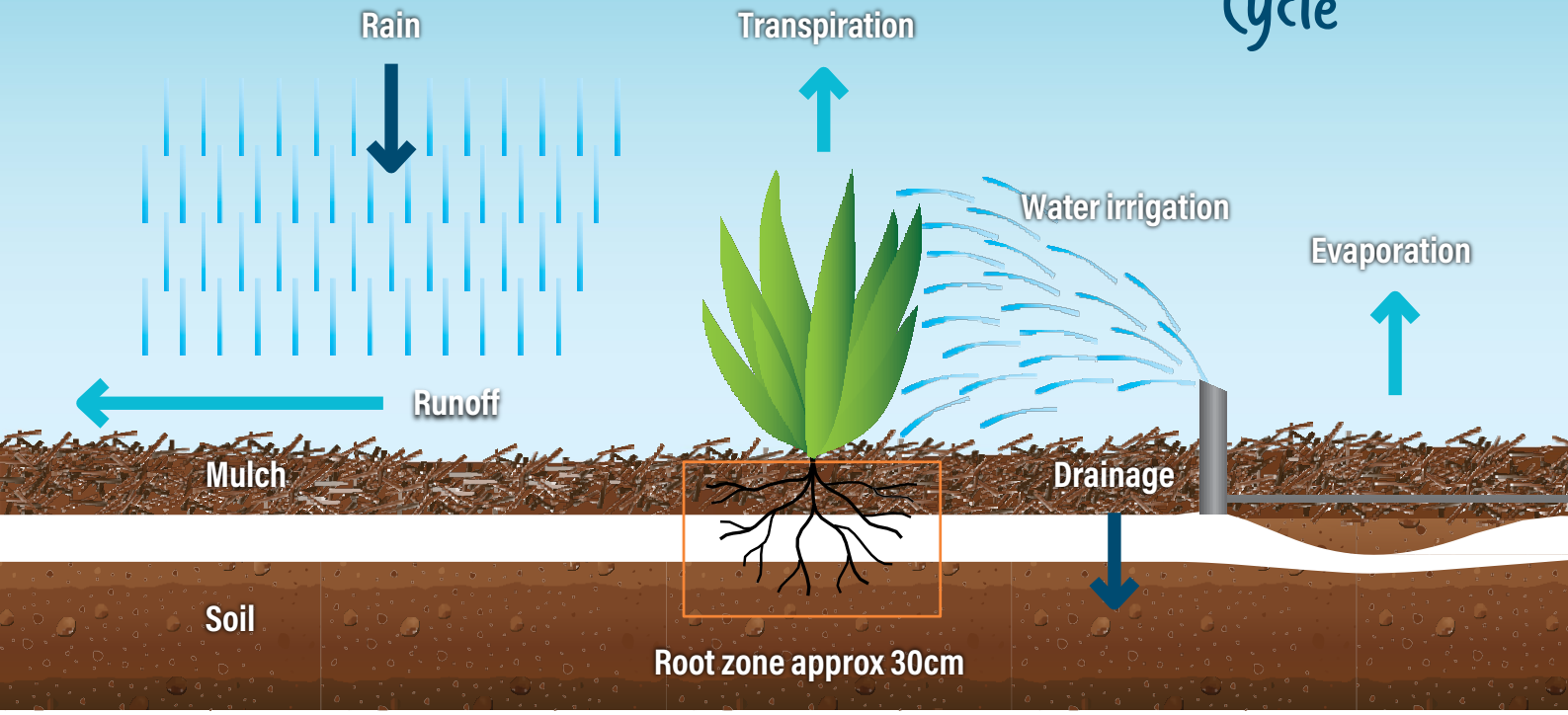
Your guide to
A WATER EFFICIENT GARDEN
WA Edition

Drought and water restrictions in many parts of Australia have shown us that water is a scarce and precious resource. Many gardeners have found to their surprise that their plants survived, even thrived, despite receiving less water due to restrictions. In other words, most gardens are regularly over-watered. Just because water restrictions permit watering at a certain time doesn't mean you need to water. And even where there are no restrictions we should all be doing our best to conserve water. Reducing the water you give your plants will also save your time, effort and money and you will still have a healthy garden.

