

Colvin, Judith

From: mweo-bounces@water.ca.gov on behalf of Hector Baeza [hbaeza@sitedesign-studio.com]
Sent: Tuesday, March 25, 2008 11:49 AM
To: mweo@water.ca.gov
Cc: 'Chris Bedord'
Subject: [MWEO] Comments Water Efficient Landscape Ordinance
Attachments: ASIC_Comments on Model Ordinance_3-17-08.pdf; Letter Model Water Efficient Landscape Ord .doc

Judy Colvin

Please find my comments on the proposed Water Efficient Landscape Ordinance. Attached is also the comments that I support from ASIC. I appreciate your consideration of these comments and look forward to your response.

Thanks
HB

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SITE LIGHTING DESIGN

March 25, 2008

Ms. Judy Colvin
Department of Water Resources
Office of Water Use Efficiency and Transfers
P.O. Box 942836
Sacramento, CA 94236-0001

**RE: Comment on Model Water
Efficient Landscape Ordinance**

Dear Ms Colvin:

On February 26, 2008 I attended a joint meeting between The American Society of Irrigation Consultants (ASIC), The American Society of Landscape Architects (ASLA) and The California Landscape Contractors Association, and several local water district representatives in attendance, in Newport Beach, California. The meeting focused on discussing the specific elements of the proposed Model Water Efficient Landscape Ordinance. Attached is the result of over 100 landscape and irrigation professional's comments made which illustrates various areas where we believe that the proposed Ordinance needs further evaluation and revision.

I am writing this letter to support the comments provided by ASIC in the attached document and urge you to review and take into serious consideration these comments. Having over 30 years of experience in the design profession, I have read the proposed Ordinance and agree with the comments provided by ASIC in the letter dated March 18, 2008. I completely agree that we should implement criteria that promotes further water conservation in our State, but avoid adopting regulations that add to the already cumbersome review process, and regulation that simply would not lead to water savings.

I am very concern that the Ordinance as written will in fact add cost to the development process, through higher consultant cost, higher installation costs, added regulatory and plan check costs; all of which will be passed on to the Owner. I recommend that the ASIC comments be implemented they represent a collective voice from the design profession and construction community. I trust common sense and sound technical knowledge will prevail.

Sincerely,
Site Design Studio, Inc.

Hector Baeza
Principal

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American Society of Irrigation Consultants

March 18, 2008

Department of Water Resources
Office of Water Use Efficiency and Transfers
P.O. Box 942836
Sacramento, CA 94236-0001
Attention: Judy Colvin

RE: Comments on Model Water Efficient Landscape Ordinance

Attached please find for your review, a 48 page document containing the comments submitted by the American Society of Irrigation Consultants pertaining to the Model Water Efficient Landscape Ordinance.

Respectfully Submitted By,

David D. Davis
President

Norman F. Bartlett
Executive Secretary

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TEXT OF PROPOSED REGULATIONS

NOTE:

- Text proposed to be added is displayed in *italic* type.
- Text proposed to be deleted is displayed in ~~strikeout~~ type.
- Existing text is displayed in regular type.

In Division 2, Title 23, California Code of Regulations, to amend and add to Chapter 2.7. Model Water Efficient Landscape Ordinance, Sections 490 through 495, to read as follows:

From: The American Society of Irrigation Consultants (ASIC)

The comments shown below in **BLUE** have been added to the final draft of the Model Water Efficient Landscape Ordinance. These comments represent the joint effort of landscape and irrigation professionals. On February 26, 2008, a joint meeting between ASIC, the American Society of Landscape Architects (ASLA) and the California Landscape Contractors Association was held in Newport Beach, California. The meeting had over 100 landscape and irrigation professionals in attendance.

California Code of Regulations

Title 23. Waters

Division 2. Department of Water Resources

Chapter 2.7. Model Water Efficient Landscape Ordinance

§490. Purpose.

1. The State Legislature has found:
 - (a) ~~that the limited supply of state waters are subject to ever increasing demands;~~ *The waters of the state are of limited supply and are subject to ever increasing demands;*
 - (b) ~~that the continuation of California's economic prosperity depends on adequate supplies of water being available for future uses.~~ *The continuation of California's economic prosperity is dependent on adequate supplies of water being available for future uses;*
 - (c) ~~that state policy promotes conservation and efficient use of water and to prevent waste of this valuable resource.~~ *It is the policy of the state to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;*
 - (d) ~~that landscapes provide recreation areas, clean the air and water, prevent erosion, offer fire protection, and replace ecosystems displaced by development;~~ *Landscapes are essential to the quality of life in California by providing areas for active and passive recreation and an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development;*
 - (e) ~~that~~ *Landscape design, installation, maintenance and management can and should be water efficient; and*
 - (f) *Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use.*
2. Consistent with the legislative findings, the purpose of this model ordinance is to:
 - (a) promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;
 - (b) establish a structure for *planning, designing, installing, and maintaining, and managing* water efficient landscapes in new *construction and rehabilitated* projects; and
 - (c) establish provisions for water management practices and water waste prevention for ~~established~~ *existing* landscapes.

~~Note: Authority cited: Sections 65591.5, 65594, Gov. Code. Reference: Sections 65591, 65591.5, 65597, Gov. Code.~~

Note: Authority cited: Section 65595, Gov. Code. Reference: Sections 65591, 65592, 65593, 65594, 65595, 65596, Gov. Code.

§490.1. Scope.

1. *This ordinance applies to all local agencies, cities or counties including charter cities and charter counties. On or before January 1, 2010, a local agency shall adopt one of the following:*
 - (a) *A water efficient landscape ordinance that is at least as effective in conserving water as this ordinance; or*
 - (b) *This updated ordinance.*
2. *If a local agency has not adopted an ordinance, on or before January 1, 2010, the ordinance adopted*

by the State of California Department of Water Resources shall apply within the jurisdiction of the local agency as of that date, shall be enforced by the local agency, and shall have the same force and effect as if adopted by the local agency.

- 3. Nothing in this ordinance shall be construed to require the local agency's water efficient landscape ordinance to duplicate, or conflict with, a water efficiency program or measure implemented by a public water system, as defined in Section 116275 of the Health and Safety Code, within the jurisdiction boundaries of the local agency.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65591, 65592, 65595, Gov. Code.

§ 490.2. Intent.

The intent of this ordinance is to guide local agencies to:

- 1. use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;*
- 2. develop mechanisms to implement and enforce the ordinance;*
- 3. incorporate the criteria and specifications of the ordinance in the bidding and contracting processes of their own landscape projects;*
- 4. develop a water use efficiency education program that seeks to educate water users in their area;*
- 5. promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;*
- 6. coordinate with the local retail water purveyor to implement a tiered rate structure as an economic incentive for water use efficiency; and*

Issue:

Based on the definition of a local agency and the above statement, it does not appear that local water purveyors are required to comply with the Model Ordinance, but may do so at the request of a local agency. Only a city or a county has the authority to enact an ordinance. Therefore, in reality a city or county has no authority over the local water purveyor to ensure compliance with the Model Ordinance and likewise the local water purveyor has no authority over a city or county. Because of privacy issues neither a city or county nor a water purveyor can share information as suggested by the Model Ordinance.

Recommendation:

Require water purveyors to track landscape water use against the "Maximum Water Allowance" as required by the Model Ordinance and assess penalties for exceeding the maximum water allowance, then and only then will there be a real chance of saving water in the landscape. IRWD is the only water district in California that tracks irrigation water use against a landscape water allocation. IRWD then assesses penalties for exceeding their landscape water allotment. IRWD should be considered as the template for all water purveyors in assuring a potential to save water in the landscape.

- 7. encourage licensing and certification programs by professional trade organizations and other educational organizations that promote water use efficiency and best management practices.*

Issue:

Landscape Architects and landscape contractors are already licensed by the State of California to

prepare a landscape and irrigation documentation packages. Most local agencies already require licensed landscape architects or landscape contractors to prepare and sign landscape and irrigation construction packages. Irrigation Consultants can provide consulting services under the Landscape Architects Practice Act' Rules and Regulations Business and Professions Code (BPC). BPC Section 5641.6 without being certified.

Individuals are not required to be licensed to practice irrigation design within the State of California. In 1970 the American Society of Irrigation Consultants (ASIC) was formed in California to create a organization of professional irrigation consultants.

LANDSCAPE DESIGN IN CALIFORNIA

Permitted Practice for Professionals, Practitioners, and Unlicensed Persons

This document has been prepared by the Landscape Architects Technical Committee (LATC), the licensing and regulatory agency for the practice of landscape architecture in California. The purpose of this document is to provide a quick reference regarding the various professionals, practitioners, and unlicensed persons who may offer landscape design services and the permitted scope and/or limitations that pertain to each. Please note that a licensed professional is required when the scope of a particular project demands the applicable professional services. While every effort has been made to ensure the accuracy of this document, it does not have legal effect. Should any difference or error occur, the law will take precedence. For more information, contact the LATC at (916) 575-7230 or latc@dca.ca.gov, or visit www.latc.ca.gov.

Irrigation Consultants

- ◆ May engage in the practice of, or offer to practice as, an irrigation consultant.
- ◆ May perform professional services, such as consultation, investigation, reconnaissance, research, design, preparation of drawings and specifications and responsible supervision, where the dominant purpose of such service is the design of landscape irrigation, in accordance with accepted professional standards of public health and safety

APPLICABLE STATUTES: Sections 5641, 5641.1, 5641.5, 5641.6 of the BPC

Recommendation:

Replace item #7 with the following: licensed landscape architects, landscape contractors, irrigation design professionals and other educational organizations shall encourage and promote water use efficiency and best management practices.

Note: Authority Cited: Sections 65995, Gov. Code. Reference: Sections 65591, 65593, 65595, 65596, Gov. Code.

§ 490.3. Applicability.

