist the applicant or licensee draft an acceptable WCEP. The preparation of the WCEP (including any associated costs) remains the applicant's responsibility.

Guidelines in Appendix B (which reflect current industry best practice) outline the water use efficiency measures the department expects to be addressed, and will form a common base to assist licensees develop a WCEP that is suitable for their circumstances. Where a licensee believes that particular water use efficiency measures are not appropriate for their circumstances, the department would expect a justification for this position.

Industry best practice guidelines or codes of practice may also assist licensees prepare a WCEP.

For new operations, the anticipated standard is the best practice that is economically justifiable.

Existing operations are expected to move towards the same standard, while being mindful of existing infrastructure investments. Improvements would be expected as opportunities present themselves (for example, when infrastructure/systems are replaced, upgraded or refurbished). Consequently, an extended timeline for implementation may be appropriate. The licensee should identify the goals, and the proposed timeline for improvements in negotiation with the department.

The WCEP should outline the measures to be undertaken by the licensee to improve water use efficiency. These commitments should be worded to ensure that they are achievable, unambiguous, quantifiable, enforceable and can be easily assessed for compliance during licence renewals and compliance audits. An implementation timetable is a convenient way of presenting this information. The commitments should be consistent with any terms and conditions that are part of the licence.

Where licensees have already implemented water use efficiency measures, these should be described in the WCEP.

Any reporting requirements (implementation of commitments and the results of monitoring programs) should be integrated into the standard licence reporting cycle to reduce effort and costs.

As the WCEP is part of the licence conditions, the licensee's consent is generally required before it can be released to the general public. However, as the information may become available to the public through Freedom of Information applications, licensees should avoid including commercially sensitive information where possible.

The department will endeavour to form partnerships with other organisations to promote water use efficiency planning where there are mutual benefits in doing so. For example, the Waterwise on the Farm course results in preparation of an irrigation and drainage management plan that could meet the department's WCEP requirements. The department will liaise with these organisations to ensure that they are aware of the department's requirements.

3.5 Assessing and approving water use efficiency information

The department will assess WCEPs to ensure relevant water use efficiency issues have been identified and addressed satisfactorily. The department may request additional information and clarification during this process.

The department has the statutory function to approve licence applications and assess compliance with licence conditions. However, as part of the licence assessment process, the department may seek and obtain advice from any relevant water resource management or advisory committees or other government departments.

When the department is satisfied that the proposed water use efficiency information adequately addresses all relevant issues, the licence application may be approved and a licence granted. A licence condition will be included on the water licence requiring the licensee to comply with the approved water use efficiency commitments (generally the condition will refer to an operating strategy, as the WCEP will normally be part of an operating strategy).

An example of the licence condition which may be included on licences subject to a WCEP is:

> The licensee shall comply with the commitments of the <variable> (operating strategy, water conservation/efficiency plan, nutrient and irrigation management plan, irrigation and drainage plan) as prepared by the licensee and approved by the department on <date of approval> including any modifications to the plan as approved during the term of the licence.

3.6 Amending plans

WCEPs may need to be amended to account for changes to water use efficiency practices and issues associated with water resource management. Examples include cases when:

- the licensed water entitlement or licence conditions have been amended

- new information on the status of the water resource indicates that changes are needed (for example, when re-evaluation of an aquifer's allocation limit indicates that the aquifer is highly allocated)
- the project, or rate of water abstraction has changed significantly to that which was originally planned (for example, significantly more water of a certain quality is needed in an industrial process, requiring relocation of some bores to access better quality water)
- water entitlement transactions occur (trade, agreement, transfer) to another licensee
- industry identifies new methods for achieving greater water efficiencies
- a water resource allocation plan or a water resource management or advisory committee (with appropriate authorisation) has recommended the water use efficiency commitments be amended.

Although clause 24 of Schedule 1 of the RIWI Act provides for the department to amend a licence (including its terms and conditions, such as an operating strategy) during its term, the RIWI Act also provides the licensee with an opportunity to apply to the State Administrative Tribunal for a review of the decision.