The Water Cycle



The diagram above shows that water is added to the soil through rain or irrigation. It is lost from the soil surface through evaporation and is transpired through the leaves of plants as they grow naturally. Water can also run off the surface and drain through the soil.

Plants draw water from the soil where their roots grow. If you overfill the soil, water will be wasted through runoff or by draining below the root zone. Additionally, too much water will result in a waterlogged soil that can cause root rot and disease that kill plants. If the soil dries out for long periods or too often it can become water repellent and your plants could wilt and die.

The challenge is to manage water applications so that there is just enough water in the root zone for your plants to stay healthy.

Important steps in creating a healthy landscape that uses less water are:

- Understanding your soil type.
- Improving the soil so that water infiltrates and is held effectively.
- Understanding when and how to supplement natural rainfall only when necessary.
- Installing a professionally designed, well-maintained irrigation system.

Topics covered:

The importance of soil

Good soil is the foundation of a healthy garden and will provide the best conditions for your plants to use less water.

Understanding your soil

Loam soil: is the ideal soil for water retention and plant growth because it holds water and drains well. Water deeply and infrequently.

Clay soil: feels sticky, holds moisture for long periods but can become compacted and impervious and it absorbs water slowly. So it's easy to waste water that will run off the surface rather than penetrate to the root zone. Water deeply at long intervals, watering it slowly, so that the water can soak in.

Sandy soil: feels gritty, is thirsty and will take in a lot of water but dries out quickly. Water can be wasted because it just drains away or because the soil is water repellent. Theoretically, if you have sandy soil you should apply smaller amounts of water more often, however, water restrictions might prevent this approach.

Improving your soil

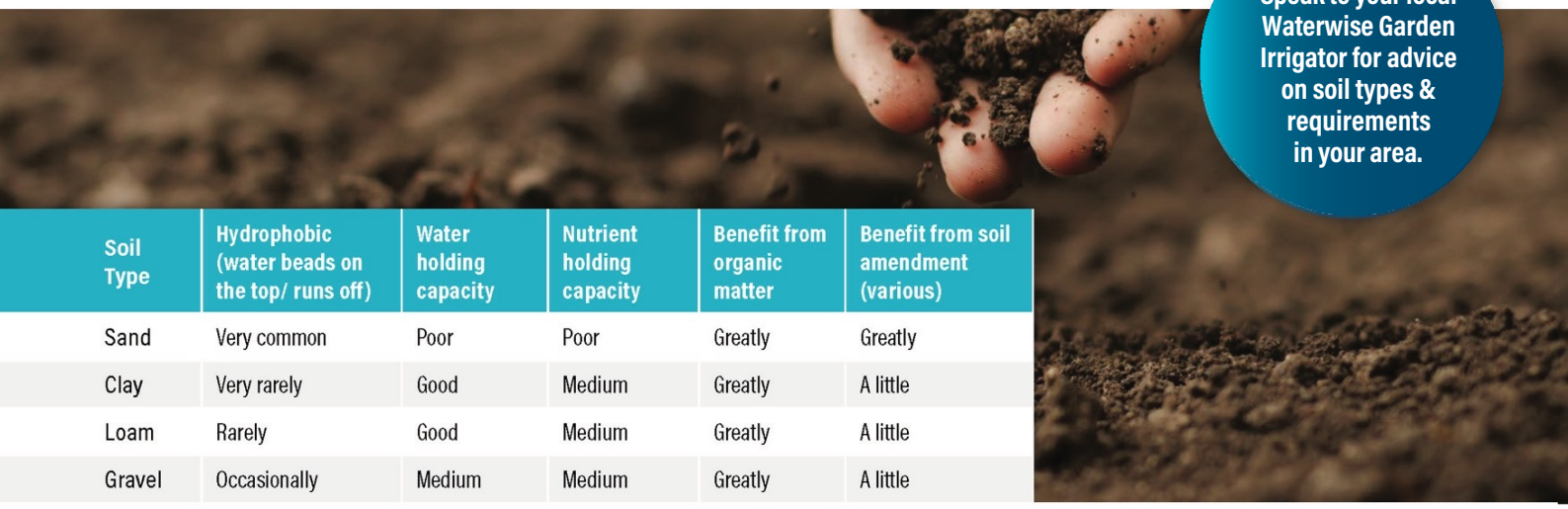
The key to saving water is to improve your soil.