(a) APPLICABILITY

~~(1) Except as provided in Section 492 (a) (3), this section shall apply to: (A) all new and rehabilitated landscaping for public agency projects and private development projects that require a permit; and (B) developer-installed landscaping in single-family and multi-family~~

~~projects:~~

1. *After January 1, 2010, this ordinance shall apply to all of the following landscape projects :*
 - (a) *new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to and greater than 2,500 square feet; requiring a permit, plan check, or design review;*
 - (b) *new construction and rehabilitated landscapes which are developer-installed in single-family and multi-family residential projects with a landscape area equal to and greater than 2,500 square feet requiring a permit, plan check, or design review; new construction and rehabilitated landscapes which are homeowner-provided and/or homeowner-hired landscaping in single-family and multi-family residential projects with a landscape area equal to and greater than 2,500 square feet requiring a permit, plan check, or design review.*
 - (c) *existing landscapes with a landscape area equal to or greater than 2,500 square feet are limited to Section 493.1;*
 - (d) *cemeteries. Recognizing the special landscape management needs of cemeteries, new cemeteries are limited to Sections 492.6, 492.13, 492.14, and 492.18 and existing cemeteries are limited to Section 493.1.*

~~(2) Projects subject to this section shall conform to the provisions in Section 492.-2. (3)~~

~~This section~~ This ordinance does not apply to:

- (a) *homeowner-provided and homeowner-hired landscaping at single-family and multi-family residential projects less than 2,500 square feet;*
- ~~(b) cemeteries;~~
- (b) registered historical sites;
- (c) ecological restoration projects that do not require a permanent irrigation system;
- (d) mined-land reclamation projects that do not require a permanent irrigation system; or
- (e) any project with a landscaped area less than 2,500 square feet.

Issue:

DWR's "Notice of Proposed Rulemaking" indicates there will be no additional costs imposed by this ordinance to. Since local agencies and school districts have the authority to levy service charges, plan check fees or assessments against any developers, builders, owners, etc. that are required to get approvals under the model ordinance, these service charges, plan check fees or assessments will be passed on to developers, builders, owners, etc. Local agencies and school districts will then be required to find and hire qualified staff to take on the workload of broader plan checking responsibilities brought on by this Model Ordinance. Local agencies and school districts will need to set up a department or sub-department within their local agency or contract with an outside consulting firms to review designs or plan check a completed Landscape Documentation Package as required by the Model Ordinance to permit any landscape and irrigation system over 2500 square feet in size. The financial impact to the local agency is unknown, but will be paid for by developers or owners in the way of plan check fees.

The California Landscape Contractors Association provided the following cost analysis for implementing the ordinance on a 5,000 square foot landscape:

Cost Analysis for the Workbook:

- Project: 5,000 sq. ft. Design/Build
- Design rate: \$65.00/manhour

- Irrigation System: Automated – 6 valves

Water Efficient Landscape Worksheet:

- Section A – D: 1.5-2.5 manhours

Certificate of completion:

- Section A – G: 4-6 manhours

Effective Precipitation Disclosure Statement:

- Section A-C: .5 manhours

Other Costs

- As Built Plans: 2.0 manhours (not incl. travel, printing)
- Soil Test/Site Assessment: 1 manhour (not incl. travel)
- Testing fees: \$100.00/sample +/- (not incl. markup)
- Total labor: 8.5-12 manhours

Total Additional Cost for implementing Model Ordinance for a 5,000 square foot landscape

- Cost: \$550.00 - \$800.00 (not including exclusions listed above)

In addition to local agencies and school districts finding and hiring qualified staff to take on the workload of broader plan checking responsibilities brought on by the Model Ordinance, there will also be an increase in consultant fees associated with the extra work and documentation required by the Model Ordinance. The largest cost to the owners, developers, etc. may lie in the additional time that will be required by their consultants to design the projects and for the local agencies to complete the plan check process in a timely manner.

- Time spent with two city permit offices discussing the costs associated with the proposed inspections said that if they were involved they would be charging fees accordingly. The fees would be based on the amount of time needed to inspect and the type of inspection needed. Currently they don't have anyone on staff that can realistically inspect or analyze the completion documents.

The Model Ordinance puts the entire burden on local agencies, owners and developers to do their part in the design and construction of a projects, however it does not look at the financial burden and time constraints required to implement the Model Ordinance.

The only way to assure that water saving will be achieved is to target those individuals or companies that have control over the irrigation system operation. Landscape water managers and contractors are not addressed in the model ordinance. There is no vehicle which requires that landscape water managers and contractors to do their part to ensure optimum water use in the landscape.

Only the water purveyors have the ability to track water use in the landscape. While the water purveyors are encouraged to participate, they are not required to participate in the Model Ordinance. If water purveyors tracked landscape water use against the "Maximum Water Allowance" required by the Model Ordinance and assessed penalties for exceeding the maximum water allowance, then and only then will there be a real chance of saving water in the landscape.

Recommendation:

Make provisions for the Model Ordinance to include requirements for landscape water managers, landscape maintenance contractors and water purveyors.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65591, 65592, 65595, Gov. Code.

§ 491. Definitions.

The ~~words~~ *terms* used in this ordinance have the meaning set forth below:

1. "application rate" means the depth of water applied to a given area, measured in inches per minute, ~~or~~ inches per hour, *or gallons per hour*.
2. "applied water" means the portion of water supplied by the irrigation system to the landscape.
~~"Automatic controller" means a mechanical or solid state timer, capable of operating valve stations to set the days and length of time of a water application.~~
3. "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.
4. "*check valve*" or "anti-drain valve" means a valve located under a sprinkler head to hold water in the system ~~so it to prevent~~ *minimizes* drainage from ~~the lower elevation sprinkler heads~~ sprinkler heads when the system is off.
5. "conversion factor (0.62)" means ~~a~~ *the* number that converts the maximum applied water allowance from acre-inches per acre per year to gallons per square foot per year. ~~The conversion factor is calculated as follows: (325,851 gallons/43,560 square feet)/12 inches = (0.62) 325,851 gallons = one acre foot 43,560 square feet = one acre 12 inches = one foot To convert gallons per year to 100 cubic feet per year, another common billing unit for water, divide gallons per year by 748. (748 gallons = 100 cubic feet.)~~
6. "*Certificate of Completion*" means the document required under Section 492.2 and 492.11.
7. "*certified landscape irrigation auditor*" means a person certified to perform landscape irrigation audits by a professional trade organization or other educational organization.
8. "*certified irrigation designer*" means a person certified to design irrigation systems by a professional trade organization or other educational organization.
9. "*common interest developments*" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1353.8.
10. "*controller*" means an automatic timing device used to remotely control valves or heads to set an irrigation schedule. A weather-based controller is a controller that uses evapotranspiration or weather data. A self-adjusting irrigation controller is a controller that uses sensor data (i.e., soil moisture sensor).

Issue:

AB-2717 recommended the use of Smart Controllers as a way of reducing water in the landscape. AB-2717 says that:

Automatic irrigations systems typically over-water due primarily to insufficient reprogramming of the irrigation schedule by the operator as weather changes. Many studies have shown that Smart Controllers can dramatically reduce this over-irrigation, thereby saving significant quantities of water and reducing urban runoff.

The Irrigation Association defines a Smart Controller as climate-based or sensor-based controllers that automatically adjust for local weather and site conditions. Once the initial set-up

and monitoring is complete, there is no need to reset the controller, or even turn it off for the winter. Smart Controllers make those adjustments automatically.

Weather based controllers are not necessarily Smart Controllers.

Recommendation:

Require Smart Controller technology using the current Center for Irrigation Technology (CIT) testing protocol and as designated on the Irrigation Association website. In addition, central irrigation control systems such as those used in golf courses and other large landscapes which are not currently being tested under the smart controllers testing protocol, should also be included as an approved irrigation control system.

11. “drip irrigation” means any non-spray low volume irrigation system utilizing emission devices with a flow rate equal to or less than two (2) gallons per hour.
12. “ecological restoration project” means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.
13. “effective precipitation” or “usable rainfall” means the portion of total precipitation that is used by the plants. ~~Precipitation is not a reliable source of water in summer, but does contribute towards the water needs of the landscape during the remainder of the year.~~
14. “emitter” means a drip irrigation fitting emission device that delivers water slowly from the system to the soil ~~measured as gallons per hour.~~
15. “established landscape” means the point at which plants in the landscape have developed significant roots growth into the site ~~adjacent to the root ball.~~ Typically, most plants are established after one or two years of growth
16. “establishment period of the plants” means the first year after installing the plant in the landscape, or the first two years if irrigation will be terminated after establishment.
17. “Estimated Applied Water Use” means the portion of the Estimated Total Water Use that is derived from applied water, as described in Section 492.6. ~~The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance. The Estimated Applied Water Use may be the sum of the water recommended through the irrigation schedule, as referenced in Section 492 (e) (3).~~
18. “Estimated Total Water Use” means the annual total amount of water estimated to be needed to keep the plants in the landscaped area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscaped area, the types of plants, and the efficiency of the irrigation system, as described in Section ~~492 (e) (4)~~ 492.6.
19. “ET adjustment factor” means a factor of ~~0.8~~ 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 ET Adjustment Factor, the average irrigation efficiency is ~~0.625~~ 0.71. Therefore, the ET Adjustment Factor ~~(0.8) = (0.50/0.625)~~ $(0.7) = (0.5/0.71)$.
20. “evapotranspiration rate” means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specific time.
21. “flow rate” means the rate at which water flows through pipes, ~~and~~ valves, or emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.
22. “hardscapes” means any durable surface material (pervious and non-pervious).
23. “hydrozone” means a portion of the landscaped area having plants with similar water needs that are served by a valve or set of valves with the same irrigation schedule. ~~A hydrozone may be irrigated or~~

~~non-irrigated. For example, a naturalized area planted with native vegetation that will not need supplemental irrigation once established is a non-irrigated hydrozone. A hydrozone may also be non-irrigated (no irrigation schedule).~~

24. “infiltration rate” means the rate of water entry into the soil expressed as a depth of water per unit of time (*i.e.*, inches per hour).
25. “irrigation efficiency” means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of this ordinance is ~~0.625~~ 0.71.
26. “Landscape Documentation Package” means the documents required under Section 492.5.
27. “landscape area” ~~(u) “landscaped area” means the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscapes such as decks and patios, and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.~~ means all of the irrigated planting and turf areas, water features, and up to 10% of the square footage of pervious non-irrigated planting areas in a landscape design plan subject to the Maximum Applied Water Allowance (MAWA) calculation. The 10% of non-irrigated planting area shall be added to the low water use hydrozone area, used in the Landscape Documentation Package. The following is not included in the landscape area: 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 (*i.e.*, open spaces). Designated recreation areas and areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens are subject to the MAWA with an ET adjustment factor not to exceed 1.0.
28. “landscape architect” means a person who holds a license to practice landscape architecture in the State under the authority of Government Code Section 5615 (Landscape Architects Practice Act).
29. “landscape contractor” means a person licensed (*i.e.*, C-27 license) by the State to construct, maintain, repair, install, or subcontract the development of landscape systems and facilities per Business and Professions Code, Section 7058 and 7059.
30. “landscape irrigation audit” means a process to perform site inspections, evaluate irrigation systems, and develop efficient irrigation schedules.
31. “landscape project” means a project, for the purposes of this ordinance, meeting the requirements under Section 490.3.
32. “lateral line” means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.
33. “low volume irrigation” means any irrigation system with a flow rate equal to or less than 0.75 inches per hour, including drip irrigation, subsurface drip, micro-sprinklers and similar irrigation type.

