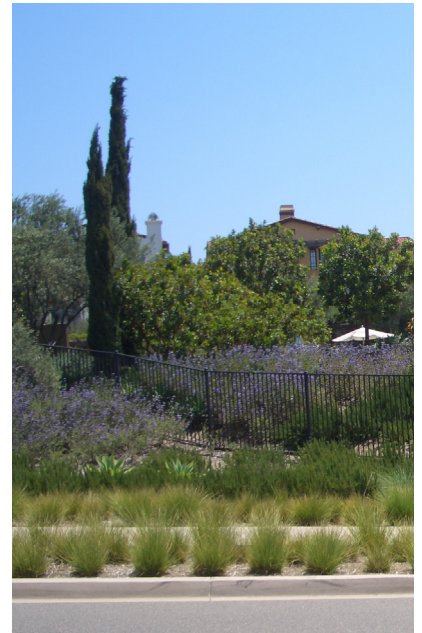


Performance-Based Irrigation Management Contract Template

A Water Smart Landscape Program



Performance-Based Irrigation Management Contract Template

Table of Contents

I. Introductory Requirements

- 1.01 Project Concepts
- 1.02 Site Map
- 1.03 Irrigation Station and Hydrozone Map
- 1.04 Site Plant List

II. General Requirements

- 2.01 Irrigation Maintenance Schedule/Inspection Schedule
- 2.02 Contractor Supervision
- 2.03 Extra Work
- 2.04 Excess Irrigation Charges

III. Scope of Work

- 3.01 Water Management Program

Appendix A: Definitions

Appendix B: Weekly Water Meter Log Sample

Appendix C: Valve Data Spreadsheet Sample

I. Introductory Requirements

1.01 Project Concepts (Optional: May be replaced and/or supplemented)

Contractor, responsible for the maintenance of the landscape areas, seeks to provide an attractive, colorful, resource efficient landscape for the benefit of the customer.

The customer expects a high standard of horticultural and irrigation service to maintain the resource efficient landscape. These standards are detailed in the Landscape Maintenance Specifications. The specifications include the use of an integrated management of program of soil, water, irrigation system, fertilization and pest management that optimizes plant health, resource efficiency and, therefore, cost-effectiveness for the site and the Customer.

1.02 Digital Site Map

A digital site map will be provided during the Request for Proposal process. Site maps should be organized according to water meter/account information. The site map will be shared between the Customer and Contractor. If a map is not available during the RFP, a digital site map shall be created during the contract transition period. The map shall reflect the general plant palette, plant associations (hydrozones), streets, and addresses. Overlays of digital graphics and labels on a satellite map like Google Maps is a great alternative if an existing site map is not available. Copies of the map shall be on file with the Customer and Contractor, and will be used to identify locations of work to be performed, locate problems, inventory repairs, etc.

1.03 Irrigation Map

A map describing the existing irrigation system including location of meters, valves controllers, quick couplers, soil sensors, weather stations, and the types (brands) of irrigation equipment utilized on site. Irrigation maps should be organized according to water meter/account information.

1.04 Site Plant List and Hydrozone Map

A list of all existing plants (*Genus species*) will be included and on file with the Customer and Contractor. Organize the list into water use categories for example: low-water use, moderate water use, and high water use. The plant list is to be used as a reference to create a general hydrozone map to assist in irrigation budget calculations, to identify plants that do not meet the standards of the association, and to help determine potential plants to add to the site when appropriate. Additionally, the list will be cross-referenced with the valve data to ensure that hydrozones are properly irrigated.

II General Requirements

2.01 Irrigation Maintenance Schedule/Inspection Schedule

Contractor shall provide service based on the scope of work. The Customer and Contractor shall participate in monthly site review/inspections.

2.02 Contractor Supervision

Contractor shall provide qualified on-site supervision to insure high quality work and provide accurate reports.