Add organic matter to improve both sandy and clay soil. Types of organic matter include coir or cocopeat, compost, green manure, aged animal manure, mushroom compost, straw, worm castings, grass clippings, composted horticulture bark. Lime will improve clay soil and gypsum works on some clay soils.

Adding clay; such as bentonite; to sandy soils will improve water and nutrient holding capacity.

Soil wetting agents come in granular and liquid forms and contain combinations of chemicals which can help water enter and be retained in water repellent (hydrophobic) soils. They should be applied in early summer, at the start of winter rains and as recommended by the manufacturer.

Mulch reduces evaporation, insulates plant roots from temperature extremes, reduces weed growth, reduces runoff and adds nutrients to the soul. Apply it thickly (7cm) to wet soil; keep it away from the base of trunks and stems; reapply regularly and loosen regularly to ensure water penetration.



Speak to your local Waterwise Garden Irrigator for advice on soil types & requirements in your area.

Soil Type	Hydrophobic (water beads on the top/ runs off)	Water holding capacity	Nutrient holding capacity	Benefit from organic matter	Benefit from soil amendment (various)
Sand	Very common	Poor	Poor	Greatly	Greatly
Clay	Very rarely	Good	Medium	Greatly	A little
Loam	Rarely	Good	Medium	Greatly	A little
Gravel	Occasionally	Medium	Medium	Greatly	A little

Fertilising your lawn and garden

Plants need food, just like people. They need a range of nutrients like nitrogen and potassium for good health and growth. Other nutrients like phosphorus and magnesium are needed in smaller quantities and trace elements like iron and copper are only needed in tiny amounts. Fertilisers may be organic or inorganic and can be applied as liquids or solids.

Slow release fertilisers are designed to release nutrients over a certain length of time.

Fertiliser should be applied near the plant's roots, or it will be wasted. Often the canopy area can be used as a guide. Most fertilisers will have a recommended application rate on the packaging. It is important to note that this is the maximum amount that should be applied.

Any nutrients not taken up by plants may enter stormwater and groundwater systems, and eventually find their way into our waterways, so it is important to fertilise responsibly. Avoid spreading fertiliser onto paths, driveways or roads where it will be washed away. Do not apply fertiliser prior to heavy rain and do not overwater to avoid washing nutrients away.

Upgrade your irrigation system

It's useful to make a sketch of your garden so you can see where you need to water. A Waterwise Irrigation Design Shop can provide expert advice on matching sprinkler types to the needs of plants.

A good irrigation system will:

- Apply the right amount of water for the plants and soils (use the sprinkler types and run times in this guide).
- Time watering to meet changing weather conditions (less in cooler seasons and switch off in winter/wet season).
- Apply water evenly to the plants in each garden area (hydrozones).
- Apply water only where required to reach the root zone.

Plants only use water where the plant roots grow, for most plants that's the top 30cm of soil.

Installing your system

1. Before you start, make sure you have all the parts and tools you need.
2. Mark out and dig trenches for the main line (PVC pipe) and a conduit with any wiring for solenoids. Make sure you space your sprinklers so your garden is watered evenly and only watering the garden. Overspray onto the road or nearby buildings is a waste.
3. Start at the water source, connect your master solenoid valve (if installing an automatic system) and then install the mainline. Flush the mainline before installing any solenoid valves so you don't have dirt in the pipes.
4. Install lateral lines, and finally, the sprinklers themselves. Don't install any nozzles until you have thoroughly flushed each station. Solenoid valves may have to be operated manually until you have made final connections to the controller. Make sure you install the right number of sprinklers on one line. Too many may result in not enough water pressure and too few may lead to high water pressure and water being wasted.
5. Fit nozzles and make sure each station waters evenly.