Issue:

Low volume irrigation as defined above cannot meet the precipitation rate of 0.75 inches per hour. Low volume does not mean low precipitation rate. Precipitation rate (PR) for irrigation devices is determined by the universal formula where the PR is equal to 96.3 times the flow in GPM divided by the area of coverage. Drip irrigation, subsurface drip and micro-sprinklers do not pass the precipitation rate test. Consider the following:

A one gallon per hour drip emitter applying water in a one foot square area will have a PR of 1.6 inches per hour.

A 0.4 gallon per minute full circle micro spray spaced at 5 feet on center will have a PR of 1.54 inches per hour.

A 0.9 gallon per hour sub-surface drip with emitters spaced 12” on center with 12” between rows will have a PR of 1.44 inches per hour.

A 3.7 gallon per minute full circle spray spaced at 15 feet on center will have a PR of 1.58 inches per hour which is lower than a drip emitter.

A 7.58 gallon per minute full circle rotor spaced at 35 feet on center will have a PR of only 0.60 inches per hour which is much lower than a drip emitter.

A 29.4 gallon per minute full circle rotor spaced at 75 feet on center will have a PR of only 0.50 inches per hour which is much lower than all of the sprinklers noted above.

Recommendation:

Consider removing low volume irrigation from the definitions and from requiring low volume irrigation from the text of the ordinance and requiring the use of proper irrigation devices as determined by the designer of the irrigation system.

34. “local agency” means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. A local agency is the entity responsible for the approval of a permit, plan check, and design review for a project.
35. “main line” means the pressurized pipeline that delivers water from the water source to the valve or outlet.
36. “Maximum Applied Water Allowance” means, for design purposes, the upper limit of annual applied water for the established landscaped area as specified in *Section 492.6*. It is based upon the area’s reference evapotranspiration, the ET Adjustment Factor, and the size of the landscaped area. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance.
37. “microclimate” means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to wind, sun exposure, plant density, proximity to reflective surfaces, etc.
38. “mined-land reclamation projects” means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.
39. “mulch” means any *organic* material such as leaves, bark, and straw or ~~other~~ *inorganic mineral mulches* materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation and suppressing weeds.
40. “operating pressure” means the pressure at which an irrigation system of sprinklers is designed by the manufacturer to operate, usually indicated at the base of a sprinkler.
41. “overhead sprinkler irrigation systems” means ~~those systems with high flow rates~~ *those systems that deliver water through the air (i.e., pop-ups, impulse sprinklers, spray heads and rotors, etc.)*.
42. “overspray” means the water which is delivered beyond the landscaped target area, wetting pavements, walks, structures, or other ~~non-landscaped~~ *non-targeted* areas.
43. “plant factor” means a factor that, in combination with irrigation efficiency, when multiplied by reference evapotranspiration, estimates the amount of water used by plants. ~~For purposes of this ordinance, the average plant factor of low water use ing plants ranges from 0 to 0.3, for average moderate water use ing plants the ranges is 0.4 to 0.6, and for high water use ing plants the range is 0.7 to 1.0. For purposes of this ordinance, the plant factor of low water use plants ranges from 0 to 0.3, the plant factor of moderate water use plants ranges from 0.4 to 0.6, and the plant factor of high water use plants ranges from 0.7 to 1.0.~~

44. “precipitation rate” means the rate of application of water measured in inches per hour.
45. “project applicant” means the individual or entity submitting a Landscape Documentation Package required under Section 492.5, to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or his/her designee.
46. “rain sensor” or “rain sensing shutoff device” means ~~a system which~~ a component which automatically ~~shuts off~~ *suspends* the irrigation ~~system~~ event when it rains.
47. “record drawing” or “as-builts” means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.
48. “recreational area” ~~means areas dedicated to active play or recreation such as parks, playgrounds, sports fields, golf courses, school yards, picnic grounds, or other areas with intense foot traffic.~~ *means portions of parks, playgrounds, sports fields, golf course, or school yards in public and private projects where turf provides a playing surface or serves other high use recreational purposes.*
49. “recycled water,” “reclaimed water,” or “treated sewage effluent water” means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.
49. “reference evapotranspiration” or “ET_o” means a standard measurement of environmental parameters which affect the water use of plants. ET_o is given in inches per day, month, or year as represented in Section 495, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool season turf that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.
50. “rehabilitated landscapes” means any re-landscaping project that requires a permit, *plan check, or design review and meets the requirements of Section 490.3.*
51. “runoff” means water which is not absorbed by the soil or landscape to which it is applied and flows from the *landscape* 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 ~~severe~~ slope.
52. “soil moisture *sensor or* sensing device” means a device that measures the amount of water in the soil.
53. “soil texture” means the classification of soil based on ~~its~~ the percentage of sand, silt, and clay ~~in the soil.~~
54. “sprinkler head” means a device which delivers water through a nozzle.
55. “static water pressure” means the pipeline or municipal water supply pressure when water is not flowing.
56. “station” means an area served by one valve or by a set of valves that operate simultaneously.
57. “swing joint” *means an irrigation component that provides a flexible, leak-free connection between the sprinkler and lateral pipeline to allow movement in any direction and to prevent equipment damage..*
58. “turf” ~~means a surface layer of earth containing mowed grass with its roots~~ *a groundcover surface of mowed grass.* Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are common cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are common warm-season grasses.
59. “valve” means a device used to control the flow of water in the irrigation system. *It may also mean all of the sprinklers or emitters in a line controlled by the valve.*
60. “water use efficiency statement” ~~“water conservation concept statement”~~ means ~~a one page checklist~~ *and a narrative summary of the water use efficiency practices to be applied in the landscape project*

~~as shown in Section 492 (e) (1).~~

61. *“water conserving plant species” means a plant species identified as using less water than plants in the same water use category.*
62. *“Water Efficient Landscape Worksheet” means the document required under Section 492.6.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65591, 65592, 65593, 65596, Gov. Code.

§492. Provisions for New Construction or Rehabilitated Landscapes.

Landscape projects under Section 490.3.1 (a), (b), and (c) are subject to all of the provisions in Section 492. New or rehabilitated cemetery landscape projects under Section 490.3.1 (e) are only subject to Sections 492.6, 492.13, 492.14 and 492.18.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.1. Compliance with Landscape Documentation Package

1. *Prior to construction, the local agency shall:*
 - (a) *provide the project applicant with the ordinance and procedures for permits, plan checks, or design reviews;*
 - (b) *review the Landscape Documentation Package submitted by the project applicant;*
 - (c) *approve the Landscape Documentation Package; and*
 - (d) *issue a permit or approve the plan check or design review for the project applicant.*
2. *Prior to construction, the project applicant shall:*
 - (a) *submit a Landscape Documentation Package to the local agency that meets all the criteria and specifications of this ordinance;*
 - (b) *upon approval of the Landscape Documentation Package by the local agency,*
 - (1) *receive a permit or approval of the plan check or design review and record the date of the permit, etc. in the Certificate of Completion,*
 - (2) *submit a copy of the approved Landscape Documentation Package along with the record drawings, and any other information to the property owner or his/her designee; and*
 - (3) *submit a copy of the Water Efficient Landscape Worksheet to the local retail water purveyor.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65595, 65596, Gov. Code.

Issue:

In its present configuration, the Landscape Documentation Package is made up documents that may conflict with existing local agency requirements. It includes documentation that would require review and approval by someone knowledgeable in several design disciplines and contains requirements for submittal of documentation that may not help to conserve water. Preparation of the Landscape Documentation Package will surely increase plan check fees as well as consultant fees. The sad part is, providing a Landscape Documentation Package as required by this ordinance is no assurance that water will be saved.

Recommendation:

Consider including only those documents that are directly related to landscape and irrigation for the Landscape Documentation Package.

§492.2. Compliance with the Certificate of Completion (see also Section 492.11)

1. *The local agency shall:*

- (a) receive the signed Certificate of Completion from the project applicant;*
 - (b) conduct a final field inspection of the project;*
 - (c) approve the Certificate of Completion; and*
 - (d) issue a Certificate of Occupancy, or equivalent, to the project applicant.*
2. *The project applicant shall:*
- (a) prior to backfilling, have a licensed landscape architect, certified irrigation auditor, or licensed landscape contractor conduct a preliminary field observation of the irrigation system;*

Issue:

A certified irrigation auditor is not trained, qualified or involved in the irrigation design process and therefore is not qualified to conduct a preliminary field observation of the irrigation system. Field observation services are provided by the landscape architect, the landscape contractor or their designated representative.

Recommendation:

Strike the words certified irrigation auditor.