2.03 Extra Work

Work determined to be beyond the tasks listed in the scope of work shall be “extra” work. Extra work will be planned, estimated and proposed to the Customer for authorization before performing the work (“extra” work should be designated and clearly understood at the initiation of the contract).

2.04 Excess Irrigation Charges

Contractor is responsible for obtaining water usage restrictions for property from applicable water purveyor and maintaining the usage within allocations. It is the responsibility of the landscape maintenance contractor to manage the irrigation within ___% of the water meter budget. The water budget formula for all sites enrolled in MWDOC’s Water Smart Landscape Program is calculated on a meter specific basis as follows:

$$(\text{Budget for Turf}) + (\text{Budget for Shrubs \& other}) = \text{Meter Budget}$$

Budget for Turf (in CCFs):

$$\text{ETo} \times \text{Kc}^* \times (\text{Turf irrigated area in acres}) \times 36.3 / \text{IE}$$

ETo: The program calculates total ETo by matching the weather data to the exact date range shown on the website.

*The Kc for turf (cool season grass) varies depending on the growing season

Turf: Irrigated Area is provided by the customer

IE: Irrigation Efficiency is 0.8 or 80% (80% is a California Best Management Practices [BMP 5] goal to achieve the water budget.

Distribution Uniformity is one of the factors in calculating IE

Budget for Shrubs and other (in CCFs):

$$(\text{ETo} \times \text{Kc}^{**} \times (\text{non-turf irrigated area in acres}) \times 36.3) / \text{IE}$$

**The Kc for shrubs and others is 0.5

The contractor is responsible for reading the irrigation meter(s) on a weekly basis and recording all readings in a water management log. The contractor will review the irrigation logs and monthly irrigation bills with the customer on a monthly basis. During these meetings the Contractor and the Customer will discuss the meter(s) with irregular

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usage, to include situations where water consumption is too low or excessively high. Flow sensors are recommended to help identify leaks and to avoid water waste. Additionally, flow sensors will assist in accurately maintaining the water usage log. It is the contractor's responsibility to provide sufficient water to maintain optimum plant health.

Optional Distribution Uniformity Testing Requirement:

Distribution uniformity (DU) testing shall be conducted on a quarterly basis. Each quarter a minimum of two valves will receive an irrigation audit to determine DU and irrigation system condition (Audited valves must change each quarter). Overhead spray irrigation requires a minimum DU of ____%. The results of the test are to be included in the quarterly performance evaluation.

Pros:

- Provides a schedule for DU testing
- Provides a tool for communicating irrigation efficiency
- ROI for system retrofits is more easily quantified

Cons:

- DU testing can be labor and time intensive
- DU is never 100%
- DU is extremely difficult and costly to measure in shrub areas

All plant stress or loss due to under-watering or over-watering will demonstrate Contractor neglect and cost to replace said material will be at Contractor's sole expense. The Customer will conduct quarterly Water Management Meetings to settle any penalty charges that were caused by the Contractor's inability to properly manage water allocations.

OPTION 1: for sites within a Budget-Based Tiered Rate Structure

The Contractor will be responsible for all penalties incurred for over-irrigation on each water meter unless reason for such penalty can be justified by to the Customer and proper Water Management practices are being met. Penalties are defined as all charges over the ____% of the budget allocation (excessive, wasteful) that are charged on the water bill. Request for Credit to the water purveyor will be the responsibility of the Contractor and a copy of each adjustment request shall be sent to the Customer for proof of correction. Requests for Credit are subject to review by the water purveyor and are not a guaranteed credit.

Pros:

- Budget-Based tiered rates are clearly defined and easy to use for measuring performance criteria
- Significant monetary incentive to maintain a water efficient landscape
- Large cost savings potential for property owner
- Reduction of stormwater runoff



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- Grow your business

Cons:

- Potential for significant financial liability
- May increase initial contracting costs

OPTION 2: for sites using the Municipal Water District of Orange County's Landscape Performance Certification Program (LPCP)

The Contractor will be required to pay any excessive irrigation on each water meter unless usages can be justified by the Customer and proper Water Management practices are being met. Excessive irrigation is defined as water usage greater than ____% of budget. Charges will be based on local water purveyor billing rates.