When to water

To get the best result from your irrigation system turn it on during the early hours of your rostered watering days (aim for as early as possible before 9am). This will reduce evaporation and allow plants to draw moisture as needed throughout the day.

Watering rosters vary region to region, so please check with your local water utility to ensure you are watering within restrictions. All irrigation systems should be turned off during the winter months.

Flow and pressure

Knowing your water pressure and flow is important to efficient irrigation design because it helps determine what type of sprinklers you can use, and how many you can use at one time.

Pressure is the force of water moved expressed in kPa (kilopascals) and can be measured with a pressure gauge.

Irrigation components require pressure to work, therefore the correct amount of pressure needs to be provided to operate effectively. Standard operating pressure for different sprinkler times vary. Most common pop-up sprinklers & micro sprinklers: 200kPa, MP rotators & mini gear-drives; 250kPa and 300kPa for large gear-drives.

Water Flow is the amount of water moved in a specified duration of time and is expressed in litres per minute (LPM).

A simple way to test your **water flow** is to measure how long it takes to fill a standard 10 litre bucket from a garden tap as close as possible to the meter, with all fittings removed. E.g. If a 10 litre bucket fills in 30 seconds, then your water flow is 20 litres per minute. To calculate: (60 sec [a minute] divided by 30 sec = 2) then (2 x 10 litre bucket = 20 LPM).

= 30 seconds to fill
= 20 litres/minute
= 1200 litres/hour

Accurate figures for both flow and pressure are essential for good irrigation design.

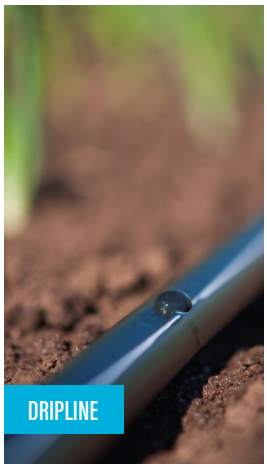
Devices with a combined flow meter and pressure tester can retail for hundreds of dollars but are available for hire at minimal cost from specialist irrigation retail stores. Contact your local Waterwise Irrigation Design Shop for any advice.

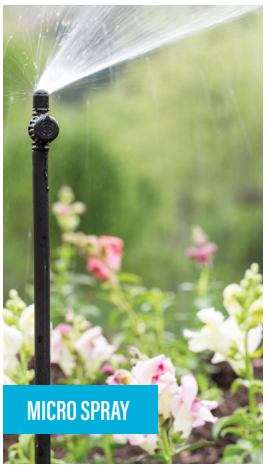
Always remember to change "like for like" when you are replacing sprinklers in your system

It is important to know that different nozzles can deliver different flow rates and distances. Simply take your old sprinkler nozzle to your local Waterwise Irrigation Design Shop to get an identical replacement.

Sprinkler Watering Run Times

It's important to remember that different types of sprinklers have different watering run times. This table can be used as a guide if you need to program your controller.





Approximate watering rate (per hour)	15-20mm	35-45mm	35-45mm	10-15mm	10-20mm
Suggested run time to apply 10mm standard drink*	**30-40 minutes**	**13-16 minutes**	**13-16 minutes**	**40-60 minutes**	**30-40 minutes**

*These are recommended run times for sandy soils and may need to be adjusted for other soil types like clay or loam.