- (b) upon project installation, have a licensed landscape architect or licensed landscape contractor conduct a final field observation for the approval of the certificate;*
- (c) upon project installation, have a certified irrigation auditor conduct a landscape irrigation audit as required under Section 492.14,*

Please refer irrigation audit schedule for additional information.

- (d) submit the signed Certificate of Completion to the local agency for approval;*
- (e) receive the Certificate of Occupancy or equivalent from the local agency; and*

Issue:

Requiring a “Certificate of Completion” for a landscape project prior to issuance of a “Certificate of Occupancy” is not a typical county, municipality, or district requirement. This is a schedule issue relative to the timely, predictable close of escrows. The landscape project is already bonded and this prerequisite for “Certificate of Occupancy” is unnecessary.

Recommendation:

Strike this requirement. Jurisdictional agency requirements shall govern.

- (f) submit copies of the approved Certificate of Completion to the local retail water purveyor and the property owner or his/her designee.*

Issue:

Compliance for the Certificate of Completion requires delivery of the Certificate of Completion to the local water purveyor and the owner. Because of privacy issues, the required local agency Certificate of Completion cannot be shared with the local water purveyor unless authorized by the Owner.

In conversations with Irvine Ranch Water District (IRWD), I was told that because of privacy issues, information gathered about a specific project by one agency can not be shared with another agency or other entity without express consent of the owner or developer of the project. Therefore, if a given project exceeds the maximum irrigation water allowance allocated by the local agency or the local water purveyor, the information cannot be shared between the agencies. Since the local water purveyor is the keeper of the water use information, this information will not be available to the local agency. Because the local agency will not be privy to the water use information of specific projects, they will not know if the landscape

irrigation systems within these projects have been operated in accordance with the terms of the Model Ordinance.

Recommendation:

Require water districts to get be a part of the model ordinance or strike the local retail water purveyor from item (f).

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65593, 65595, 65596, 65599, Gov. Code.

§492.3. Waivers and Variances.

A local agency may administratively waive or modify one or more requirements of the ordinance when unusual difficulties make their strict application impossible, and upon a determination that the waiver or variance is consistent with the purpose and intent of the ordinance.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65593, 65595, 65596, 65599, Gov. Code.

§492.4. Penalties.

A local agency may administer penalties to the project applicant for non-compliance with the ordinance, including, but not limited to:

- 1. deny Certificate of Occupancy or equivalent until the Certificate of Completion has been submitted, reviewed, and approved by the local agency;*
- 2. issue warning letters or citations;*
- 3. impose and collect monetary penalties or fines;*
- 4. administer an appeals process or equivalent; or*
- 5. terminate water service.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65593, 65596, 65599, Gov. Code.

~~(b) LANDSCAPE DOCUMENTATION PACKAGE~~

~~(1) A copy of the landscape documentation package conforming to this chapter shall be submitted to the city or county. No permit shall be issued until the city or county reviews and approves the landscape documentation package.~~

~~(2) A copy of the approved landscape documentation package shall be provided to the property owner or site manager along with the record drawings and any other information normally forwarded to the property owner or site manager.~~

~~(3) A copy of the Water Conservation Concept statement and the Certificate of Substantial Completion shall be sent by the project manager to the local retail water purveyor.~~

~~(4) Each landscape documentation package shall include the following elements, which are described in Section 492 (e):~~

- ~~(A) Water Conservation Concept Statement~~
- ~~(B) Calculation of the Maximum Applied Water Allowance~~
- ~~(C) Calculation of the Estimated Applied Water Use~~
- ~~(D) Calculation of the Estimated Total Water Use~~
- ~~(E) Landscape Design Plan~~
- ~~(F) Irrigation Design Plan~~

- ~~(G) Irrigation _____ Schedules~~
- ~~(H) _____ Maintenance _____ Schedule~~
- ~~(I) Landscape Irrigation Audit Schedule~~
- ~~(J) _____ Grading _____ Design _____ Plan~~
- ~~(K) Soil Analysis~~

~~(L) Certificate of Substantial Completion. (To be submitted after installation of the project.) (5) If effective precipitation is included in the calculation of the Estimated Total Water Use, then an Effective Precipitation Disclosure Statement from the landscape professional and the property owner shall be submitted with the Landscape Documentation Package.~~

~~(e) Elements of Landscape Documentation Package~~

~~(1) Water Conservation Concept Statement~~

~~Each landscape documentation package shall include a cover sheet, referred to as the Water Conservation Concept Statement similar to the following example. It serves as a check list to verify that the elements of the landscape documentation package have been completed and has a narrative summary of the project.~~

~~Sample Water Conservation Concept Statement~~

~~Project Site:~~

~~Project Number:~~

~~Project Location:~~

~~Landscape Architect/Irrigation Designer/Contractor:~~

~~Included in this project submittal package are: (Check to indicate completion)~~

- ~~1. Maximum Applied Water Allowance: _____ gallons or cubic feet/year~~
- ~~2. Estimated Applied Water Use: _____ gallons or cubic feet/year~~
- ~~*2.(a) Estimated Amount of Water Expected from Effective Precipitation: _____ gallons or cubic feet/year~~
- ~~3. Estimated Total Water Use: _____ gallons or cubic feet/year~~

~~Note: * If the design assumes that a part of the Estimated Total Water Use will be provided by precipitation, the Effective Precipitation Disclosure Statement in Section 494 shall be completed and submitted.~~

- ~~4. Landscape Design Plan~~
- ~~5. Irrigation Design Plan~~
- ~~6. Irrigation Schedules~~
- ~~7. Maintenance Schedule~~
- ~~8. Landscape Irrigation Audit Schedule~~
- ~~9. Grading Design Plan~~
- ~~10. Soil _____ Analysis~~

~~Description of Project~~

~~(Briefly describe the planning and design actions that are intended to achieve conservation and efficiency in water use.) Date: _____ Prepared By: _____~~

§492.5. Landscape Documentation Package.

1. The Landscape Documentation Package shall include all of the following elements:

- (a) Water Efficient Landscape Worksheet*
 - (1) Section A Project Information and Checklist*
 - (2) Section B Water Use Efficiency Statement*

- (3) *Section C Water Budget Calculation*
 - (A) *Section C1 Maximum Applied Water Allowance (MAWA)*
 - (B) *Section C2 Estimated amount of water expected from Effective Precipitation (Eppt)*
 - (C) *Section C3 Estimated Water Use (EWU) for Hydrozones and Estimated Total Water Use (ETWU)*
 - (D) *Section C4 Estimated Applied Water Use (EAWU)*
 - (4) *Section D Hydrozone Information*
 - (A) *Section D1 Hydrozone Map*
 - (B) *Section D2 Hydrozone Table*
 - (C) *Section D3 Hydrozone Calculation Summary*
 - (b) *Soil Management Plan*
 - (1) *Soil Analysis Report*
 - (2) *On-Site Soil Assessment with Recommendations*
 - (c) *Landscape Design Plan*
 - (d) *Irrigation Design Plan*
 - (e) *Grading Design Plan*
 - (f) *Effective Precipitation Disclosure Statement (optional)*
2. Each element of the Landscape Documentation Package is described in Sections 492.6 through Section 492.10, and Section 494. There are also sample forms in Appendix B.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65591, 65596, Gov. Code.

§492.6. Water Efficient Landscape Worksheet.

A project applicant shall complete the Water Efficient Landscape Worksheet which contains four (4) sections to meet the criteria and specifications of the ordinance. See sample worksheet in Appendix B.

1. Section A shall contain general project information and, a checklist of the required elements.
2. Section B shall contain the Water Use Efficiency Statement which is a narrative summary of the water use efficiency practices applied in the landscape project.
3. Section C shall contain a water budget calculation for the project. For the calculation of the Maximum Applied Water Allowance, a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Section 495 Appendix A.

The example calculations below are hypothetical to demonstrate proper uses of the equations and do not represent an existing and/or planned landscape project. The ETo values used in these calculations are historical data for planning purposes only. For actual irrigation scheduling, a project applicant shall use current reference evapotranspiration (ETo) data, such as from the California Irrigation Management Information System (CIMIS) or other self-adjusting device (i.e., soil moisture sensor).

Also, monthly time steps are used for demonstration purposes only. A project applicant may use a time step of their choice (daily, weekly, biweekly, etc.) to complete these calculations.

- (a) ~~(2) The~~ Section C1 Maximum Applied Water Allowance (MAWA). ~~(A) The~~ landscape project's Maximum Applied Water Allowance shall be calculated using this formula-equation:

$$\begin{aligned} \text{MAWA} &= \frac{(ETo) (0.8) (LA) (0.62)}{(0.7) (LA) (0.62)} \end{aligned}$$

where:

- MAWA* = Maximum Applied Water Allowance (gallons per year)
- ET_o* = Reference Evapotranspiration Appendix A (inches per year)
- ~~0.8~~ 0.7 = ET Adjustment Factor
- LA* = Landscaped Area (square feet)
- 0.62 = Conversion factor (to gallons per square foot)

~~(B) Two example calculations of the Maximum Applied Water Allowance are presented as follows: (i) PROJECT SITE ONE: Landscaped area of 50,000 sq-ft in Fresno.~~

~~(1) Example MAWA calculation: A hypothetical landscape project in Fresno, CA with an irrigated landscape area of 50,000 sq. ft. To calculate MAWA, the annual (ET_o) value for Fresno is 51.1 inches as listed in the Reference Evapotranspiration (ET_o) Table in Section 495~~

$$\begin{aligned} \text{MAWA} &= (\text{ET}_o) (0.8) (\text{LA}) (0.62) \\ &= (51 \text{ inches}) (0.8) (50,000 \text{ square feet}) (.62) \text{ Maximum Applied Water Allowance} \\ &= 1,264,800 \text{ gallons per year (or 1,691 hundred cubic feet per year: } 1,264,800/748 = 1,691) \end{aligned}$$

$$\text{MAWA} = (\text{ET}_o) (0.7) (\text{LA}) (0.62) \text{ MAWA} = (51.1 \text{ inches}) (0.7) (50,000 \text{ square feet}) (0.62) = 1,108,870 \text{ gallons per year}$$

$$\begin{aligned} \text{To convert from gallons per year to hundred-cubic-feet per year} &= 1,108,870/748 \\ &= 1,482 \text{ hundred-cubic-feet per year (100 cubic feet} = 748 \text{ gallons)} \end{aligned}$$