Pros:

- Incentive criteria is scientifically derived from local Evapotranspiration data
- LPCP is a free program paid for by the Municipal Water District of Orange Co.
- Large cost savings potential for property owner
- Reduction of stormwater runoff

Cons:

- May increase initial contracting costs
- Monetary incentive is not as significant as budget-based tiered rate structure

Option 3: Landscape Contractor Pays Water Bills (Santa Rosa)

In this model the property owner and landscape contractor would agree to a baseline landscape water budget based on an average of several previous years of actual water consumption. The contractor is responsible for managing the site's irrigation water at or below the baseline budget. In a scenario where contractor becomes the actual water customer, the property owner/manager would then pay the monthly water bill as calculated in the baseline as part of the maintenance contract, or the property owner/manager continues as the water customer and pays the monthly bill. Either way, this option places the entire burden of irrigation related expenses on the contractor. If the contractor is able to manage irrigation below the baseline irrigation expenses he/she will keep the remaining margin as profit (or a portion thereof in the case where the property wants to take a share of any profits). If the contractor manages irrigation above the baseline irrigation expenses, he/she will be required to pay for the overage.

An additional option could be to have the contractor make landscape/irrigation efficiency upgrades at his/her own expense (with owner approval). These calculated changes would result in significant water savings and larger profit margins for the contractor (efficiency improvements would result in more profit margin on water savings than the cost of implementing the work). This type of approach would also necessitate a longer maintenance contract (5+ years) in order for the contractor to have the time to make the improvements cost effective.

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This option provides a monetary bonus incentive to contractors that are managing landscapes more efficiently than previous contractors.

Pros:

- Possibility for contractor to receive incentive bonus for efficient irrigation
- Positive and negative monetary incentives encourage water efficient landscapes
- Possibility for longer maintenance contract (desirable for the contractor)
- Property owner could receive landscape/irrigation upgrades at no additional cost

Cons:

- May be difficult to compare baseline to actual at the end of each year because irrigation demands fluctuate with Evapotranspiration. Ex: baseline will incorporate and average of historical consumption but what if an extended period of drought occurs during the contract period?
- Property owner may not realize all of the water cost savings
- How are leaks, breaks and water loss due to vandalism addressed?
- Small landscape companies may not be able to participate due to insufficient cash flow

III. Scope of Work

3.01 Water Management Program

The water management program is intended to maximize plant health, minimize water damages to association hardscape and property, and eliminate all excessive water use and irrigation runoff.

Option 1:

A complete irrigation system audit will be conducted prior to contract commencement.

Option 2:

A complete irrigation system audit will be conducted at contract commencement.

Contractor shall consistently maintain all components of the irrigation system in proper working order, as per manufacturers specifications, by inspecting the entire system on an ongoing basis.

1. Drip lines and spray heads shall be randomly checked on an ongoing basis such that the entire system is checked each month. Malfunctioning systems will be corrected immediately. Methods of detection include: visual sightings of water on association hardscape and property, soil probing, meter monitoring and specific line observations.
2. Irrigation controllers and irrigation scheduling shall be adjusted regularly as weather changes (ET_o); plant needs and water budget allocations (70-80% ET_o)

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- to avoid water penalty charges. Frequent controller rescheduling may be required depending on weather conditions.
3. Irrigation system pressure shall be checked and adjusted at least monthly to insure efficient operation.
 4. All irrigation replacement parts shall be as original installation or approved to assure distribution uniformity is maintained.
 5. Turf spray heads shall be uniform in output and kept adjusted for accurate throw. If the irrigation is not adequate to provide uniform coverage and ability to meet water budgets, the Customer (property owner) agrees to upgrade the system to achieve site efficiency. It is recommended that each quarter a minimum of two valves will receive an irrigation audit to determine DU and irrigation system condition (Audited valves must change each quarter). The results of the test are to be included in the quarterly performance evaluation.
 6. Contractor shall list and report all irrigation system damages to the Customer with the cost estimate of repair/replacement.
 7. Contractor shall track and provide the customer an irrigation-scheduling log that tracks the irrigation schedule and the amount (volume) of water applied to various site hydrozones. The Contractor may choose to use irrigation scheduling and monitoring software of their choice to determine water schedules.
 8. The water budget formula for all sites enrolled in MWDOC's Water Smart Landscape Program is calculated on a meter specific basis as follows:

$$(\text{Budget for Turf}) + (\text{Budget for Shrubs \& other}) = \text{Meter Budget}$$

Budget for Turf (in CCFs):

$$\text{ETo} \times \text{Kc}^* \times (\text{Turf irrigated area in acres}) \times 36.3 / \text{IE}$$

Budget for Shrubs and other (in CCFs):

$$(\text{ETo} \times \text{Kc}^{**} \times (\text{non-turf irrigated area in acres}) \times 36.3) / \text{IE}$$

******The Kc for shrubs and others is 0.5

9. For weather based scheduling, Contractor shall use software that will track and report water applications on a station-by-station basis and that can compare actual water use to local ETo.
10. Irrigation scheduling will be performed to encourage deep roots, including deep watering through use of multiple repeat cycles. Soil probing shall be used to determine soil moisture depth, overall moisture levels and the need to adjust irrigation schedules. Soils will be allowed to dry to a 50% moisture depletion level between irrigations in order to avoid root-rot and allow adequate air to be present in the soil.
11. Irrigation scheduling will be coordinated with all other maintenance activities, including mowing, aeration and fertilization.

Definitions

“*Distribution Uniformity*” or “*DU*” is a measure of how uniformly an irrigation head applies water to a specific target area and theoretically ranges from zero to 100 percent.

“*Drip irrigation*” means any non-spray *low volume irrigation* system utilizing emission devices with a *flow rate* measured in gallons per hour. *Low volume irrigation* systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

“*Emitter*” means a *drip irrigation* emission device that delivers water slowly from the system to the soil.

“*Estimated Applied Water Use*” or “*EAWU*” means the annual total amount of water estimated to keep plants in a healthy state. It is based on factors such as reference *evapotranspiration rate*, the size of the *landscaped area*, *plant water use factors*, and the *irrigation efficiency* within each hydrozone.

“*Evapotranspiration adjustment factor*” or “*ETAF*” means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. For purposes of the ETAF, the average irrigation efficiency is 0.71. Therefore, the ETo Adjustment Factor is $(0.7) = (0.5/0.71)$. ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing non-rehabilitated landscapes is 0.8.

“*Evapotranspiration rate*” means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

“*Flow rate*” means the rate at which water flows through pipes, *valves* and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

“*Hardscapes*” means any durable material or feature (*pervious* and *non-pervious*) installed in or around a *landscaped area*, such as pavements or walls. Pools and other water features are considered part of the *landscaped area* and not considered *hardscapes* for purposes of these Guidelines.

“*Hydrozone*” means a portion of the *landscaped area* having plants with similar water needs and typically irrigated by one *valve/controller* station. A *hydrozone* may be irrigated or non-irrigated.

“*Infiltration rate*” means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

“*Invasive plants species*” or “*noxious*” means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. *Invasive plant species* may be regulated by county agricultural agencies as *noxious species*.

“*Irrigation audit*” means an in-depth evaluation of the performance of an irrigation system conducted by a *Certified Landscape Irrigation Auditor*. An *irrigation audit* includes, but is not limited to: inspection, system tune-up, system test with *distribution uniformity* or emission uniformity, reporting *overspray* or *runoff* that causes overland flow, and preparation of an irrigation schedule.