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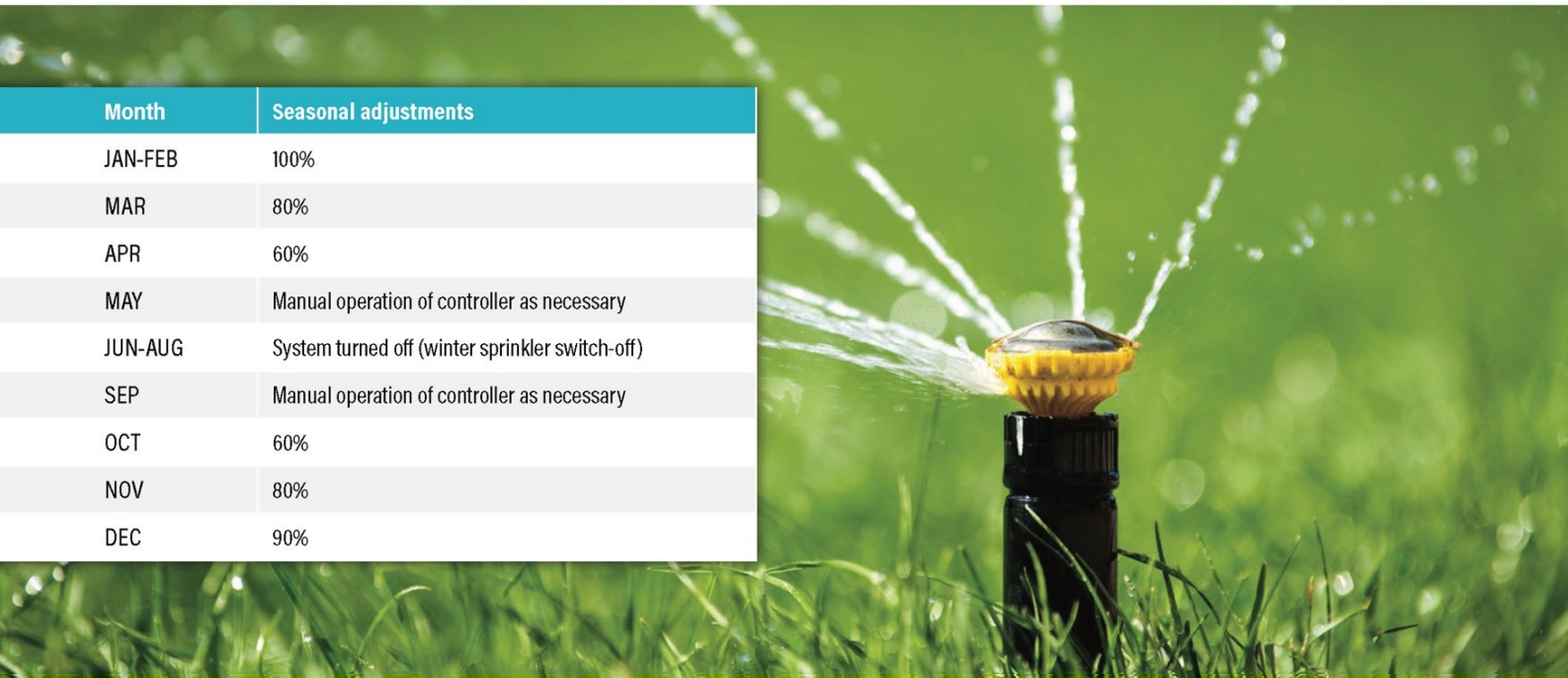
Contact your local Waterwise irrigation professional for expert advice | www.waterwiseprograms.com.au

Seasonal adjustment settings

As the seasons change, so do the water needs of your lawn and garden. The table below shows the adjustments that should be made to your irrigation controller's 'Seasonal Adjustment' setting to avoid over watering. No matter what the season, your controller should always be turned off when it's raining.