~~(ii) PROJECT SITE TWO: Landscaped area of 50,000 sq. ft. in San Francisco MAWA = (ET_o) (.8) (LA) (.62) = (35 inches) (.8) (50,000 square feet) (.62) Maximum Applied Water Allowance = 868,000 gallons per year (or 1,160 hundred cubic feet per year)~~

~~(C) Portions of landscaped areas in public and private projects such as parks, playgrounds, sports fields, golf courses, or school yards where turf provides a playing surface or serves other recreational purposes are considered recreational areas and may require water in addition to the Maximum Applied Water Allowance. A statement shall be included with the landscape design plan, designating recreational areas to be used for such purposes and specifying any needed amount of additional water above the Maximum Applied Water Allowance.~~

~~(b) Section C2 Estimated amount of water expected from Effective Precipitation (Eppt). For this ordinance, the Effective Precipitation is no more than 25 percent of the local annual mean precipitation.~~

~~(1) Example Eppt calculation: For Fresno, monthly average total precipitation (P_{tot}) was obtained from the California Irrigation Management Information System (CIMIS) data. In areas where precipitation amount is not significant, applicants can skip this section.~~

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
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<i>P_{tot}</i>	2.53	1.97	2.17	0.90	0.60	0.20	0.03	0.02	0.11	0.56	0.87	1.67	11.64
<i>Eppt</i>	0.63	0.49	0.54	0.23	0.15	0.05	0.01	0.01	0.03	0.14	0.22	0.42	2.91
<i>Eppt</i> (=2.91 inches X 50,000 sq.ft.), inches													145,500

~~(4) Estimated Total Water Use:~~

(A) A calculation of the Estimated ~~Total Water Use shall be~~ Total Water Use ~~the~~ shall be submitted with the Landscape Documentation Package. The Estimated Total Water Use may be calculated by summing the amount of water recommended in the irrigation schedule and adding any amount of water expected from effective precipitation (not to exceed 25 percent of the local annual mean precipitation) or may be calculated from a formula such as the following: The Estimated Total Water Use for the entire landscaped area equals the sum of the Estimated Water Use of all hydrozones in that landscaped area.

~~EWU=(ET_o)(PF)(HA)(.62)/(IE)~~
~~EWU (hydrozone) = Estimated Water Use (gallons per year)~~
~~ET_o = Reference Evapotranspiration (inches per year)~~
~~W = plant factor~~
~~HA = hydrozone area (square feet)~~
~~0.62 = conversion factor~~
~~IE = irrigation efficiency~~

(B) If the Estimated Total Water Use is greater than the Estimated Applied Water Use due to precipitation being included as a source of water, an Effective Precipitation Disclosure Statement such as the one in Section 494 shall be included in the Landscape Documentation Package.

(c) Section C3 Estimated Water Use (EWU) for a hydrozone and Estimated Total Water Use (ETWU). The landscape project's Estimated Water Use for each hydrozone is calculated using the following equation:

$$EWU = \frac{(ET_o)(PF)(HA)(0.62)}{(IE)}$$

where:

- EWU* = Estimated total water use for a hydrozone (gallons)
- ET_o* = Reference evapotranspiration Appendix A (inches per month)
- PF* = Plant factor
- HA* = Hydrozone area (square feet)
- 0.62* = Conversion factor
- IE* = Irrigation efficiency

(1) Example EWU calculation for three (3) hydrozones: the hypothetical landscape project in Fresno from the previous section. The following assumptions are made for the landscape: there are three hydrozones one each for high, moderate, and low water using plants; each hydrozone has the same irrigation type; and soil characteristics and slopes are uniform over the total landscape area.

Hydrozone 1 - High water use plant. The following additional assumptions are made for the high water using plant; landscape coefficient/plant factor is 0.7, landscape area is 16,667 sq.

ft., and irrigation efficiency (IE) is 0.65.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<i>ETo</i>	0.90	1.70	3.30	4.80	6.70	7.80	8.40	7.10	5.20	3.20	1.40	0.60	51.10
<i>PWR</i>	0.63	1.19	2.31	3.36	4.69	5.46	5.88	4.97	3.64	2.24	0.98	0.42	35.77
<i>IWR</i>	0.97	1.83	3.55	5.17	7.22	8.40	9.05	7.65	5.60	3.45	1.51	0.65	55.03
<i>Total for Hydrozone 1 (=55.03 X 16,667 sq.ft.), inches</i>													917,167

Where:

ETo = Reference evapotranspiration Appendix A (inches/month)

PWR = Plant water requirement
 = (*ETo*) (PF)

IWR = Irrigation water requirement
 = (*PWR*)/(IE)

Hydrozone 2 - Moderate water use plant. The following assumptions are made: landscape coefficient/plant factor is 0.4; landscape area is 16,667 sq. ft.; and irrigation efficiency (IE) is 0.8.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<i>ETo</i>	0.90	1.70	3.30	4.80	6.70	7.80	8.40	7.10	5.20	3.20	1.40	0.60	51.10
<i>PWR</i>	0.36	0.68	1.32	1.92	2.68	3.12	3.36	2.84	2.08	1.28	0.56	0.24	20.44
<i>IWR</i>	0.45	0.85	1.65	2.40	3.35	3.90	4.20	3.55	2.60	1.60	0.70	0.30	25.55
<i>Total for Hydrozone 2 (=25.55 X 16,667 sq.ft.), inches</i>													425,833

Where:

ETo = Reference evapotranspiration Appendix A (inches/month)

PWR = Plant water requirement
 = (*ETo*) (PF)

IWR = Irrigation water requirement
 = (*PWR*)/(IE)

Hydrozone 3 - Low water use plant. The following assumptions are made: landscape coefficient/plant factor is 0.2; landscape area is 16,667 sq. ft.; and irrigation efficiency (IE) is 0.8. If the landscape area includes non-irrigated planting area, 10% of the non-irrigated planting area may be added to the low water use plant hydrozone.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<i>ETo</i>	0.90	1.70	3.30	4.80	6.70	7.80	8.40	7.10	5.20	3.20	1.40	0.60	51.10
<i>PWR</i>	0.18	0.34	0.66	0.96	1.34	1.56	1.68	1.42	1.04	0.64	0.28	0.12	10.22
<i>IWR</i>	0.23	0.43	0.83	1.20	1.68	1.95	2.10	1.78	1.30	0.80	0.35	0.15	12.78
<i>Total for Hydrozone 3 (=12.78 X 16,667 sq.ft.), inches</i>													213,000

Where:

ETo = Reference evapotranspiration Appendix A (inches/month)

PWR = Plant water requirement
 = (*ETo*) (PF)

$$\begin{aligned} IWR &= \text{Irrigation water requirement} \\ &= (PWR)/(IE) \end{aligned}$$

(2) Example calculation ETWU. The Estimated Total Water Use for the landscape is the sum total of estimated water uses for each hydrozone:

$$ETWU = \sum_{i=1 \text{ to } n} (EWU_i)$$

Where:

i = hydrozone number

n = total number of hydrozones

$$ETWU = 917,167 \text{ inches} + 425,833 \text{ inches} + 213,000 \text{ inches} = 1,556,000 \text{ inches per year}$$

$$\begin{aligned} \text{To convert from inches per year to gallons per year:} &= 1,556,000 \times 0.62 \\ &= 964,720 \text{ gallons per year} \end{aligned}$$

$$\begin{aligned} \text{To convert Effective Precipitation from inches to gallons per year:} &= 145,500 \text{ inches} \\ \times 0.62 &= 90,210 \text{ gallons per year} \end{aligned}$$

~~(4) Estimated Applied Water Use.~~

~~(A) The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance.~~

~~(B) A calculation of the Estimated Applied Water Use shall be submitted with the Landscape Documentation Package. It may be calculated by summing the amount of water recommended in the irrigation schedule.~~

(d) Section C4 Estimated Applied Water Use (EAWU). The Estimated Applied Water Use is calculated as the Estimated Total Water Use minus Effective Precipitation or:

$$EAWU = ETWU - Eppt$$

(1) Example EAWU calculation:

$$\begin{aligned} EAWU &= ETWU - Eppt \\ &= 964,720 \text{ gallons} - 90,210 \text{ gallons} \\ &= 874,510 \text{ gallons} \end{aligned}$$

(e) For the example water budget calculation, the EAWU (874,510 gallons) is less than the MAWA (1,108,870 gallons per year) and therefore, the water budget is acceptable.

(f) Recreational areas (see definitions) and areas permanently and solely dedicated to edible plants, such as orchards and vegetable gardens, may require water in addition to the Maximum Applied Water Allowance. A statement shall be included in the landscape design plan and the irrigation schedule designating those portions of the landscape to be used for such purposes and specifying any additional water needed above the Maximum Applied Water Allowance. The total amount of irrigation water allowed for these areas shall not exceed 1.0 of ETo.

4. Section D shall contain hydrozone information for the landscape project including a hydrozone map, hydrozone table, and hydrozone calculation summary. See sample

worksheet in Appendix B, Section D.

Note: Authority Cited: Sections 65595, Gov. Code. Reference Section 65595 Gov. Code.

~~(11) Soils~~

~~(A) A soil analysis satisfying the following conditions shall be submitted as part of the Landscape Documentation Package:~~

~~(i) Determination of soil texture, indicating the percentage of organic matter. (ii) An approximate soil infiltration rate (either measured or derived from soil texture infiltration rate tables.) A range of infiltration rates shall be noted where appropriate. (iii) Measure of pH, and total soluble salts.~~

~~(B) A mulch of at least three inches shall be applied to all planting areas except turf.~~

§492.7. Soil Management Plan.

A soil management plan that addresses the soil attributes of the project site shall include a laboratory soil analysis and an on-site assessment with a statement of recommendations by a qualified soil specialist. A soil management plan meeting the following criteria shall be submitted as part of the Landscape Documentation Package.

