



## **Efficient Irrigation for Water Conservation**

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### **Guideline**



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# 1. Important Regulatory and Water Restriction Information

It is a requirement under the Queensland Plumbing and Wastewater Code (QPW Code), from 1 March 2009, for Class 1 and Class 2 buildings, where irrigation systems are installed, they must comply with this Queensland Water Commission (QWC) *Efficient Irrigation for Water Conservation Guideline (Irrigation Guideline)*.

Definitions are used throughout this *Irrigation Guideline* and defined terms are written like **this** and listed in Schedule 1. Please ensure you read Schedule 1 (at the back of this Irrigation Guideline) as the definitions contain important information.

Before watering or irrigating your **garden** or **lawn** by any means, it is important to check your water supplier for any restrictions on watering or the use of urban irrigation systems that might apply in your area.

Your water supplier might be your local water Retailer, Water Service Provider or your local Council.

QWC Water Restrictions apply to South East Queensland (SEQ) local Government areas of:

- Brisbane City Council;
- Gold Coast City Council;
- Ipswich City Council;
- Lockyer Valley Regional Council;
- Logan City Council;
- Moreton Bay Regional Council;
- Scenic Rim Regional Council; and
- Somerset Regional Council.

From 1 July 2009, QWC outdoor Water Restrictions will also apply to:

- Sunshine Coast Regional Council; and
- Redland City Council.

In these ten local Government areas, efficient outdoor watering of residential and non-residential **gardens** may only be undertaken at Medium Level Restrictions and within the prescribed periods.

Efficient outdoor watering of residential and non-residential **lawns** (and gardens as per Medium Level Restrictions) may only be undertaken at Permanent Water Conservation Measures.

If you are not sure of the current Restriction level, contact your local Council or go to the QWC website at [www.qwc.qld.gov.au](http://www.qwc.qld.gov.au).

## 2. Helping you make efficient choices – Smart Approved WaterMark

To assist you to identify the water efficient devices and water wise gardening practices required by this Irrigation Guideline, the QWC has worked with Smart Approved WaterMark and the irrigation and nursery and garden industries.

Smart Approved WaterMark is Australia's national, not-for-profit labelling scheme for products and services that help to reduce water use outdoors and around our homes.

Smart Approved WaterMark is a sister scheme to the Water Efficiency Labelling and Standards (WELS) scheme which allows consumers to compare the water efficiency of different indoor products and appliances.

This QWC *Irrigation Guideline* identifies irrigation products that are considered by the QWC to be water efficient. These products will display the Smart Approved WaterMark, so look for this sign when selecting irrigation products. For more information on *Smart Approved WaterMark* products go to: <http://www.smartwatermark.org/products>



### 3. Application

The QWC has designated efficiency levels for urban irrigation systems and sprinklers in this *Irrigation Guideline* which applies to:

- the use of water from a **reticulated (town) supply system** for watering a **garden** and **lawn** in and around residential and, for SEQ, non-residential premises;
- watering devices – what you can use to water (sections 5, 6 and 7);
- operating requirements – how you can water (section 8); and
- watering periods – how long you can water (section 14).

This *Irrigation Guideline* also contains information to help you:

- calculate how much water your **garden** actually requires (section 9);
- plan your **garden** and irrigation system (sections 11 and 12);
- understand how much water **emitters** and sprinklers use (Appendix B); and
- meet water consumption targets under restrictions (section 14);

If planning to use **reticulated (town) supply system** in an **efficient irrigation system** installed on your premises, you must ensure the efficiency of the irrigation system and/or sprinkler(s) comply with this *Irrigation Guideline*. In particular, this *Irrigation Guideline* explains what is considered to be an **efficient irrigation system** and an **efficient sprinkler**.

This *Irrigation Guideline* provides a framework for water-wise gardening and **lawn** maintenance to allow residents to enjoy their **gardens**, **lawns** and outdoor lifestyle while ensuring water is used efficiently, wisely and responsibly.

For SEQ, there are additional requirements for non-residential premises where the area to be irrigated exceeds 350 square meters. Please refer to the QWC's website at [www.qwc.qld.gov.au](http://www.qwc.qld.gov.au) for more information.

For residents outside of SEQ, please check the application of water restrictions in your area with your water Retailer, Water Service Provider or your local Council.

This *Irrigation Guideline* and QWC's Water Restrictions for SEQ apply to the use of water from the **reticulated (town) supply system**. It does not apply to the use of water sourced from alternate sources such as rainwater, bores and greywater.