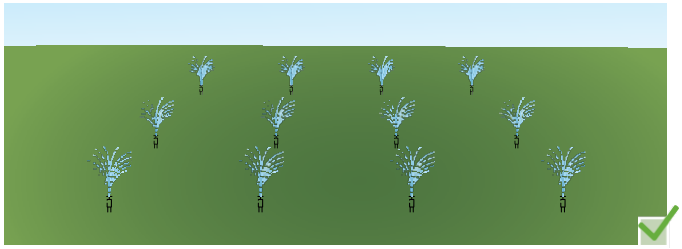
Month	Seasonal adjustments
JAN-FEB	100%
MAR	80%
APR	60%
MAY	Manual operation of controller as necessary
JUN-AUG	System turned off (winter sprinkler switch-off)
SEP	Manual operation of controller as necessary
OCT	60%
NOV	80%
DEC	90%



Do

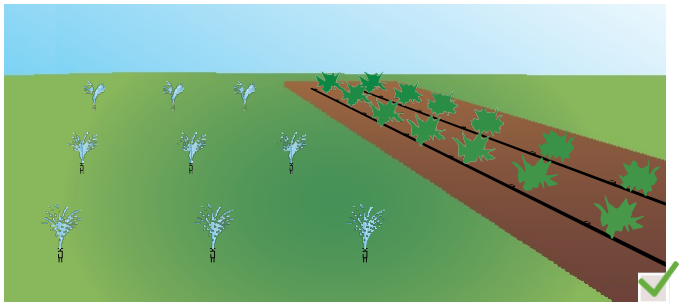
Contact your local Waterwise irrigation professional for design and installation services to ensure the most efficient system is achieved.

Space emitters to apply water evenly.



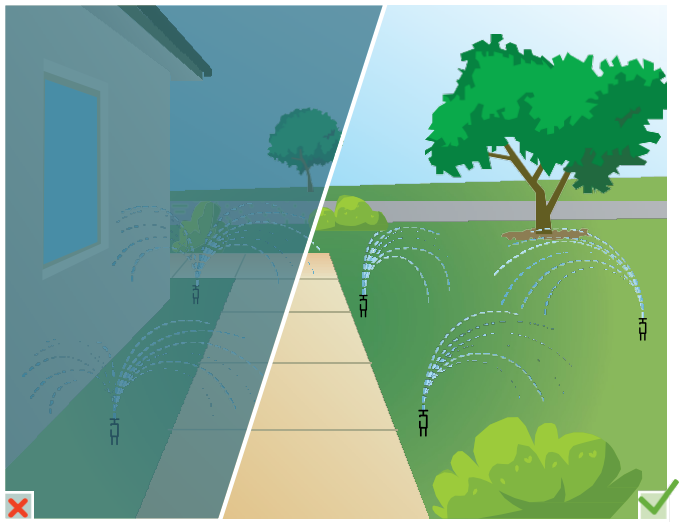
Check and maintain your system regularly. Look for leaks, blocked nozzles, plant growth that is blocking spray heads.

Divide the system into zones as required by garden size, flow rates or planting schemes. E.g. different zones for vegetables and lawn.



Consider installing a wifi weather-based irrigation controller that will adjust run times based on the weather. Other options include rain sensors or soil moisture sensors.

Only place emitters where they are needed, Make sure they only water plants, not pathways or buildings.



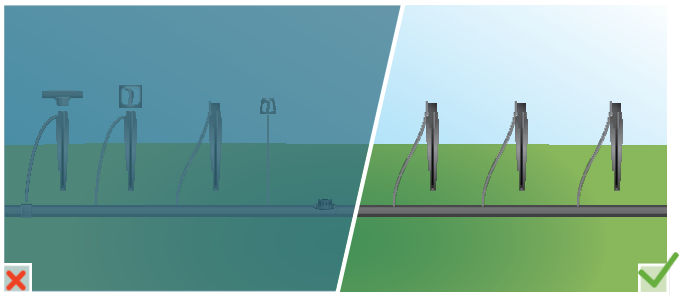
Test your sprinkler application rates with catch cups

Catch cups (graduated measuring containers) are a valuable tool for testing how efficiently an irrigation system is operating and the sprinkler application rates. To test, you should:

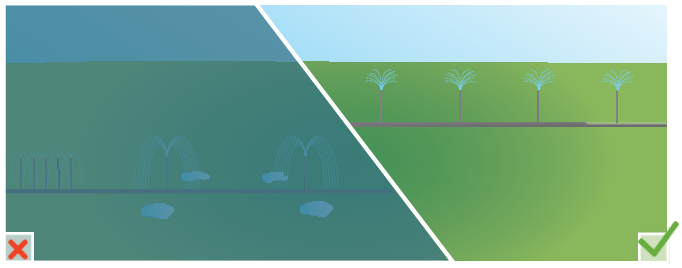
- spread catch cups or containers of the same size randomly around the watering zone
- make sure they are at least 1 metre from the closest sprinkler
- time how long it takes the sprinklers to fill the catch cups to the depth of 10mm (the standard drink for an area of sandy soil). Then adjust your irrigation controller accordingly.