- 1. A laboratory soil analysis of soil sample(s) from the project site, prior to installation, that evaluates physical and chemical properties shall be required. At a minimum, the soil analysis report shall include:
 - (a) soil texture (percent clay, silt, sand), indicating the percentage of organic matter;*
 - (b) approximate soil infiltration rate (either measured or derived from soil texture infiltration rate tables). A range of infiltration rates shall be noted where appropriate;*
 - (c) pH;*
 - (d) total soluble salts; and*
 - (e) other soil physical or chemical properties relevant to improving water use efficiency and maintaining plant health (e.g., conductivity, nitrogen, phosphorus, potassium, calcium, magnesium, sodium, sulfur, etc.).**
- 2. A laboratory soil analysis may be excluded if a certified statement addressing reasons for not completing such a soil analysis is provided by a qualified soil specialist or scientist.*
- 3. Prior to installation, an on-site soil assessment by a qualified soil specialist that identifies soil attributes or conditions that may minimize water use efficiency or limit plant growth shall be required. The on-site soil assessment shall:
 - a) identify planting or turf areas that may need amendment;*
 - b) provide a statement of recommendations to correct or improve soil conditions (i.e., applying organic compost as a soil amendment in planting and turf areas);*
 - c) conduct a further analysis of soil conditions (i.e., soil profile, hardpan, bulk density, soil toxicity, salinity, etc.), where applicable; and**
- 4. A project applicant shall implement the recommendations from the on-site soil assessment and apply any relevant information from the on-site soil assessment to the design plans.*

Issue:

The Model Ordinance requires a “Soil Management Plan” as a part of the design package. For many projects mass grading may not have begun and fine grading will not have begun and therefore cannot be submitted as a part of the Landscape Documentation Package.

Recommendation:

Delete soil management plan from the Landscape Documentation Package or develop an alternative plan that can be use soil information when it becomes available.

Note: Authority Cited: Sections 65595, Gov. Code. Reference Section 65595 Gov. Code.

§492.8. Landscape Design Plan.

For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following requirements—design criteria and specifications shall be submitted as part of the Landscape Documentation Package.

~~(A) Plant Selection and Grouping~~

~~(i) Any plants may be used in the landscape, providing the Estimated Applied Water Use recommended does not exceed the Maximum Applied Water Allowance and that the plants meet the specifications set forth in (ii), (iii) and (iv).~~

~~(ii) Plants having similar water use shall be grouped together in distinct hydrozones.~~

~~(iii) Plants shall be selected appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the site. Protection and preservation of native species and natural areas is encouraged. Avoidance of invasive species is encouraged. The planting of trees is encouraged wherever it is consistent with the other provisions of this ordinance.~~

~~(iv) Fire prevention needs shall be addressed in areas that are fire prone. Information about fire prone areas and appropriate landscaping for fire safety is available from local fire departments or the California Department of Forestry.~~

1. Criteria

(a) Plant Material

(1) Any plant may be selected for the landscape, providing the Estimated Applied Water Use recommended for the project site does not exceed the Maximum Applied Water Allowance. To encourage the efficient use of water, the following is highly recommended:

(A) Protection and preservation of native species and natural vegetation.

(B) Selection of water conserving plant species and turf species.

(C) Selection of trees based on applicable local tree ordinances or tree shading guidelines.

(D) Selection of plants from local and regional landscape program plant lists (e.g., California Friendly Landscapes, Bay Friendly Landscaping, River Friendly Landscaping, Lush & Efficient, etc.).

(2) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. To encourage the efficient use of water, the following is highly recommended:

(A) Use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate.

(B) Recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots, etc.) to minimize damage to property or infrastructure (e.g., buildings, sidewalks, power lines, etc.).

(C) Consider the solar orientation for plant placement to maximize summer shade and winter

solar gain.

- (3) *A landscape design plan for projects in fire-prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required per California Public Resources Code 4291(a) and (b). Avoid fire-prone plant materials and mulches.*
- (4) *Invasive species of plants shall be avoided especially near parks, buffers, greenbelts, water bodies, and open spaces because of their potential to cause harm in sensitive areas.*
- (5) *The architectural guidelines of a common interest development, which include community apartment projects, condominium projects, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.*

(b) Turf

- (1) *Turf areas shall be sized and shaped to minimize irrigation overspray and runoff.*
- (2) *Installation of turf on slopes greater than 4:1 (horizontal to vertical) shall not be permitted.*
- (3) *Installation of long, narrow, or irregularly shaped turf areas less than eight (8) feet in width in any direction shall be irrigated with subsurface irrigation or other low volume irrigation technology.*
- (4) *Irrigated areas (including turf) within 24 inches of non-permeable hardscape shall be irrigated with drip irrigation or subsurface irrigation technology.*

(c) Water Features

- (1) ~~(i)~~ *Recirculating water shall be used for decorative water features.*
- (2) *Where available, recycled water shall be used as the source for water features.*
- (3) *Surface area of a water feature shall be included in the Maximum Applied Water Allowance (MAWA) calculation. The evaporation rate for all water features shall be equivalent to the evapotranspiration rate of a high water use plant.*
- (4) ~~(ii)~~ *Pool and spa covers are highly recommended encouraged.*

Issue:

Requiring “Water Features” be subject to the Maximum Water Allowance (MAWA) calculation is going too far into programmed and recreational aspects of projects. This category is not defined. Swimming pools, for example, are not excluded. In addition, most water features are recycled filtered water and are a closed system.

Recommendation:

Strike “water features” from the text subjected to MAWA and add Water Features and Swimming Pools to the areas not subjected to the MAWA calculation.

Issue:

This is a jurisdictional issue. Water features are regulated by other ordinances and should not be confused by requirements in this ordinance.

Recommendation:

Strike this requirement. Existing code requirements shall govern.

(d) Mulch

- (1) *A minimum two inch (2”) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, and creeping or rooting groundcovers. In mulched planting*

areas, the use of drip irrigation is highly recommended.

Issue:

Mulch is a design, functionality and cost issue. Mulch is usually reserved for level planting areas where it will not “wash away” with seasonal rainfall. Mulch can not be held in place on slopes. This is a horticultural and maintenance consideration and should not be dictated by a water conservation ordinance.

Recommendation:

Strike this requirement.

~~(C) Landscape Design Plan Specifications~~

~~The landscape design plan shall be drawn on project base sheets at a scale that accurately and clearly identifies:~~

~~(i) Designation of hydrozones.~~

~~(ii) Landscape materials, trees, shrubs, groundcover, turf, and other vegetation. Planting symbols shall be clearly drawn and plants labeled by botanical name, common name, container size, spacing, and quantities of each group of plants indicated.~~

~~(iii) Property lines and street names.~~

~~(iv) Streets, driveways, walkways, and other paved areas.~~

~~(v) Pools, ponds, water features, fences, and retaining walls.~~

~~(vi) Existing and proposed buildings and structures including elevation if applicable.~~

~~(vii) Natural features including but not limited to rock outcroppings, existing trees, shrubs that will remain.~~

~~(viii) Tree staking, plant installation, soil preparation details, and any other applicable planting and installation details.~~

~~(ix) A calculation of the total landscaped area.~~

~~(x) Designation of recreational areas.~~

2. *Specifications*

The landscape design plan shall be drawn on project base sheets at a scale that accurately and clearly identifies the following specifications, where applicable:

(a) Site

(1) Location map with north arrow, scale, and legal description of the property.

(2) Project name.

(3) Title block with name, license number, mailing address, email address, and telephone number of licensed landscape architect.

(4) Total landscape area (square feet).

(5) Benchmark name, elevation, and location.

(6) Topography with proposed contour lines and elevations.

(7) Property lines and setbacks.

(8) Street names.

(9) Location of all utilities, (e.g. telephone, electrical, gas, sewer, drainage, etc.). The use of this information is limited to the landscape design and installation.

(10) Location and details of existing and proposed public improvements within right-of-way (e.g. curb, gutter, sidewalk, street light, fire hydrants, driveways, other approaches, etc.).

Issue:

All jurisdictional agencies have requirements for landscape project submittal inclusions or specifications. It is unnecessary for the water efficient landscape ordinance to confuse existing agency requirements.

While the above information would certainly be nice to show on each drawing, none of this information will save water in the landscape. Obtaining this information for existing and smaller projects may be next to impossible as well as very costly and time consuming.

Recommendation:

Strike this section. Jurisdictional agency requirements shall govern.

- (b) *Hydrozone (See also Section 492.5.1(a)(4) of the Landscape Documentation Package and Section D of the Water Efficient Landscape Worksheet)*
 - (1) *Delineate and label each hydrozone by number, letter, or other method.*
 - (2) *Indicate the square footage of each hydrozone.*
 - (3) *Identify each hydrozone as low, moderate, high water use, etc.*
 - (4) *Identify recreational areas (see Section 491.48).*
 - (5) *Identify areas permanently and solely dedicated to edible plants.*
 - (6) *Identify any other pertinent factors (e.g., sun exposure, microclimate, etc.)*
- (c) *Plant*
 - (1) *Location of all plant material (e.g., turf, annuals, perennials, groundcovers, shrubs, trees and other vegetation, etc.).*
 - (2) *Detailed legend explaining all the symbols used in the landscape design plan including botanical names, common names, quantity, container size, etc.*
- (d) *Mulch*
 - (1) *Type of mulch.*
 - (2) *Depth (inches).*
- (e) *Design Elements*
 - (1) *Water features.*
 - (2) *Hardscapes (pervious and non-pervious).*
 - (3) *Existing natural features including, but not limited to, rock outcroppings, creeks or streams, wetlands, and plant materials that will remain.*
- (f) *Other*
 - (1) *Installation details for the landscape including soil preparation, plant material installation, tree planting and staking, and any other applicable details.*
 - (2) *Location and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Examples include, but not limited to:*
 - (A) *Infiltration beds, swales, and basins that allow water to collect and soak into the ground.*
 - (B) *Constructed wetlands and retention ponds that retain water, handle excess flows, and filter pollutants.*
 - (C) *Pervious or porous surfaces (e.g., permeable pavers or blocks, pervious or porous concrete, etc.) that minimize runoff (volume and velocity).*

Issue:

Water quality/run-off management documentation is based on federal legislation and is governed by a myriad of existing ordinances and codes. These documents require separate submittal and permits.