This means, that you can use your **efficient irrigation system** or **efficient sprinkler** with water from your rainwater tank without restriction. You can also alternate – sometimes using water from your rainwater tank and sometimes using water from the **reticulated (town) supply system**. Just remember, when using water from the **reticulated (town) supply system** you must ensure you are operating your system within the period(s) permitted under water Restrictions in effect in your area.

### 4. How compliance can be demonstrated

Compliance with this *Irrigation Guideline* and water restriction requirements can be demonstrated by:

- using an **efficient irrigation system** (or **efficient sprinkler**); (section 8)
- watering you **garden** or **lawn** in accordance with the permitted hours set out in the water restrictions for your local area; (section 14)
- adopting water efficient **gardening** practices (section 9) and
- using water in accordance with this *Irrigation Guideline*.

### 5. Efficient irrigation systems

An **efficient irrigation system** must have the following features:

- a. a network of permanent piping connected to **emitters** which has been designed and installed to water a specific landscape area; and
- b. the maximum output capacity of each **emitter** within the irrigation system must not exceed **9 litres/minute\***; and



You can also look for information such as shelf labels or brochures displayed near irrigation products and **emitters**. You may be able to find information on **emitter** flow rates from the manufacturer's website or by asking your irrigation professional or hardware retailer.

## Drip-line

**Drip-line** means a permanent piping system which has in-line or internal dripper inserted manually or during manufacturing. To be an **efficient irrigation system** there should be at least 30 cm between each dripper/drip-hole. This information is usually on the packaging because the drippers have been inserted at the time of manufacture. There are a number of **pressure-compensated drip-line** products which have been accredited with the Smart Approved WaterMark.

## Soil moisture monitors and rain sensors

A **Soil moisture sensor** measures the amount of residual moisture or water in the soil and prevents an irrigation system from being used when the soil is already wet. A **rain sensor** prevents an irrigation system from being operated during, or soon after rainfall.

There are a number of **soil moisture sensors** and **rain sensors** which have also been accredited with the Smart Approved WaterMark. Consult your local irrigation professional or hardware specialist to help find the right one for your system.

## 7. An Efficient Sprinkler

Sprinklers are attached to the end of a **garden** hose and are generally moved around the **garden** or **lawn** from time to time to cover the area to be watered. To be an **efficient sprinkler**, the device must:

- a. be non-fixed;
- b. have a maximum output capacity which does not exceed more than 9 litres of water per minute; and
- c. be capable of connection to a standard **garden** hose or permanent piping of 15 mm diameter or less; and
- d. be connected to and used in conjunction with a timer;
- e. have an adjustable distribution pattern so that hard surfaces are not watered; and
- f. the use of an **efficient non-fixed sprinkler** must be in accordance with the operating requirements and watering times determined by the QWC (for SEQ) or by your local Council (for residents outside SEQ).

## 8. Operating Requirements

An **efficient irrigation system** or **efficient sprinkler** must be operated efficiently to conserve water. When watering **gardens** and **lawns** by any means, you should:

- apply water at a rate so that it does not ponds, pools or runs off;
- not apply water when the soil is already adequately moist to sustain plant growth, whether as a result of rain or other watering;
- apply water in such a manner so that it does not falls on buildings or hard surfaces;
- use a manual timer with a maximum timing capability of 30 minute with an **efficient sprinkler**;
- not apply water in windy conditions where the distribution pattern of the irrigation or sprinkling systems will be affected;
- apply water only to **gardens** that are sufficiently **mulched** to reduce evaporation; and
- apply water to only **lawns** that have been laid on a soil underlay with a minimum depth of at least 150mm.

## 9. Efficient Gardening Practices

### Understanding how much water your **garden** or **lawn** requires

Many residents tend to over water their **gardens** and **lawns** because they don't understand how little water the **garden** or **lawn** actually requires. Just because you can water for a certain period each week, doesn't mean your **garden** or **lawn** actually requires this volume of water. Depending upon the type of **efficient irrigation system** or **efficient sprinkler** you have, you may only need to run it for a very short-time before the required amount of water is delivered to your **garden** or **lawn**.

Remember, being water-wise doesn't mean you can't have a beautiful thriving **garden** and **lawn**. If you plan and maintain your **garden** and **lawn** responsibly, you can keep it looking fabulous for years to come.

## Precipitation rate

**Precipitation rate** means the volume of water (in litres) applied by the **efficient irrigation system** to a defined area (square metres) over a specified period of time (minutes).