“*Irrigation Management Efficiency*” or “*IME*” means the measurement used to calculate the *irrigation efficiency* of the irrigation system for a landscaped project. A 90% IME can be achieved by using evapotranspiration controllers, soil moisture sensors, and other methods that will adjust irrigation run times to meet plant water needs.

“*Irrigation efficiency*” or “*IE*” means the measurement of the amount of water beneficially used divided by the amount of water applied to a *landscaped area*. *Irrigation efficiency* is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average *irrigation efficiency* for purposes of these *Guidelines* is 0.71. Greater *irrigation efficiency* can be expected from well-designed and maintained systems. The following irrigation efficiency may be obtained for the listed irrigation heads with an IME of 90%:

- a. Pop-up stream rotator heads = 75%
- b. Stream rotor heads = 75%
- c. Microspray = 75%
- d. Bubbler = 80%
- e. Drip emitter = 85%
- f. Subsurface irrigation = 90%

“*Landscape coefficient*” (*KL*) is the product of a *plant factor* multiplied by a density factor and a *microclimate* factor. The *landscape coefficient* is derived to estimate water loss from irrigated *landscaped areas* and *special landscaped areas*.

“*Landscape Performance Certification Program*,” also called “*Water Smart Landscape Program*,” Is a FREE water management tool for homeowner associations, landscapers and property managers. Participants in the program use the Internet to track their irrigation meter’s monthly water use and compare it to a custom water budget. This enables property managers and landscapers to easily identify areas that are over/under watered, and enhances their accountability to homeowner association boards. Participants of this program receive a monthly Irrigation Performance Report directed to the Property

Pilot Program

Owner, Property Manager and Landscaper to: easily track irrigation water use, help reduce water bills, improve the health, appearance and value of landscapes, protect the environment by decreasing urban runoff, maintain compliance with NPDES requirements. This program is provided free of charge by the Municipal Water District of Orange County and your local water purveyor.

“*Landscape professional*” means a licensed *landscape architect*, licensed landscape contractor, or any other *person* authorized to design a landscape pursuant to Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the California Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the California Food and Agriculture Code.

“*Landscaped area*” means all the planting areas, *turf* areas, and *water features* in a landscape design plan subject to the *Maximum Applied Water Allowance* and *Estimated Applied Water Use* calculations. The *landscaped area* does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other *pervious* or *non-pervious hardscapes*, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

“*Maximum Applied Water Allowance*” or “*MAWA*” means the upper limit of annual applied water for the established *landscaped area*, as specified below. It is based upon the area’s *reference evapotranspiration*, the *ETAF*, and the size of the *landscaped area*. The *Estimated Applied Water Use* shall not exceed the *Maximum Applied Water Allowance*. This design and management standard is mandated by law in AB-1881.

Total *MAWA* = (ETo x 0.7 x LA in Sq. Ft. x 0.62) + (ETo x 1.0 x SLA in Sq. Ft. x 0.62) = Gallons per year for LA+SLA

MAWA = *Maximum Applied Water Allowance* (gallons per year)

ETo = Reference Evapotranspiration **Appendix C** (inches per year)

0.7 = *Evapotranspiration Adjustment Factor (ETAF)*

1.0 = ETAF for *Special Landscaped Area*

LA = *Landscaped Area* (square feet)

0.62 = *Conversion factor* (to gallons per square

“*Microclimate*” means the climate of a small, specific area that may contrast with the climate of the overall landscaped area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

“*Mulch*” means any organic material such as leaves, bark, straw or compost, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

Pilot Program

“*Non-pervious*” means any surface or natural material that does not allow for the passage of water through the material and into the underlying soil.

“*Overspray*” means the irrigation water, which is delivered beyond the target area.

“*Pervious*” means any surface or material that allows the passage of water through the material and into the underlying soil.

“*Plant factor*” or “*plant water use factor*” is a factor, when multiplied by *ETo* that estimates the amount of water needed by plants. For purposes of this *Water Efficient Landscape Ordinance*, the *plant factor* range for low water use plants is 0 to 0.3; the *plant factor* range for moderate water use plants is 0.4 to 0.6; and the *plant factor* range for high water use plants is 0.7 to 1.0. *Plant factors* cited in these *Guidelines* are derived from the Department of Water Resources 2000 publication “Water Use Classification of Landscape Species.”