The department will consult with the licensee on any amendments it proposes to make to the licence before any amendments are undertaken.

The licensee can also request an amendment to the WCEP at any time. The circumstances for amending or updating a WCEP can be provided within the WCEP. The department will need to be informed, in writing, of proposed amendments and the justification for them. If the department considers the proposed amendments are acceptable, the licence conditions will be changed to acknowledge the amendments.

3.7 Licence compliance

Licensees are required to manage the taking and use of water in accordance with the licence terms and conditions. This requirement includes any WCEP (prepared as a stand-alone document or as part of another document such as an operating strategy) referred to in the licence conditions. Failure to comply with the commitments of an approved operating strategy (or similar document) is a breach of the licence conditions and may result in the department taking enforcement action.

If the licensee commits an offence against the RIWI Act or contravenes a condition of the licence, the department may:

- issue a written warning
- issue a direction under clause 18 of Schedule 1 of the RIWI Act
- refuse to renew or transfer a licence
- cancel the licence; or if the water was leased, cancel the agreement and return the allocation to the original licence holder
- initiate legal action against the licensee that may include prosecution for unauthorised taking of water.

A licensee's inability to comply with a WCEP should be reported to the department immediately. In such cases, the licensee should describe the circumstances under which the plan could not be implemented. If the situation is likely to continue, the licensee should undertake changes to their business operations or request the WCEP be amended. The department will determine whether the requested amendments are acceptable.

Reports submitted to the department in response to a WCEP should include all relevant monitoring data, an assessment of that data against the licence terms and conditions, and an assessment of progress against the WCEP commitments.

Should monitoring reveal any non-compliant results, the report must include an explanation of the cause (where known) and a description of the action that the licensee proposes to take to achieve compliance. This action could include proposing changes to the WCEP. Where appropriate, the department may also request that the licensee describes the effectiveness and accuracy of the monitoring program in the report, and recommends changes for the department's consideration.

3.8 Transfers of licences and agreements to take water

The RIWI Act allows water licences or entitlements to be transferred to other persons. The department will consider the total final volume of a licensee's entitlement when determining what level of WCEP is appropriate, using Table 2 in Section 3.2 as a guide. If the required level of WCEP changes, a new or revised WCEP should be approved by the department before the transfer proceeds.

Where an agreement with a licensee to take water (also known as a lease) is made for a short-term, revising the WCEP may not be required, depending on the individual case. 'Short-term' would generally refer to a 12-month period (or a single growing season). Existing licence conditions (including those related to water use efficiency) would continue to apply where appropriate.

Where an agreement to take water is for a period longer than 12 months, the department may require the lessee to review the existing WCEP to ensure the water is used efficiently.

4. Review

This policy will be reviewed five years from the publication of this document. The policy may be reviewed sooner if significant changes (such as the introduction of new water management legislation or new water management initiatives) warrant a review of this policy.

Appendices

Appendix A — Water conservation/efficiency plan framework

The water efficiency plan framework provides a tool that water licensees and water managers can use to determine the value of water efficiency in managing the water supply and water demand aspects of their operations.

Investing time and money into the preparation of a water conservation/efficiency plan (WCEP) can have financial benefits by saving money on operational costs. Preparation of the plans also has environmental and social benefits because looking after our water resources provides a secure water supply for the benefit of the community and the environment.

The following simple steps provide the basis for the preparation of a WCEP. This approach enables all licensees, ranging from small to large water users, to prepare a plan with ease:

Step 1 – identify your water use

Step 2 – identify opportunities for improving water efficiency

Step 3 – identify and select water efficiency measures

Step 4 – prepare your water efficiency plan

Step 5 – put your water efficiency plan into action.

This structure is provided as a guide on what needs to be considered when preparing a WCEP.

When the WCEP has been completed, it should be submitted to the department for approval. The department may negotiate with the licensee regarding the information and timelines proposed within the WCEP.