Recommendation:

Strike this submittal requirement which is legislated otherwise.

- (3) *Rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.)*
- (4) *Each sheet of the landscape design plan shall contain the following statement along with a licensed landscape architect's or licensed landscape contractor's stamp and signature: "I have agreed to comply with the criteria and specifications of the ordinance and I have applied them accordingly for the efficient use of water in the landscape design plan."*

Issue:

By licensure statute in the State of California, all licensed landscape architects are required to sign each sheet of project documentation acknowledging their compliance with all regulations applicable to the subject project. Requiring a separate acknowledgement of compliance with this ordinance is unnecessary and redundant.

Recommendation:

Strike this requirement.

Note: Authority Cited: Sections 65595, Gov. Code. And Section 1353.8 Civil Code. Reference: Sections 65596, Gov. Code and Section 1353.8 Civil Code

(A) Irrigation Design Criteria

~~(i) Runoff and Overspray. Soil types and infiltration rate shall be considered when designing irrigation systems. All irrigation systems shall be designed to avoid runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, or structures. Proper irrigation equipment and schedules, including features such as repeat cycles, shall be used to closely match application rates to infiltration rates therefore minimizing runoff. Special attention shall be given to avoid runoff on slopes and to avoid overspray in planting areas with a width less than ten feet, and in median strips. No overhead sprinkler irrigation systems shall be installed in median strips less than ten feet wide.~~

~~(ii) Irrigation Efficiency. For the purpose of determining the maximum applied water allowance, irrigation efficiency is assumed to be 0.625. Irrigation systems shall be designed, maintained, and managed to meet or exceed 0.625 efficiency.~~

~~(iii) Equipment. Water meters. Separate landscape water meters shall be installed for all projects except for single family homes or any project with a landscaped area of less than 5,000 square feet.~~

~~Controllers. Automatic control systems shall be required for all irrigation systems and must be able to accommodate all aspects of the design.~~

~~Valves. Plants which require different amounts of water shall be irrigated by separate valves. If one valve is used for a given area, only plants with similar water use shall be used in that area.~~

~~Anti-drain (check) valves shall be installed in strategic points to minimize or prevent low head drainage.~~

~~Sprinkler heads. Heads and emitters shall have consistent application rates within each control valve circuit. Sprinkler heads shall be selected for proper area coverage, application rate, operating pressure, adjustment capability, and ease of maintenance.~~

~~Rain Sensing Override Devices. Rain sensing override devices shall be required on all irrigation systems.~~

~~Soil Moisture Sensing Devices. It is recommended that soil moisture sensing devices be considered where appropriate.~~

§492.9. Irrigation Design Plan.

For the efficient use of water, an irrigation system shall meet all irrigation design criteria and specifications, manufacturer's specifications, and any local agency code requirements. An irrigation system and its related components shall be planned and designed to allow for proper installation, management and maintenance. An irrigation design plan meeting the following conditions design criteria and specifications shall be submitted as part of the Landscape Documentation Package.

1. Criteria

(a) System

- (1) Dedicated (separate) landscape water meters shall be installed for all projects greater than 5,000 square feet, except for single family residences (Authority Cited: Statutes of 2006, AB 1881, Chapter 559, Article 44.5, Section 535). Dedicated landscape water meters are highly recommended on landscape areas less than 5,000 square feet to facilitate water management.*
- (2) Weather-based irrigation controllers, soil moisture based controllers or other self-adjusting irrigation controllers, shall be required for all irrigation systems. The controller must be able to accommodate all aspects of the landscape and irrigation design plans.*

Issue:

AB-2717 recommended the use of Smart Controllers as a way of reducing water in the landscape. AB-2717 says that:

Automatic irrigations systems typically over-water due primarily to insufficient reprogramming of the irrigation schedule by the operator as weather changes. Many studies have shown that Smart Controllers can dramatically reduce this over-irrigation, thereby saving significant quantities of water and reducing urban runoff.

The Irrigation Association defines a Smart Controller as climate-based or sensor-based controllers that automatically adjust for local weather and site conditions. Once the initial set-up and monitoring is complete, there is no need to reset the controller, or even turn it off for the winter. Smart Controllers make those adjustments automatically.

Weather based controllers are not necessarily Smart Controllers.

The weather based and sensor based controller requirement negates the need for several other calculation requirements of the ordinance.

Recommendation:

Revise ordinance requirements which are redundant to the requirement of "weather-based irrigation controllers or other self-adjusting irrigation controllers."

Require Smart Controller technology using the current Center for Irrigation Technology (CIT) testing protocol and as designated on the Irrigation Association website. In addition, central irrigation control systems such as those used in golf courses and other large landscapes which are

not currently being tested under the smart controllers testing protocol, should also be included as an approved irrigation control system.

- (3) *All irrigation systems shall be designed to avoid excessive pressure. Static water pressure, dynamic or operating pressure and flow reading of the water supply shall be measured at the time of day the system will operate. These pressure and flow measurements shall be conducted at the design phase, if available, or, prior to installation, if not available at the design phase.*
- (4) *If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure regulators, booster pumps or other devices shall be installed to meet the required dynamic pressure of the irrigation system.*
- (5) *Sensors (e.g., rain, freeze, wind, etc.), either integral or auxiliary, that suspend irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climactic conditions.*
- (6) *Ball valves (i.e., gate valve or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss due to an emergency (i.e., main line break) or repair.*
- (7) *Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the local agency code (i.e., public health) for additional backflow prevention requirements.*
- (8) *High-flow check valves, or other technology to interrupt operation in high flow conditions created by irrigation system damage or malfunction, shall be required.*

Issue:

This is not clear. In general, more sophisticated irrigation controllers use master valves, flow sensors and flow monitoring to control high flow conditions. When a high flow condition such as a broken mainline occurs, a signal from the flow sensor to the flow monitor will trigger the irrigation controller to shut down the master valve. This is used on high end commercial and golf irrigation system and is not usually used in residential or light commercial applications.

Recommendation:

Require master valves, flow sensing and monitoring on irrigation system where the landscape is greater than one acre in size. Require all irrigation systems to use, when available, sprinkler heads that incorporate anti-drain valves and pressure compensating nozzles for maximum irrigation system efficiency. Allow third party devices that employ anti-drain and pressure compensating characteristics when using sprinkler heads that do not incorporate these features into the sprinkler head construction. Large turf and golf rotors should be excluded from incorporating the pressure compensating feature.

- (9) *The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways or structures.*
- (10) *Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.*

Issue:

On new projects, the soil management plan can only provide appropriate soil information after mass grading and fine grading are complete. Addition of soil amendments will also change the characteristics of the soil. Irrigation schedules cannot be developed until final soil type and soil

infiltration rates are known. Irrigation plans are normally completed long before final soil information is available. Preparing irrigation schedules must be the responsibility of the landscape manager after all of the final soil information is known. Soil is an irrigation management issue not an irrigation design issue.

Recommendation:

Since soil type and soil infiltration rates will not be available during the design period, item 10 should be removed from irrigation criteria section of the Irrigation Design Plan.

- (11) Consideration of the prevailing wind direction and speed is highly recommended.*
- (12) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.*

(b) Hydrozone

- (1) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions and plant materials with similar water use.*
- (2) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.*
- (3) Sprinkler heads shall have matched application rates for uniform coverage*
- (4) Head to head coverage shall be required when designing the sprinkler system.*
- (5) Swing joints or other riser-protection components shall be required on all risers adjacent to high traffic areas*
- (6) Check valves or anti-drain valves shall be required for all sprinkler heads.*

Recommendation:

Require sprinkler heads to incorporate pressure compensating devices to assure maximum irrigation system efficiency. Allow third party devices that employ pressure compensating characteristics when using sprinkler heads that do not incorporate these features into the sprinkler head construction. Large turf and golf rotors should be excluded from incorporating the pressure compensating feature.

- (7) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers and turf.*
- (8) Long, narrow, or irregularly shaped areas less than eight (8) feet in width in any direction shall be irrigated with drip irrigation or low volume irrigation technology.*

Issue:

This is a design, cost, and long term maintenance issue. The ordinance should not dictate design, or a particular product installation technique. Each design should satisfy the water conservation and run-off objectives with the most appropriate technique.

Recommendation:

Strike this requirement.

- (9) Irrigated areas (including turf) within 24 inches of non-permeable hardscape shall be irrigated with drip irrigation or subsurface irrigation technology.*

Issue:

This is a significant aesthetic and functional design issue. The addition of 24" buffer of drip of subsurface irrigation is very costly and does not assure a reduction in landscape water use and does not

necessarily reduce runoff. Proper management of the irrigation system reduces or eliminates runoff. This is evidenced by the CIT protocol testing of Smart Controllers and by the EPA Residential Runoff Study found at IRWD's website <http://www.irwd.com/Conservation/R3-ExecSum10-26-04%5B1%5D.pdf>

The model ordinance should not dictate the appearance of the landscape. Each design should satisfy the water conservation and run-off objectives without dictating that turf irrigated with an overhead spray technique must be held 2' away from paved surfaces. The equipment selection and application scheduling for each project should be left to the applicant as necessary to adhere to the ordinance.

Recommendation:

Strike this requirement.

(10) Slopes greater than 4:1 shall be irrigated with drip irrigation or other low volume irrigation technology.

Issue:

Contrary to popular belief, drip may be low volume but it does not have a low precipitation rate

As noted in the definition section of the Model Ordinance, low volume irrigation, including drip cannot meet the precipitation rate of 0.75 inches per hour and is inappropriate for many slope irrigation system applications. Low volume does not mean low precipitation rate. Precipitation rate (PR) for irrigation devices is determined by the universal formula where the PR is equal to 96.3 times the flow in GPM divided by the area of coverage.