As a guide, a well-designed **garden** may only require around 10 mm of water each week to sustain growth. A water smart **lawn** will require even less water - as little as 6 mm in summer when it is growing and 3mm in winter when it is dormant. This volume of water includes, of course, any rainfall your **garden** may have received.

The volume of water required for your **garden** or **lawn** will depend upon your soil and plant type(s) (section 11). You should seek advice from your local horticultural specialist or nursery.

## The Precipitation Rate of Your Irrigation System

You can use the following calculation to work out the approximate **precipitation rate** at which your irrigation system is delivering water to your **garden** or **lawn**.

### Precipitation Rate Calculation

Precipitation =  $\frac{\text{discharge volume of your emitters (litres per hour)}}{S}$

S = spacing between **emitters** in metres.

If you have **emitters** fitted to hose and then multiple rows of hose, you will need to multiply the distance between each **emitter** by the row spacing.

For example: If your **emitters** are 1 metre apart and in rows that are 3 metres apart, you will need to multiply 1 x 3 metres = 3 metres.

Please note that this is a general calculation only and cannot take into account the specifics of every garden or lawn. Further information and worked calculations for L/min or L/hour are also available in the two case studies in Appendix A- Precipitation Rate-Case Studies.

If these calculations do not assist you in deciding the volume of water being delivered by your irrigation system, please seek advice from your irrigation professional.

## Take Note of the Rainfall Your Garden and Lawn Receives

If your local area has recently received significant rainfall (more than 50 mm) it may be weeks before you need to water again. You must have a **soil moisture sensor** or **rainfall sensor** connected to your **efficient irrigation system**. This will prevent the system operating if the soil already has adequate moisture or if it is raining. There are two ways in which you can determine the volume of rainfall your **garden** receives each week:

1. You can install a rainwater gauge; or
2. You can check the rainfall figures from the nearest Bureau of Meteorology (BOM) weather station closest to your house at:

<http://www.bom.gov.au/weather/qld/brisbane-observations-map.shtml>; or

[http://www.bom.gov.au/hydro/flood/qld/rain\\_river.shtml](http://www.bom.gov.au/hydro/flood/qld/rain_river.shtml)

## 10. Use Water Wisely

### Your **efficient irrigation system** or **efficient sprinkler** should apply water correctly

To ensure your **garden** and **lawn** is receiving the maximum volume of water from your irrigation system or sprinkler and water is not being wasted, you should ensure your **emitters** are:

- applying water only to the root zone of the plant, where the plant can actually use it;
- spaced to ensure adequate and even distribution of water or as otherwise recommend by the manufacturer; and
- adjusted so that you are not watering buildings or other hard surfaces such as paving.



Seek advice from your irrigation professional and/or your horticultural specialist or nursery when designing or installing a system.

## Use alternative sources of water where they are available

More than a third of households in SEQ now have a rainwater tank and many households have been using rainwater for some time to sustain their **garden**. Always use rainwater before using your town water to irrigate.

Some households also use greywater on their **garden** and **lawns**. This can save thousands of litres of town water each year. There are requirements associated with the use of greywater around the home. For example household greywater must not be sprayed or used in your irrigation system or sprinkler. The Department of Environment and Resource Management has information sheets on the use of greywater in the **garden**, which can be sourced from:

[http://www.nrw.qld.gov.au/water/saverscheme/pdf/greywater\\_brochure\\_complete.pdf](http://www.nrw.qld.gov.au/water/saverscheme/pdf/greywater_brochure_complete.pdf)

## 11. Know Your Garden and Lawn and Plan Appropriately

Every **garden** and **lawn** is different, from the plants you have chosen, to the soil you have and the wind and sunshine your **garden** receives. It is likely that different parts of your **garden** will have a different microclimate and may therefore have different watering requirements.

### Know Your Soil Type and Improve It Where Necessary

Different soils retain different volumes<sup>1</sup> of moisture as demonstrated in the table below.

Soil type	Sand	Loam	Clay
Water (mm stored in 20 centimetre (cm) depth of soil)	12 mm	42 mm	28 mm

If you are unfortunate enough to have sandy soil, you will know that it retains relatively little water and therefore plants growing in sandy soils are likely to require more water to survive. However, applying more than 12 mm of water on sandy soil at a time is a waste of water, because it will simply drain through, past the root zone.

You should consult your local horticultural specialist about how to improve sandy or poorer soils. Some tips and options include:

- replacing the soil with better quality loam; or
- treating the soil with a wetting agent or using water crystals; or
- adding organic matter such as compost; or
- using plants which thrive in sandy soils, such as coastal plants and some Australian native plants.