There is scope for industry groups to develop their own water efficiency or water conservation plan structure, subject to approval by the department. For example, local government through the Western Australian Local Government Association (WALGA) and participating councils have initiated the development of a model water conservation plan for the turf and landscape sector, focusing primarily on local government needs.

Note: The framework in this appendix should be used in conjunction with the water efficiency measures in Appendix B.

Step 1 – identify your water use

Taking an inventory of the existing water resources, the water supply and water demand system and the conditions affecting its use is an important part of the water conservation/efficiency plan process. This step can be achieved by undertaking a water audit to identify where and how water is used.

Methods of measuring water use include:

- read and record water meter readings regularly
- record pump operating hours and relate to volume of water abstracted (consult pump manufacturer)
- estimate flow rates and operating time by measuring how long it takes to fill a container of known volume.

In addition, you should consider and note:

- the water supply and demand system used
- the method and time of operation of the water supply and demand system
- the condition and servicing of the water supply and demand system
- potential for leaks/losses in the system or inefficient water use by the operator
- water availability issues or water restrictions in the area
- climatic factors affecting operation of the system
- any other factors affecting water use efficiency.

A description of water abstraction and use methods, operating rules and relevant administrative information should be provided within your water conservation/efficiency plan.

Step 2 – identify opportunities for improving water efficiency

Identify water management opportunities and goals based on anticipated benefits from improved operational efficiency of the water supply and water demand system. Reducing water demand by adopting water efficient practices can provide benefits and reduce energy and water supply costs. In turn, minimising the volume of water taken from the water resource has environmental and social benefits. This step can be achieved by understanding the nature and cost of water use.

Things to do to better understand your water use:

- identify trends, patterns or limitations – including any seasonal variations, unexplained increases, water losses or unaccounted water
- relate use to a unit rate (for example, 6,000 kL/hectare per annum, 30 kL/animal per annum, 100 000 kL/ore production per annum)
- consider energy costs to pump and/or distribute water
- consider maintenance costs (for pumps, pipes, valves, controllers and so on)
- consider water treatment costs to make water suitable for use (where relevant)
- consider whether any activities could be undertaken using less water.

Now that you have a better understanding of your water use (obtained from steps 1 and 2), provide a brief description of your water management goals in your water conservation/efficiency plan. Your water management goals should highlight opportunities for increasing water efficiency.

Step 3 – identify and select water efficiency measures

Determine any improvements to the water supply and water demand system and identify and select water efficiency measures to improve water efficiency within a reasonable planning timeframe (up to 10 years).

This can be achieved by reviewing the list of water efficiency measures indicated in Appendix B and identifying the measures that have already been implemented and those that are planned, including a timeframe for implementation. With changing technology leading to greater innovation in water use efficiency, licensees may also recommend their own water efficiency measures (if these are not already included in Appendix B).

Note that cost-effectiveness is only one criterion affecting the selection of a water efficiency measure. Other factors such as environmental and social benefits should be considered and weighted accordingly in the selection process.

Step 4 – prepare your water conservation/efficiency plan

Your water conservation/efficiency plan should now be prepared. As a guide, it should address all the requirements referred to in Steps 1–5.

Each of your water efficiency measures (identified in Step 3) should be described in more detail, clarifying what is proposed and how it will be implemented within the planned time frame. Justification of any estimated water savings should be provided.

As the plan is a document subject to review, it needs to be updated periodically to confirm successful implementation of a water efficiency measure or to describe why one was not met.

A recommended structure for presenting the implementation information is provided. The information should also be summarised in an implementation timetable.

Table A1 below is a sample implementation timetable (for inclusion in all WCEPs), indicating the proposed implementation date for each water efficiency measure and an estimate of the water savings achieved from each measure. The ‘actions field’ can be used to list actions for achieving outcomes.

Recommended structure

Implementation of water use efficiency measures

System design

- Describe the system, outlining any improvements and actions required.

Irrigation control

- Describe the method for controlling irrigation scheduling and any improvements and actions required.