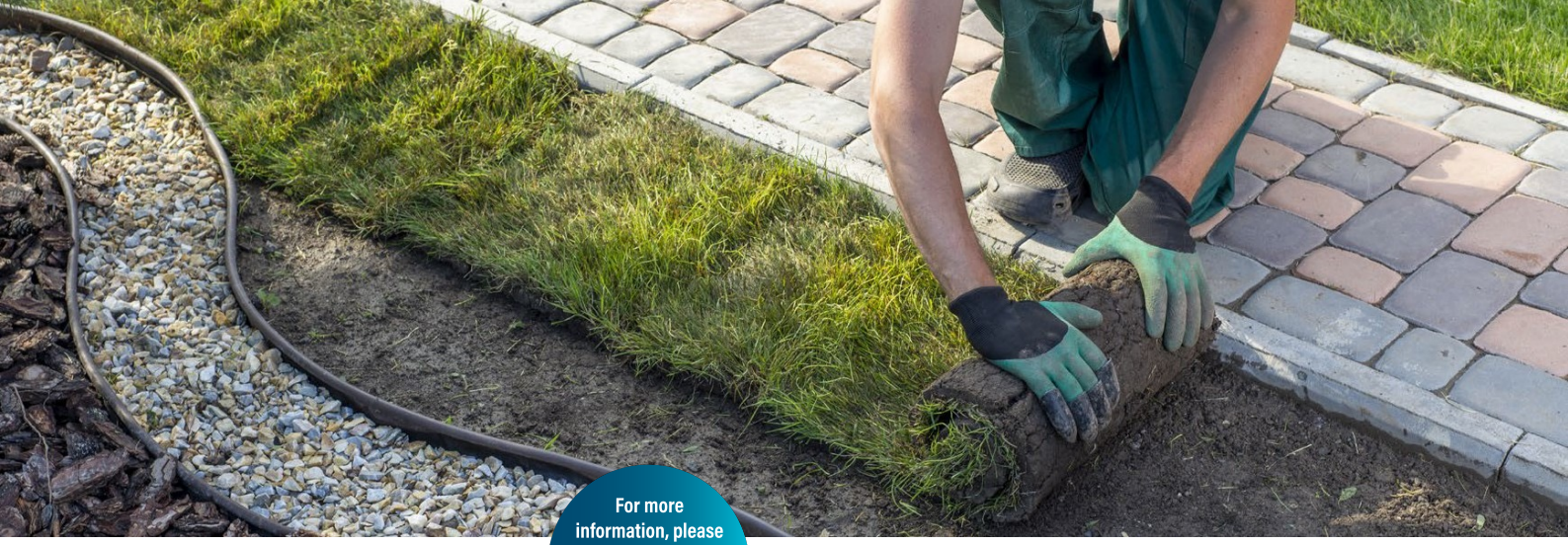
Don't

Don't mix different types of emitters on the one watering zone. E.g. never mix drippers with sprayers or sprinklers.



Don't put too many emitters (insufficient water will come out) or too few (will result in high pressure and wasted water) on one line.





For more information, please contact your local water utility for the latest exemption updates

Watering exemptions – New Lawns & Gardens

You may be eligible to apply for a watering exemption outside current water roster restrictions if you have planted a new lawn or garden. Garden beds planted at the same time as laying new lawn may be included in an exemption. Exemptions are issued from the date that new lawn is installed.

Contact your local water utility for more information on how to apply.