The Department Environment and Resources Management has further information on understanding your soil type which can be sourced from: [http://www.nrw.qld.gov.au/water/saverscheme/pdf/soil\\_types.pdf](http://www.nrw.qld.gov.au/water/saverscheme/pdf/soil_types.pdf)

If you are still unsure of your soil type or how to improve it, take a sample along to your local nursery or landscaping specialist and seek advice. Also, ask about the water retention properties of potting mix next time you're buying it as there are significant differences between products.

## 12. Planning your garden

When planning a new irrigation system or modifying an existing system you should select the system and **emitters** which are efficient and appropriate for your microclimate, plant selection and soil type of **your garden**, in accordance with this *Irrigation Guideline*. You should also consider the conditions in different parts of your **garden**.

For example, drippers are an excellent and water-wise irrigation option for most **gardens**, but may not be suitable for sandy soils. You should consult your local irrigation professionals, horticultural specialist or nursery to determine which system(s) are right for your **garden**. Your irrigation specialist may design a different type of system for different parts of your **garden**.

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<sup>1</sup> Irrigation Australia Limited



As outlined in section 6, your **emitters** should be planned and placed appropriately in order to water effectively. Take a simple plan of your **garden** along to your local retailer or irrigation specialist so that they can help you design a system which will distribute the right amount of water in the right places.

## Choose the right plants for your garden

If you are re-planting or planning a new **garden**, you should choose plants which have a low water requirement and are likely to thrive in the specific conditions in your **garden** such as exposure to sun, wind and soil type. Your local horticultural specialist or nursery can assist you to select the plants which are right for you and your local area - refer to the references in section 15 of this [Irrigation Guideline](#).

Remember, it is a good idea to group plants which have similar watering requirements, so that you can irrigate more effectively.

## Mulch your garden

You should **mulch** your **garden**. Common types of **mulch** include woodchips, straw, shredded plant materials and pebbles. A minimum depth of 5 cm is required. A greater depth may be required to reduce evaporation effectively in your **garden**. This depends on the type of **mulch** used. You should check with your horticultural specialist or nursery.

If you use organic **mulch** which breaks down quickly, you should top it up several times a year.

**Drip-line** systems are designed to sit beneath **mulch** or in the soil to reduce evaporation and ensure more water goes directly into the soil and to plant roots. Ask your irrigation professional or retailer for more advice on how to use these systems effectively when using **mulch**.

## 13. Water-Smart Lawn

The depth and quality of soil beneath your **lawn** dramatically influences the water retention properties of your **lawn** and its' ability to withstand dry periods. The Queensland Turf Producer's Association (QTPA) recommends a minimum depth of 100mm of quality soil underlay meeting the Australian Standards for landscaping and garden use AS 4419-2003. The make-up of the underlay should consist of:

- Quality loam with sand, silt and clay components; and
- Organic matter/ humus.

Ask your QTPA accredited turf supplier for more information on how to achieve a water-smart soil underlay.

If your existing **lawn** has been laid on rubble or other poor quality materials, it will not thrive in the longer-term, particularly in times of drought. It may be best in these circumstances to re-lay turf after a suitable underlay has been prepared.

When relying on builders or landscape contractors to plant a new **lawn**, you should make sure they comply with the requirement of this [Irrigation Guideline](#) and use quality underlay of a minimum depth of 100mm. Add organic matter or wetting agents to your **lawn** after planting to improve its' soil retention properties.

## Choose Water Efficient Turf Varieties

When planting a **lawn** for the first time, make sure you choose a warm-season variety.

There are a variety of commercially-available grasses belonging to the grass species below which can be grown under a range of conditions. These species are well-suited to the SEQ climate and use significantly less water than other grasses:

- Buffalo grass;
- Couch grass; and
- Zoysia grass.

Ask your QTPA accredited turf supplier to recommend a water-efficient variety to suit your property.

## Maintaining a Water-Smart Lawn

Now that you have laid your new water-efficient **lawn** species on a suitable underlay, you should ensure your **lawn** is maintained in a water efficient manner. Only water your new **lawn** when it actually needs watering and in the periods and on the days permitted in the water restrictions. This will ensure your **lawn** can cope with dry conditions. Signs that your **lawn** is ready for watering include:

- changing colour;
- the soil below is difficult to penetrate using a sharp object; and
- your **lawn** doesn't spring back after being walked on.

