



# Five Keys to Creating an Optimum Irrigation Schedule

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We all know that an irrigation system's job is to supply plants and turf with the water they need to look their best. As water prices continue to rise and fresh water availability decreases, advances in irrigation technology have made it possible to use less water than ever before in the pursuit of beautiful, healthy landscapes. However, even an irrigation system with the latest controller, rotors, sprays and drip irrigation can't be water-efficient if it's not operating under an optimum irrigation schedule.

Because every property is different, with varying terrain, sun exposure and soil types, it can be a real challenge to create an irrigation schedule that applies just the right amount of water at the right times. Whether you're programming a standard controller, smart controller or using a central control system, take some time to consider the following five factors. Understanding the importance of these factors and how they're determined is the first step to creating the best possible irrigation schedule for any site.

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## Plant Water Requirement

The amount of water a plant needs to thrive depends upon the type of plant in question and that plant's root depth. For example, plants with deeper roots, like perennials and native species, have more water available within their root zones. These plants can be watered less often. Plants with shallow roots, like annuals, will require more frequent irrigation. The amount of sun exposure a plant receives and how densely it's planted will also factor into its watering requirements.

Some smart controllers and sophisticated central controls can automatically take plant type and density into account when creating an irrigation schedule. For example, Rain Bird's Maxicom2® Central Control can break down properties into unique microclimates based upon a number of variables, including the types of plant material present.

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## Soil Moisture-Holding Capacity



Soils that consist of smaller particles, like clay, accept water at a slow rate. Soils that consist of large particles, like sand, absorb water much faster. By combining your known soil type with the degree of slope present, you can calculate the maximum number of minutes that water can be applied to the landscape without experiencing runoff.

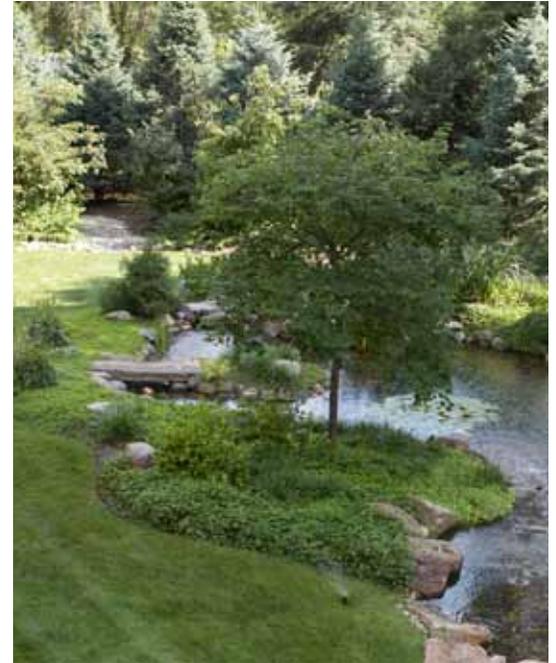
Soils with slow intake rates (e.g. clay) will require multiple irrigation cycles with shorter zone run times. Some controllers, like Rain Bird's ESP-LX Series models, and central control systems like Rain Bird's Maxicom2, IQ™ v2.0 and SiteControl products, include a feature called Cycle + Soak™ that can automatically run multiple irrigation cycles without the need to manually program multiple start times.

## Evapotranspiration

Evapotranspiration, or ET, is the amount of water lost from the soil through evaporation, plus a plant's water loss (known as transpiration), both of which are dramatically affected by humidity, wind speed, soil moisture, plant species and temperature.

Some smart irrigation controllers and central control systems are able to receive current weather data and determine actual ET rates through their own on-site weather stations, using this information to adjust irrigation schedules automatically. For example, Rain Bird's ET Manager™ and ET Manager™ Cartridge can upgrade controllers to this type of smart, ET-based control by receiving weather data via radio broadcasts.

Other controllers and central controls without on-site weather stations can connect to a database of historical ET rates—the average monthly ET rate for a particular geographic location, as calculated by national weather stations and organizations like the National Oceanic and Atmospheric Administration (NOAA).



## Sprinkler Precipitation Rates

Different brands and models of sprinklers will have different precipitation rates—the amount of water each sprinkler applies to the landscape, typically measured in inches per hour. Sprinklers (e.g. sprays or rotors) come in varying precipitation rates to better suit different landscape characteristics. For example, Rain Bird's 1800® Spray, outfitted with a Rotary Nozzle, has a stated precipitation rate of 0.60 inches per hour, while the 5000 Series Rotor's precipitation rate ranges from 0.20 inches – 1.01 inches per hour.

Obviously, a sprinkler's precipitation rate will affect the length of time an irrigation system's zones must run to apply enough water to the landscape. Knowing the precipitation rates of the different sprinklers present within your landscape is necessary to create an optimum irrigation schedule. Keep in mind that sprinkler spacing and water pressure at a particular site can cause actual precipitation rates to vary somewhat from the rates mentioned in a manufacturer's catalog. To ensure greater accuracy, it's possible to calculate an entire zone's precipitation rate by determining its flow rate in gallons per minute by looking at the water meter. Then, divide that number by the total number of square feet present within the zone.

## Watering Windows

An ideal irrigation schedule is one that applies just the right amount of water in the right amount of time without overwatering or under-watering. When calculating zone run times, you must consider the fact that there are often times of day or days of the week when irrigation isn't possible. For example, a water purveyor may enforce restrictions that say watering must only occur between the hours of 10:00 PM to 6:00 AM, or only on Mondays, Wednesdays and Fridays. Or, an athletic complex may host soccer practices from 4:00 PM to 8:00 PM every night, making it impossible to water during that timeframe. In either situation, the remaining periods of time that are available for irrigation at a particular site are called its "watering windows."



Some controllers, like Rain Bird's ESP-LX Series, include special scheduling features that can make it easier to create programs that fit within tight watering windows. For example, the ESP-LX Series Controllers include a SimulStation™ feature that allows users to define a number of zones that can operate simultaneously within each program. A Station Sequencing option lets users choose the sequence by which zones can operate. This same feature also lets users sequence by a zone's priority, ensuring that high-priority zones always get watered first. Some of Rain Bird's controllers and central control systems offer a Flo-Manager® feature that also makes it possible to operate multiple stations simultaneously, efficiently balancing system demands and maximum capacities to meet tight watering windows.

Before installing an irrigation system, landscape designers will sometimes create a "worst-case scenario" irrigation schedule

to ensure that the system is able to apply enough water during available watering windows. If the schedule isn't able to complete within the allotted amount of time, then the landscape designer may need to change the landscape design and irrigation system to ensure healthy plants and turf in the future. Rain Bird's IQ v2.0 Central Control System includes a Dry-Run feature that effectively tests an irrigation schedule to make sure it's correct before it's implemented.

Creating an optimum irrigation schedule can require a great deal of thought, research and manual calculations. Smart controllers and central control systems can make this task a great deal easier by walking contractors through the process. However, even when using a smart controller, it's still important for irrigation professionals to understand and apply the scheduling parameters that contribute to zone run times and overall water use.



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