Water accounting loss and control

- Describe the method used to account for water and control any losses, outlining any improvements and actions required.

Industry specific requirements

- Address any industry specific requirements (such as land and crop management for horticultural industries; dust suppression for mining industries; landscape efficiency and soil type for turf and landscaping industries; retrofitting for water service providers).

Training

- Describe any training requirements or education programs being undertaken and their outcomes.

Reporting

- Describe the reporting process that will be used to notify the department (and any other relevant groups) of progress and outcomes from implementing water efficiency measures.

Table A2: Timetable for implementation of water efficiency measures

Water efficiency measures	Implementation date		Estimated water savings (kL/yr)	Actions
	Planned	Actual		

Step 5 – put your water conservation/efficiency plan into action

Now that an implementation timetable for introducing water efficiency measures has been provided (in step 4), the final step is to put the plan into action.

Consider:

- who is responsible for undertaking the plan requirements
- how progress on implementing water efficiency measures will be monitored and reported to the department
- the reporting of results and outcomes (such as successful implementation of measures; or analysis of measures that were not met successfully and how this could be improved)
- when and how often the plan will be reviewed and updated.

The method for actioning the water conservation/efficiency plan requirements, reporting the results and reviewing the plan's content should be detailed within your water conservation/efficiency plan.

Appendix B – Water conservation/efficiency plan guidelines

These guidelines provide general guidance on the scope of water use efficiency measures that the department considers are appropriate for each water use sector. The department recognises that the circumstances of individual operations vary greatly across the state. Hence, these water use efficiency measures provide general guidance rather than being prescriptive requirements.

Licensee's individual circumstances and operations will influence the appropriate water use efficiency measures. For example, the measures for irrigated agriculture operations in the Ord River irrigation scheme are likely to be different to those on the sand plains in the south-west of the state. The guidelines have flexibility to deal with such differences.

These guidelines (which reflect current industry best practice) form a common base to assist licensees develop a water conservation/efficiency plan that is suitable for their circumstances. The guidelines provide a cumulative approach to water efficiency measures and are organised into three different levels: basic, intermediate and advanced.

The relevant level of water efficiency measures (as determined from Table 2 of the policy) should be adopted. Where a licensee believes that particular water use efficiency measures are not appropriate for their circumstances, the department expects a justification for this position.

Water use efficiency measures

Table B1:Mining, mineral processing, heavy industry

Water efficiency measure	Requirements	Level
System design	• fittings to avoid unnecessary/continual discharge • metering of water use • water use efficiency considered in system design • water return from tailings maximised	B, I, A B, I, A I, A A
Water accounting and loss control	• leak detection and repair strategy • system maintenance schedule • self-audit of water system • total site water balance and water credit describing water use in each use point	B, I, A B, I, A B, I, A A
Information and education	• employee education and awareness program (at induction)	B, I, A

Dust suppression	• use of additives or alternatives to reduce water needs for dust suppression	A
Replacements and upgrading	• new systems designed for water use efficiency • water efficient systems incorporated when upgrading facilities	B, I, A I, A
Dewater[1]	• use of dewater in other processes and dust suppression	I, A
Reporting	• report on implementation with standard water licence reports	B, I, A
B: basic requirements I: intermediate requirements A: advanced requirements		

[1] The proponent must first consider the following (in order of priority) before the department approves any uncontrolled discharge of dewater to the environment:

1. investigate opportunities (and implementation issues) for reusing the dewater either by the proponent or by other nearby operations
2. aquifer reinjection to existing water table level
3. subsurface reticulation into watercourse alluvium
4. controlled surface discharge to mimic natural flow regime
5. uncontrolled discharge as last resort.