A water-smart **lawn** requires very little water to maintain it in good condition – only 6mm a week in summer and 3mm a week in winter. Depending on rainfall, you may only need to run an **efficient irrigation system** or an **efficient sprinkler** for between 10 and 20 minutes per week to achieve this application. Unlike many plants, **lawn** can remain dormant for some time during periods of drought and quickly spring back to life after rain.

If you observe bright green patches or the presence of fungus (toadstools) or moss, you may be over-watering. By watching your **lawn**, you will soon get a feel for how often and when you need to water throughout the year. Do not water your **lawn** during winter - your **lawn** is dormant during this period.

If you have a large area of **lawn** to be irrigated – consider installing an **efficient irrigation system** designed to water the entire area evenly. Attempting to move an **efficient sprinkler** around a large area may result in areas of overlap (soaked **lawn**) and dry patches

Improve the water-penetration properties of your soil by regular aerating and applying organic material or wetting agents so that more water reaches **lawn** roots.

### Fertilizing

Apply fertilizer during the spring and summer months when there is higher rainfall and your **lawn** is actively growing. Use small amounts of an organic fertilizer as this will require far less water post-application than a chemical fertilizer.

### Mowing

Mowing your **lawn** incorrectly will result in it quickly drying out and needing more water. When mowing your **lawn** you should:

- keep your **lawn** at a height of at least 3cm and only cut when necessary; and
- mow outside of the heat of the day when your newly cut **lawn** will simply dry out.

## 14. Meeting Restriction Consumption Targets

Water restrictions are in force in many areas of Queensland and you must comply with restriction requirements when watering your **garden** and **lawn** (where this is permitted under restrictions). For residents outside of SEQ, please check with your water supplier for restrictions in effect in your local area.

Where water restrictions provide a period in which you can water your **garden** or **lawn**, you must only water for the time it takes to meet the water use needs of your **garden** or **lawn**.  
Remember, *use only what you need.*

For residents of SEQ, each level of Restrictions has a consumption target to help residents manage their water use. The consumption target is based on the level of water consumption that can be effectively sustained at different water supply levels. When choosing when and how to use water outdoors, you should consider how much water different outdoor activities typically require. The Table on the next page provides some examples.

Activity	Flow Rate <sup>2</sup> (litres per minute)	Usage (minutes per week)	Total litres used
Using a high-pressure cleaning device.	7-9	10	90 litres
Hosing continuously - Trigger Nozzle.	18-20	15	270-300 litres

<sup>2</sup> Approximate flow rate – devices vary in efficiency

Washing vehicles – using a bucket and continuously hosing for 5 minutes using a trigger or twist nozzle.	18-20	5	100 litres
Topping up a pool or spa using a hose (without trigger or twist nozzle).	24	10	240 litres

## Calculating how long to operate your *efficient irrigation system*

You can calculate the period you need to operate your *efficient irrigation system* by using the simple calculation outlined below.

<p><b>Period of Operation Calculation</b></p> $T = \frac{\text{Discharge volume of your watering devices (litres/ min) x Number of devices in your system}}{\text{Discharge volume of your watering devices (litres/ min) x Number of devices in your system}}$ <p>T = outdoor volumetric water use target for your household per week (e.g. 1400 litres for 4 person household) – any other outdoor water use activities.</p>
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## Watering Times

As discussed previously, water restrictions apply in many areas of Queensland and water restrictions are sometimes combined with a consumption target. SEQ residents have target water use volumes at various restriction levels which include all outdoor water use activities, such as:

- topping up pools and spas;
- washing vehicles, materials and equipment;
- washing the external surfaces of a building; and
- watering ***gardens*** and ***lawns***.

In order to meet QWC Permanent Water Conservation Measures and Target 230 (230 litres per person per day), it is necessary for SEQ residents to manage their outdoor water use. In general, Target 230 can be achieved by restricting outdoor water use to around 1.5 hours per week in total.

Consequently, the amount of permitted time a household has each week to water ***gardens*** and ***lawns*** will depend on how much time and water they spend on other outdoor watering activities. This means you will need to think about how you want to use water outdoors and plan ahead. While this may take a little time in the beginning, once you have a plan, you only need to be consistent in how you use water.

Make sure you only water during the permitted times under the current level of restriction applicable in your local area. If in doubt check with your Council or, for SEQ residents you can also check the QWC's website at [www.qwc.qld.gov.au](http://www.qwc.qld.gov.au). As an example, the table below outlines watering times for each device used to water ***gardens*** and ***lawns*** under Permanent Water Conservation Measures.