“*Precipitation rate*” means the rate of application of water measured in inches per hour.

“*Property owner*” or “*owner*” means the record owner of real property as shown on the most recently issued equalized assessment roll.

“*Reference evapotranspiration*” or “*ETo*” means a standard measurement of environmental parameters, which affect the water use of plants. *ETo* is given expressed in inches per day, month, or year as represented in Appendix C of these *Guidelines*, and is an estimate of the evapotranspiration of a large field of four to seven-inch tall, cool-season grass that is well watered. *Reference evapotranspiration* is used as the basis of determining the *Maximum Applied Water Allowances*.

“*Runoff*” means water, which is not absorbed by the soil or landscape to which it is applied and flows from the landscaped area. For example, *runoff* may result from water that is applied at too great a rate (application rate exceeds *infiltration rate*) or when there is a slope.

“*Sprinkler head*” means a device, which delivers water through a nozzle.

“*Station*” means an area served by one *valve* or by a set of *valves* that operate simultaneously.

“*Turf*” means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermuda grass, Kikuyu grass, Seashore Paspalum, St. Augustine grass, Zoysiagrass, and Buffalo grass are warm-season grasses.

“*Valve*” means a device used to control the flow of water in an irrigation system.

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“Budget Based Tiered Rate Water Usage Tiers

| Tier | Use (Percent of Allocation) |
|-------------|------------------------------------|
|-------------|------------------------------------|

| | |
|------------|---------|
| Low Volume | 0 - 40% |
|------------|---------|

| | |
|-----------|-----------|
| Base Rate | 41 - 100% |
|-----------|-----------|

| | |
|-------------|-------------|
| Inefficient | 101% - 110% |
|-------------|-------------|

| | |
|-----------|-------------|
| Excessive | 111% - 120% |
|-----------|-------------|

| | |
|----------|-------|
| Wasteful | 121%+ |
|----------|-------|

Based on the Irvine Ranch Water District Budget Based Tiered Rate Structure

“*WUCOLS*” means the Water Use Classification of Landscape published by the University of California Cooperative Extension, the Department of Water Resources, and the Bureau of Reclamation, 2000. www.owue.water.ca.gov/docs/wucols00

Weekly Water Meter Reading and Allocation Log



Site Name: _____

Meter Number: _____

Weather Station Zone: _____

| Today's Date | Today's Meter Reading | Minus - | Previous Meter Reading | Equals = | Water Usage | Allocation: CCF/Acre or Inches/Week | Times x | Site Acreage | Equals = | Site Allocation | Over/Under |
|--------------|--------------------------|------------|---------------------------|-------------|-------------|---|------------|--------------|-------------|-----------------|------------|
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |
| | | - | | = | 0 | | x | | = | 0 | |

CIMIS Instructions:

Access CIMIS Station #75 data by establishing a user account with CIMIS.

"My CIMIS Reports" provide daily, weekly, and monthly ETo data for the Orange County Irvine weather station.

website: <http://www.cimis.water.ca.gov/cimis/frontMyReport.do>

IRWD ET Hotline Instructions:

Call the ET Hotline* at 949-453-5451 to get the allocation per acre for your climate zone. If you are not certain which climate zone this meter is in, call IRWD customer service at 949-453-5300.

How Allocations Work

Landscape water-use allocations are determined by the square footage of irrigated landscape and the ET for exactly those day that occurred during the billing cycle. Because ET changes daily, the allocation will change with every bill. Allocations have several "buffers" built in, so your usage should always be below your allocation. For example, IRWD assumes that all landscape is 100 per- cent turf, located in 100 percent sun. There is also an "inefficiency" factor built into the formula because you are not expected to change your controllers daily nor have a perfect irrigation system.