Table B2: Horticulture, irrigated agriculture

Water efficiency measure	Requirements	Level
Install appropriate systems	• new systems designed by a certified irrigation designer • system and method or irrigation identified; including (but not limited to) drip irrigation and low-pressure speakers • efficient distribution systems (minimise leakage and evaporation) • metering of water use • irrigation zones of plants and oil types with similar water requirements • a distribution uniformity[2] of greater than 75 per cent is maintained (where this measure is appropriate)	B, I, A B, I, A B, I, A B, I, A I, A I, A
Irrigation control	• Soil moisture sensor to detect water passing the root zone	I, A
Land and crop management	• Soil and crop types identified and considered when determining application rates • Land and soil improvements to retain water/reduce runoff or recharge past the root zone	B, I, A A
Water accounting and loss control	• leak detection and repair strategy • system maintenance schedule • self-audit of water system	B, I, A B, I, A B, I, A
Training	• employee education and awareness program	I, A
Reporting	• report on implementation with standard water licence report	B, I, A
B: basic requirements I: intermediate requirements A: advanced requirements		

2 Distribution uniformity is a measure of the evenness of cover and is highly related to efficiency. Distribution uniformity is measured by using catch cups to record the precipitation rate and is determined as: Distribution uniformity = 100 x (average of the lowest 25 per cent of catch cup volumes/average catch cup volume).

Table B3: Turf and landscape (for example, local government, gardens, recreation grounds, schools, golf courses, racecourses)

Water efficiency measure	Requirements	Level
Install appropriate systems	• new systems designed by a certified irrigation designer • irrigation system minimises water fall on paved surfaces • metering of water use • separate control stations for different use areas • a distribution uniformity[3] of greater than 75 per cent is maintained (where this measure is appropriate)	B, I, A B, I, A B, I, A I, A I, A
Irrigation control	• watering avoided between 9 am and 6 pm • soil moisture sensor to detect water passing the root zone	B, I, A A
Soil type	• soil and grass/plant types identified and considered when determining application rates • soil wetting agents used where appropriate • soil amendments made to increase water and nutrient retention	B, I, A I, A I, A
Water accounting and loss control	• leak detection and repair strategy • system maintenance schedule • self-audit of water system	B, I, A B, I, A B, I, A
Landscape efficiency	• low water use turf and plant species selected • landscape design of larger sites reviewed	B, I, A I, A
Training	• employee education and awareness program	I, A
Reporting	• report on implementation with standard water licence report	B, I, A

B: basic requirements

I: intermediate requirements

A: advanced requirements

3 Distribution uniformity is a measure of the evenness of cover and is highly related to efficiency. Distribution uniformity is measured by using catch cups to record the precipitation rate and is determined as: Distribution uniformity = 100 x (average of the lowest 25 per cent of catch cup volumes/average catch cup volume).

Table B4: Water service providers, irrigation water providers

Water efficiency measure	Requirements	Level
Universal customer metering	• service connection metering and reading • metering of public use water • fixed interval meter reading • meter accuracy analysis	B, I, A B, I, A I, A A
Water accounting and loss control	• leak detection and repair strategy • system maintenance schedule • self-audit of water system • report and analysis of causes of non-accounted for/lost water	B, I, A B, I, A B, I, A A
Information and education	• water use and efficiency information available on water bill	I, A
Contingency planning	• demand management strategies linked to environmental triggers (such as reduced groundwater levels or increased rate of decline)	I, A
Assist water users to audit and improve their water use efficiency	• advisory service available to assist large volume users improve their water efficiency	A
Retrofit water efficient appliances (including rebates and promotional aspects)	• retrofit kits available and promoted • rebates available to customers where economically justified	A A
Reporting	• report on implementation with standard water licence report	B, I, A
B: basic requirements I: intermediate requirements A: advanced requirements		

Table B5: Animal production (for example beef, dairy, poultry and eggs)