Watering Method	Established Garden or Lawn	New Garden or Lawn
<ul style="list-style-type: none"> <li>• bucket;</li> <li>• watering can;</li> <li>• gravity drip fed watering device (with a maximum capacity of two litres).</li> <li>• <b><i>hand-held hose</i></b> fitted with a trigger nozzle or twist action nozzle;</li> <li>• <b><i>efficient irrigation system</i></b>; or</li> <li>• <b><i>efficient sprinkler</i></b></li> </ul>	<p>No Monday watering.</p> <p>Between 4.00 pm and 10.00 am on any other day of the week</p>	<p>Between 4.00 pm and 10.00 am on any day of the week</p>

The amount of time you need to water by operating an ***efficient irrigation system*** or ***efficient sprinkler*** depends on what device or systems you use.

## 15. Further information

The following Industry, State Government and Local Council information resources will assist you in planning and maintaining your **garden** and **lawn**.

Local Councils often provide gardening and horticultural information specific to your local area. The list of Councils below is not exhaustive, so check the website of your local Council.

Organisation	Website Address
A number of innovative irrigation products are available to consumers. Check the Smart Approved Watermark website at:	<a href="http://www.smartwatermark.org/products">http://www.smartwatermark.org/products</a>
Irrigation Australia Limited Your Guide to Good Garden Watering available at:	<a href="http://www.irrigation.org.au/assets/pages/6E9E6203-1708-51EB-A65470E3F41123EB/GuidetoGoodGardenWatering%2Epdf">http://www.irrigation.org.au/assets/pages/6E9E6203-1708-51EB-A65470E3F41123EB/GuidetoGoodGardenWatering%2Epdf</a>
Irrigation Australia Limited – information on Certified Irrigation Professionals who can provide competent design, installation and auditing services:	<a href="http://www.irrigation.org.au/index.cfm?/training-and-certification/certified-irrigation-professionals-listings">http://www.irrigation.org.au/index.cfm?/training-and-certification/certified-irrigation-professionals-listings</a>
The Queensland Turf Producers Association (QTPA) at:	<a href="http://www.qtpa.com.au">www.qtpa.com.au</a>
The Nursery and Garden Industry Australia available at:	<a href="http://www.lifeisagarden.com.au/wiseabtwater/wiseabtwater.asp?fromwaw-homegardener">http://www.lifeisagarden.com.au/wiseabtwater/wiseabtwater.asp?fromwaw-homegardener</a>
The Savewater Alliance at:	<a href="http://www.savewater.com.au/index.php?sectionid=13">http://www.savewater.com.au/index.php?sectionid=13</a>
Queensland Water Commission (QWC) at:	<a href="http://www.qwc.qld.gov.au">www.qwc.qld.gov.au</a>
The Department of Environment and Resource Management have a range of publications for waterwise gardening available at:	<a href="http://www.nrw.qld.gov.au/water/saverscheme/waterwise_gardening.html">http://www.nrw.qld.gov.au/water/saverscheme/waterwise_gardening.html</a>
Easy Steps to a Waterwise Garden: Environmental Protection Agency (Queensland) at:	<a href="http://www.epa.qld.gov.au/environmental_management/water/how_to_be_waterwise_in_your_home_and_garden/easy_steps_to_a_waterwise_garden/">http://www.epa.qld.gov.au/environmental_management/water/how_to_be_waterwise_in_your_home_and_garden/easy_steps_to_a_waterwise_garden/</a>
Brisbane City Council has a number of useful articles on plants and gardening tips, specifically for the Brisbane climate at:	<a href="http://www.ourbrisbane.com/living/gardening/water/">http://www.ourbrisbane.com/living/gardening/water/</a> <a href="http://www.ourbrisbane.com/living/gardening/plants/">http://www.ourbrisbane.com/living/gardening/plants/</a>
The Gold Coast City Council has developed the Garden Watersaver specifically for the Gold Coast climate which is available at:	<a href="http://www.goldcoast.qld.gov.au/attachment/gccc_gardening_guide.pdf">http://www.goldcoast.qld.gov.au/attachment/gccc_gardening_guide.pdf</a>
Ipswich City Council has a number of useful waterwise gardening publications available at:	<a href="http://www.ipswichwater.com.au/about_us/publications/">http://www.ipswichwater.com.au/about_us/publications/</a>
The Sunshine Coast Regional Council provides the Sunshine Coast WaterWise Gardening Handbook. Available at:	<a href="http://www.sunshinecoast.qld.gov.au">www.sunshinecoast.qld.gov.au</a>

## Schedule 1 - Definitions

Schedule 1 defines particular words that are used in the *Efficient Irrigation for Water Conservation Guideline*. Unless a contrary intention appears, definitions used in the *Water Act 2000* and in QWC's Water Restrictions apply to the interpretation of this *Efficient Irrigation for Water Conservation Guideline*:

**Certified Irrigation Professional** means a person who has attained nationally recognised qualifications in irrigation and achieved certification through Irrigation Australia Limited (IAL).