Suggested watering schedule for new lawns & gardens:

1 October – 31 March

It is recommended that you water your new lawn or garden with 10mm of water a day.

A possible watering schedule for this period is:

Days	Amount	Frequency	Time
1-10	3.5mm	3x daily	Before 9am, at 12 noon and at 3pm
11-20	5.0mm	2x daily	Before 9am and at 3pm
21-28	10.0mm	1x daily	Before 9am
29-42	10.0mm	Every second day	Before 9am

1 April – 30 September

It is recommended that you water your new lawn or garden with 7.5mm of water a day.

A possible watering schedule for this period is:

Days	Amount	Frequency	Time
1-14	4.0mm	2x daily	Before 9am and at 2pm
15-28	7.5mm	1x daily	Before 9am
29-35	7.5mm	Every second day	Before 9am

Exemption breaches
Any breaches are the responsibility of the property owner, not the person who installed the lawn, plants and irrigation system!

Please note that the exemption period starts from the date of the installation of your new lawn/garden. Please check with your local water for full terms and conditions.

At the end of the exemption period, the setting on your irrigation controller must be amended according to the sprinkler roster for your area.

Loss of water due to hidden leaks

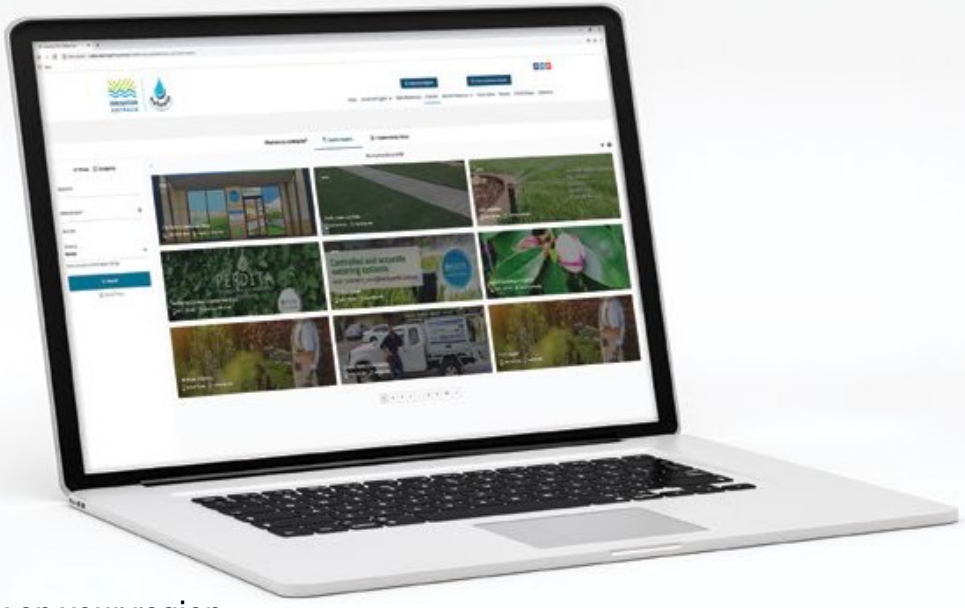
If you have experienced a hidden leak in your irrigation system, you may be eligible to apply for a leak allowance to cover a portion of the total water use. In general, to be eligible for an allowance irrigation systems must (as a minimum) have a WaterMark certified manual isolation valve, a backflow prevention valve and a master control solenoid installed to meet irrigation industry standards. If these are not present, an allowance may be assessed upon re-application after the irrigation system is upgraded to the required plumbing standard and regulations.

For more information, check the leak allowance policy of your local water utility or speak to your nearest Waterwise Garden Irrigator for advice.

Do you need help with your irrigation system?

Look for the Waterwise sign in your region

Waterwise PROGRAMS



Whether you are starting scratch or wanting to improve your existing system, talk to a Waterwise Garden Irrigator for installation services or maintenance.

If you prefer to do-it-yourself, get expert advice and quality parts form your local Waterwise Irrigation Design Shop (retail outlet).

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Look for the Waterwise sign in your region

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