Water efficiency measure	Requirements	Level
Install appropriate systems	• new systems designed by a certified irrigation designer • efficient distribution systems (minimise leakage and evaporation) • water fall minimised on paved/hard surfaces • metering of water use • separate control stations for different use areas • a distribution uniformity[4] of greater than 75 per cent is maintained (where this measure is appropriate)	B, I, A B, I, A B, I, A B, I, A I, A I, A
Irrigation control	• irrigation management to avoid runoff and deep percolation • soil moisture monitoring to detect deep water percolation below root zone	B, I, A A
Land and livestock management	• livestock matched to carrying capacity of soil/land • dry cleaning techniques used to remove solid waste from yard/pens before cleaning with water • check made for leaks or overflows on animal drinking troughs	B, I, A B, I, A B, I, A
Water accounting and loss control	• leak detection and repair strategy • system maintenance schedule • self-audit of water system	B, I, A B, I, A B, I, A
Training	• employee education and awareness program	I, A
Reporting	• report on implementation with standard water licence reports	B, I, A

B: basic requirements

I: intermediate requirements

A: advanced requirements

4 Distribution uniformity is a measure of the evenness of cover and is highly related to efficiency. Distribution uniformity is measured by using catch cups to record the precipitation rate and is determined as: Distribution uniformity = 100 x (average of the lowest 25 per cent of catch cup volumes/average catch cup volume).

Further water use efficiency options

This information is provided to assist water users and managers progress towards higher levels of water use efficiency.

Table C1: Mining, mineral processing, heavy industry

Water use efficiency measures	Requirements
System design	• system designed for maximum practical water use efficiency
Water accounting and loss control	• automated sensors/telemetry • loss prevention program • selective process water use submetering
Self-audits of water use	• selective end-use self-audits
Replacements and upgrading	• adoption of new technologies
Reuse and recycling	• large volume irrigation applications
Dewater	• dewater made available to other sites/users
Reporting	• explanation and analysis of results • benchmarking against similar processes
Integrated resource management	• supply- and demand-side technologies considered

Table C2: Horticulture, irrigated agriculture

Water use efficiency measures	Requirements
Install appropriate systems	• local meteorological conditions monitored to allow real time scheduling adjustments • irrigation water passes the root zone only during specific irrigation events designed to flush the root zone • independent control of irrigation rates for each soil type/irrigation unit where practicable
Irrigation control	• system controls to avoid watering when rainfall provides adequate moisture
Water accounting and loss control	• automated sensors/telemetry • loss prevention program
Integrated resource management	• supply- and demand-side technologies considered
Reporting	• explanation and analysis of results and trend analysis

Table C3: Turf and landscape (for example, local government, gardens, recreation grounds, schools, golf courses, racecourses)

Water use efficiency measures	Requirements
Install appropriate systems	• local meteorological conditions monitored to allow real time adjustments • independent control of irrigation rates for each soil type/irrigation unit where practicable
Irrigation control	• system controls to avoid watering when rainfall provides adequate moisture
Water accounting and loss control	• automated sensors/telemetry • loss prevention program
Landscape efficiency	• landscape planning and renovation • selective submetering of large irrigation areas
Integrated resource management	• supply- and demand-side technologies considered
Reporting	• explanation and analysis of results and trend analysis

Table C4: Water service providers, irrigation water providers

Water use efficiency measures	Requirements
Universal customer metering	• meters tested, calibrated and replaced
Water accounting and loss control	• automated sensors/telemetry • loss prevention program
Information and education	• workshops • advisory committee
Reporting	• explanation and analysis of results and trend analysis • benchmarking conducted against similar processes
Assist water users to audit and improve their water use efficiency	• selective end-use audits • landscape planning and renovation
Retrofit water efficient appliances (including rebates and promotional aspects)	• targeted programs with customer rebates/subsidies
Pressure management	• selective use of pressure-reducing valves
Reuse and recycling	• industrial and large volume irrigation applications • two-tier systems to allow lower quality water to be supplied for non-potable purposes (for new developments)
FWater use regulation	• requirements for new developments
Integrated resource management	• supply- and demand-side technologies considered

Table C5: Animal production (for example, beef, dairy, poultry and eggs)