**drip-line** means a piping system which has in-line or internal dripper inserted manually or during manufacturing

**efficient irrigation system** means a system designed to:

- a. use water efficiently within the volume and time limits set by Restrictions to maintain a healthy, functional **garden** or **lawn** without exceeding the water requirements of the **garden** or **lawn**; and
- b. operate in accordance with the Commission *Efficient Irrigation for Water Conservation Guideline*.

**efficient sprinkler** means a non-fixed watering device that is designed to:

- a. attach to a hose;
- b. be moved around in order to irrigate a **garden** or **lawn**;
- c. use water efficiently within the volume and time limits set by Restrictions to maintain a healthy, functional **garden** or **lawn** without exceeding the water requirements of the **garden** or **lawn**; and
- d. must operate in accordance with the Commission *Efficient Irrigation for Water Conservation Guideline*.

**emitter** means a device of any kind fitted on a network of permanent piping which is operated under pressure to discharge water in a spray, mist or drip form. Common types of **emitters** include drippers, micro-sprayers, pop-up and gear-drive sprays and fixed sprinkler heads.

**garden** is defined as any ground used for the cultivation of, or in which there are situated trees, shrubs, flowers, plants, vegetables, or vegetation of any kind including plants in pots or tubs and excluding **lawn**.

**hand held hose** means a hose fitted with a trigger nozzle or twist action nozzle that is held by hand when it is used.

**lawn** means an expanse of grass-covered land that is usually associated with a **garden**, but does not include active playing surfaces (such as sports grounds).

**mulch** means any material used to cover the surface in and around plants designed to retain moisture and reduce evaporation.

**Precipitation rate** means the volume of water (in litres) applied by the **efficient irrigation system** to a defined area (square metres) over a specified period of time (minutes).

**pressure-compensated** means the ability of the **drip-line** to maintain the same emission rate over a range of pressures.

**rain sensor** means a device that prevents an irrigation system from being operated during, or soon after rainfall.

**reticulated (town) supply system** means a system of water distribution infrastructure operated by a service provider delivering potable (drinking quality) water to premises in the local government area of the service provider, directly to the premises through the distribution system or indirectly to the premises in a water tanker or other container containing water that has been sourced from the reticulated supply system; the system also includes a rainwater tank which contains any water sourced from the reticulated water supply system including rainwater tanks employing a trickle top-up system. However, the system does not include a rainwater tank that is connected to a house via an automatic switching valve for the purpose of maintaining supply to internal toilet cisterns, washing machine cold water taps or other fixtures specified in a local planning instrument where stored rainwater is sourced directly from an outlet from a tank or upstream from the automatic switching valve.

**soil moisture sensor** means a device that measures the amount of residual moisture or water in the soil. It prevents irrigation systems from being used when the soil is already wet.

## APPENDIX A – Precipitation Rate- Case Studies

### **Case Study 1- where manufacturer specification is given in L/min**

Mrs Smart irrigates a garden area of  $18 \text{ m}^2$  using six emitters. The manufacturer's specifications on the emitters state that each emitter has an output of 6 L/min. The combined flow rate from the six emitters in Mrs Smart's irrigation system = 6 emitters x 6 L/minute each = 36L/minute.

Mrs Smart can divide the combined flow rate from the six emitters by the garden area of  $18 \text{ m}^2$  to determine the precipitation rate of her irrigation system. Thus  $36\text{L/minute} \div 18 \text{ m}^2$  garden area = 2 mm/minute.

Should Mrs Smart's garden require only 10mm of precipitation in each irrigation event, then the length of time that Mrs Smart needs to run her irrigation system to get the right amount of water on her garden can be determined by dividing the 10mm required by the precipitation rate of her irrigation system (2mm/minute). Thus  $10\text{mm}/2\text{mm/minute} = 5$  minutes of irrigation time required.

### **Case Study 2- where manufacturer specification is given in L/hour**

Mrs Smart irrigates a garden area of  $18 \text{ m}^2$  using six emitters. The manufacturer's specifications on the emitters state that each emitter has an output of 360 L/hour. The combined flow rate from the six emitters in Mrs Smart's irrigation system = 6 emitters x 6 L/hour each = 2160L/minute.

Mrs Smart can divide the combined flow rate from the six emitters by the garden area of  $18 \text{ m}^2$  to determine the precipitation rate of her irrigation system. Thus  $2160\text{L/minute} \div 18 \text{ m}^2$  garden area = 120 mm/hour.

Should Mrs Smart's garden require only 10mm of precipitation in each irrigation event, then the length of time that Mrs Smart needs to run her irrigation system to get the right amount of water on her garden can be determined by dividing the 120mm/hour by 60 minutes = 2mm/minute, which requires five minutes of irrigation run time equal 10mm precipitation.

Important calculations to keep in mind:

- Precipitation rate (mm/hr) =  $\frac{\text{total flow rate (L/hour)}}{\text{Total area (m}^2\text{)}}$
- Irrigation run time (mins) = precipitation needed (mm)  $\div$  precipitation rate (mm/minute)
- Irrigation run time (hours) = precipitation needed (mm)  $\div$  precipitation rate (mm/hour)



Conversely, if Mrs Smart's rain gauge indicates 10mm or more of rainfall on her garden in the last week, then Mrs Smart has no need to turn on her irrigation system.

## APPENDIX B - Emitter and Efficient Sprinkler Output

Efficient irrigation system emitters	Output Range	Example <i>Emitter</i>	Example of how to achieve Target 200 (litres per person per day) if all of weekly outdoor water use allocation is used for watering <i>garden or lawn</i> Persons per household		Example Precipitation rate <sup>3</sup>
			2 (700L)	4 (1400L)	
<b>Drippers</b> 	2 litres/ hour to 8 litres/ hour; or 0.03 litres/min to 0.13 litres/min.	8 litre/ hour	87 <b>emitters</b> for one hour	174 <b>emitters</b> for one hour	10 mm per hour if spaced 80 cm apart
<b>Micro-sprayer</b> 	25 litres/ hour to 150 litres/hour; or 0.4 litres/min to 2.5 litres/ min.	25 litres/ hour	112 <b>emitters</b> for 15 mins	224 <b>emitters</b> for 15 mins	10 mm per 50 min if spaced two metres apart
		75 litres/ hour	37 <b>emitters</b> for 15 mins	74 <b>emitters</b> for 15 mins	10 mm per 15 min if spaced two metres apart
		125 litres/ hour	22 <b>emitters</b> for 15 mins	44 <b>emitters</b> for 15 mins	10 mm per 10 min if spaced two metres apart
<b>Fixed sprayers (including pop-up sprinklers and gear drives)</b> 	4 litres/ min to 8 litres/min.	4 litres/ min	17 <b>emitters</b> for 10 mins	34 <b>emitters</b> for 10 mins	10 mm per 10 min if spaced four metres apart
		6 litres/ min	11 <b>emitters</b> for 10 mins	21 <b>emitters</b> for 10 mins	10 mm per 7 min if spaced four metres apart
		8 litres/ min	8 <b>emitters</b> for 10 mins		10 mm per 5 min if spaced four metres apart

<sup>3</sup> Sample figures provided as an example only, check with your irrigation specialist or retailer.



<p><b>Drip-line <i>pressure-compensated</i> (50 metres)</b></p> 	<p>0.66 litres/ metres /min to 1.16 litres/ metres/min; or 33 litres to 58 litres/min for 50 metres</p>	<p>1.6 litres/hr at 40 cm spacing</p>	<p>50 metres for 20 mins</p>	<p>100 metres for 20 mins</p>	<p>10 mm per 15 min for 50 metres</p>
		<p>2.1 litres/hr at 30 cm spacing</p>	<p>50 metres for 12 mins</p>	<p>100 metres for 12 mins</p>	<p>10 mm per 10 min for 50 metres</p>
<p><b><i>Efficient Sprinkler</i></b></p>	<p><b>Output Range</b></p>	<p><b>Example</b></p>	<p><b>Example of how to achieve Target 200 Efficient watering of <i>gardens and lawns</i> (weekly)</b></p>		
	<p>1.18 litres/min to 6.4 litres per minute</p>	<p>7 litres/min</p>	<p>2 x 30 minute periods per week @ 7 litres per minute will use 420 litres.</p>		<p>2 x 30 minute periods per week @ 9 litres per minute will use 540 litres</p>