Water use efficiency measures	Requirements
Install appropriate systems	• local meteorological conditions monitored to allow real time scheduling adjustments • irrigation rates controlled independently for each soil type/irrigation unit where practicable
Irrigation control	• system controls to avoid watering when rainfall provides adequate moisture
Land and soil management	• land and soil improvements to retain water/reduce runoff or recharge past the root zone • grazing management accounts for changing pasture growth between seasons, avoid overgrazing
Water accounting and loss control	• automated sensors/telemetry • loss prevention program
Integrated resource management	• reuse and recycling opportunities maximised • separation of clean and dirty water management to reduce amount of water needing treatment
Reporting	• explanation and analysis of results and trend analysis

Glossary

Term	Definition
Agency or authority	(a) a department or other agency of government of the state or of the Commonwealth; or (b) an authority of the state or of the Commonwealth established for a public purpose; or (c) a local government authority.
Allocation	the volume of water which has been allocated for use each year.
Allocation limit	in the department's current water licensing system, an allocation limit is a volumetric limit. It is ordinarily equal to or less than the sustainable yield.
Agreement	agreements are a form of lease and occur via the temporary change of a licensed entitlement, or part thereof, to another party. The new party is then able to operate under the terms of the licence for the period of the agreement. Water may be taken from a different location, requiring an assessment of the likely impacts.
Aquifer	a geological formation or group of formations capable of receiving, storing and transmitting significant quantities of water. Usually described by whether they consist of sedimentary deposits (sand and gravel) or fractured rock. Aquifer types include unconfined, confined and artesian.
Bore	a narrow, normally vertical hole drilled in soil or rock to monitor or withdraw groundwater from an aquifer.
Environmental value	(also known as beneficial uses) is a value or use of the environment or any element or segment of the environment which is conducive to public benefit, welfare, safety, health or aesthetic enjoyment and which requires protection.
Groundwater	refers to the water that occurs in pore spaces and fractures in rocks beneath the ground surface.
Groundwater area	all the boundaries that are proclaimed under the *Rights in Water and Irrigation Act 1914* and used for water allocation planning, management, and licensing
Operating strategy	operating strategies detail a licensee's responsibilities for managing the impacts of taking and using water and specify: monitoring and reporting requirements; methods used to manage impacts on the environment and other water users; water efficiency measures; and contingency plans describing how the licensee

Term	Definition
	will alter their operations to cope with any directions to temporarily reduce water consumption (refer to *Policy: Use of operating strategies in the water licensing process*).
Policy	refers to a protocol that is not directly supported by any legislation but has been adopted by the department as its guide to undertaking its business.
Subarea	a management unit of a groundwater area. Subareas are defined through surface or groundwater management plans prepared by the department.
Submetering	the ability to measure the components of a water user's overall water consumption. This could be different processes/purposes on a mine site or different properties in a horticultural operation.
Sustainable yield	the volume of water abstracted from a source that can be sustained on a long-term basis without exceeding the rate of replenishment.
Trade	where an entitlement is transferred to another person and the water will be taken from another location. An example is where a licensee sells his water entitlement to another person who will take the water from a different location and possibly use it for a different purpose.
Transfer	where an entitlement is transferred to another person, but the water will be taken from the same location. An example of a transfer is when a licensee sells their property operation (for example, a market garden) together with the water entitlement to another person who will continue with the operation.
Water resource management unit	refers to an aquifer (or aquifer layer) within a subarea. This is particularly important for multiple level aquifers, such as those of the Swan coastal plain. For example, the Leederville aquifer in the Perth groundwater area, Stirling subarea.
Water year	refers to an annual period, generally beginning at the anniversary of licence issue, unless otherwise specified in the operating strategy or water conservation/efficiency plan (Note: irrigation years from July to June are commonly used in agriculture).
Water conservation	an action, behavioural change, efficiency measure, technology, device, design or process implemented to reduce water loss, waste or use. Water efficiency is a component of water conservation.

Term	Definition
Water use efficiency	increasing water supply efficiency and water demand efficiency to minimise the taking and use of water.

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