A one gallon per hour drip emitter applying water in a one foot square area will have a PR of 1.6 inches per hour.

A 0.9 gallon per hour sub-surface drip with emitters spaced 12" on center with 12" between rows will have a PR of 1.44 inches per hour.

A 3.7 gallon per minute full circle spray spaced at 15 feet on center will have a PR of 1.58 inches per hour which is lower than a drip emitter.

A 7.58 gallon per minute full circle rotor spaced at 35 feet on center will have a PR of only 0.60 inches per hour which is much lower than a drip emitter and has an irrigation distribution uniformity of 75% to 80%.

Consider the following:

- Drip or sub-surface irrigation cannot germinate hydro-seed. Hydro-seed is used almost exclusively to stabilize and landscape slopes including fuel modification slopes for fire protection.
- If laid on the surface of a slope, drip and or sub-surface irrigation systems will be damaged by wildlife animals.
- Because of the close spacing required by drip irrigation (as close as one foot between rows and drippers), burying drip or sub-surface irrigation may damage the structural integrity of the slope and would not be approved by the civil engineer certifying the slope.

- Burying drip or sub-surface irrigation systems would create excessive construction costs in comparison to installing highly efficient, low precipitation rate rotor systems.
- Damaged drip or sub-surface irrigation systems would be almost impossible to locate let alone repair in mature landscape such as acacia redolens as well as other plant materials normally used to stabilize slopes.
- While drip and sub-surface irrigation has its place in the landscape, irrigation of slopes is not one of them.
- Many Cities and other governmental agencies as well as large land developers have statements such as the following from the City of San Jose irrigation design standards.

4.17.13 Drip Irrigation: Drip irrigation systems of any sort utilizing drip emitters, micro-spray heads, and/or spaghetti tubing are not allowed in City Streetscape Projects due to the high levels of maintenance required for these types of systems.

Recommendation:

Strike the requirement of using drip or sub-surface irrigation for slope irrigation. Each design should satisfy the water conservation and run-off objectives without dictating the irrigation technique that should be used. The equipment selection and application scheduling for each project should be left to the applicant as necessary to adhere to the ordinance.

(11) Individual hydrozones that mix plants of moderate and low water use plants or moderate and high water use plant, may be allowed if the EWU calculation is based on the proportions of the respective plant water uses and their plant factors. Individual hydrozones that mix high and low water use plants shall not be permitted.

~~(C) Irrigation Design Plan Specifications Irrigation systems shall be designed to be~~

~~The irrigation design plan shall be drawn on project base sheets. It shall be separate from, but use the same format as, the landscape design plan. The scale shall be the same as that used for the landscape design plan described in Section 492 (c) (5) (C). The irrigation design plan shall accurately and clearly identify:~~

- ~~(i) Location and size of separate water meters for the landscape.~~
- ~~(ii) Location, type, and size of all components of the irrigation system, including automatic controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, and backflow prevention devices.~~
- ~~(iii) Static water pressure at the point of connection to the public water supply.~~
- ~~(iv) Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (psi) for each station.~~
- ~~(v) Recycled water irrigation systems as specified in the Section 492 (c) (4) (6).~~

2. Specifications

The irrigation design plan shall be drawn on separate project base sheets at a scale identical to the landscape design plan to accurately and clearly identify the following specifications, where applicable:

(a) Site

- (1) Location map with north arrow, scale, and legal description of the property.*

- (2) *Project name.*
- (3) *Title block with name, license/certification number, mailing address, email address, and phone number of licensed landscape architect or certified irrigation designer, etc.*
- (4) *Benchmark name, elevation, and location.*
- (5) *Topography with proposed contour lines and elevations.*
- (6) *Property lines and setbacks.*
- (7) *Street names.*
- (8) *Location of all utilities (e.g. telephone, electrical, gas, sewer, drainage, etc. The use of this information is limited to the landscape design and installation.*
- (9) *Location and details of existing and proposed public improvements within right-of-way (e.g., curb, gutter, sidewalk, street light, fire hydrants, driveways, other approaches, etc.).*

Issue:

All jurisdictional agencies have requirements for landscape project submittal inclusions or specifications. It is unnecessary for the water efficient landscape ordinance to confuse existing agency requirements.

While the above information would certainly be nice to show on each drawing, none of this information will save water in the landscape. Obtaining this information for existing and smaller projects may be next to impossible as well as very costly and time consuming.

Recommendation:

Strike this section. Jurisdictional agency requirements shall govern.

(b) Irrigation System

- (1) *Layout of the irrigation system and all related components.*
 - (2) *Detailed legend explaining all the symbols used in the irrigation design plan.*
 - (3) *Location, manufacturer, model, type, and size of all components of the irrigation system such as: ~~including automatic controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, and backflow prevention devices.~~*
 - (4) *Water meters*
 - (5) *Controllers*
 - (6) *Valves*
 - (7) *Check valves*
 - (8) *Main lines and lateral lines (indicate depth)*
 - (9) *Swing joints or other riser-protection components*
 - (10) *Sprinkler heads, drip emitters and other emission devices*
 - (11) *Sensors (e.g., rain, freeze, wind, etc.)*
 - (12) *Soil moisture sensors*
 - (13) *Pressure regulators*
 - (14) *Pumps*
 - (15) *Backflow prevention devices*
 - (16) *Quick couplers*
 - (17) *Other related components*
- (c) Hydrozone (see also Section 492.5.(a)(4) of the Landscape Documentation Package and Section D of the Water Efficient Landscape Worksheet)*
- (1) *Delineate and label each hydrozone by number, letter, or other method.*

Issue:

The Criteria section of the Irrigation Design Plan requires that “Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions and plant materials with similar water use”. Since this information is required to be shown on the irrigation plans and is already a part of the information which will be submitted to the local agency. Showing this information as a part of Section D of the Water Efficient Landscape Worksheet is a duplicate of effort and adds to the cost of preparing irrigation design plans without assuring any additional water savings. Providing this duplication of work will also increase work loads and time constraints on the local agencies.

(2) Indicate the square footage of each hydrozone.

Issue:

Knowing the square footage of each hydrozone for each control valve is a very tedious, costly and time consuming effort which will not contribute to the overall goal of reducing water in the landscape. Setting a maximum applied water allowance (MAWA) and estimated water use for the various hydrozones (EWU) as required by Section C of the Water Efficient Landscape Worksheet is all that should be required.

(3) Identify each hydrozone as low, moderate, or high water use, etc.

Issue:

The Criteria section of the Landscape Design Plan requires identification of hydrozones as low, moderate, or high water use, etc. Since this information is required to be shown on the landscape plans and is already a part of the information which will be submitted to the local agency. Showing this information as a part of Section D of the Water Efficient Landscape Worksheet is a duplicate of effort and adds to the cost of preparing landscape and irrigation design plans without assuring any additional water savings. Providing this duplication of work will also increase work loads and time constraints on the local agencies.

(4) Identify recreational areas (see Section 491.48).

Issue:

The Criteria section of the Landscape Design Plan requires identification of recreational areas. Since this information is required to be shown on the landscape plans and is already a part of the information which will be submitted to the local agency. Showing this information as a part of Section D of the Water Efficient Landscape Worksheet is a duplicate of effort and adds to the cost of preparing landscape and irrigation design plans without assuring any additional water savings. Providing this duplication of work will also increase work loads and time constraints on the local agencies.

(5) Identify areas permanently and solely dedicated to edible plants.

Issue:

The Criteria section of the Landscape Design Plan requires identification of edible plant areas. Since this information is required to be shown on the landscape plans and is already a part of the information which will be submitted to the local agency. Showing this information as a part of Section D of the Water Efficient Landscape Worksheet is a duplicate of effort and adds to the cost of preparing landscape and irrigation design plans without assuring any additional water savings. Providing this duplication of work will also increase work loads and time constraints on the local agencies.

(6) Identify any other pertinent factors (e.g., sun exposure, microclimate, etc.).

Issue:

It is pre-mature to identify all of the factors that affect irrigation scheduling. Sun exposures change as tree mature, root depths change as plants mature and soil infiltration rates will not be known until grading and addition of soil amendments are complete. These are clearly factors that must be determined by the landscape water manager.

Recommendation:

Delete Section D of the Water Efficient Landscape Worksheet from the model ordinance. Controllers, valve circuits, plant types and irrigation methods are already included as a part of the landscape and irrigation plans. The area in square feet is already included as a part of Worksheet C in determining the maximum water allowance and the estimated water use. What is not useful information is the requirement to calculate the square footage of the landscape area covered by each control valve and express this area as a percentage of the total landscape area. This information will not affect the irrigation schedule nor will it contribute to the savings of water used in the landscape. Section D of the Water Efficient Landscape Worksheet is basically a duplication of work prepared in other sections of the ordinance.

(d) Hydraulics

- (1) Static water pressure (pounds per square inch, psi).*
- (2) Recommended system operating pressure range (psi).*
- (3) Acceptable system operating pressure range (psi), minimum and maximum.*
- (4) Flow rate (gallons per minute, gpm) and application rate (inches per hour) for each valve.*

(e) Other

- (1) Details for recycled water irrigation systems as specified in Section 492.16.*
- (2) Construction or installation details for irrigation system.*
- (3) Each sheet of the irrigation design plan shall contain the following statement along with a licensed landscape architect's, certified irrigation designer's, or licensed landscape contractor's stamp and signature: "I have agreed to comply with the criteria and specifications of the ordinance and I have applied them accordingly for the efficient use of water in the irrigation design plan."*

Issue:

By licensure statute in the State of California, all licensed landscape architects are required to sign each sheet of project documentation acknowledging their compliance with all regulations applicable to the subject project. Requiring a separate acknowledgement of compliance with this ordinance is unnecessary and redundant.

Recommendation:

Strike this requirement.

(4) Apply best management practices for installation of irrigation systems.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.10. Grading Design Plan.

For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading design plan ~~satisfying meeting~~ the following ~~conditions~~ design criteria and specifications shall be submitted as part of the Landscape Documentation Package.

Issue:

Grading design is legislated by public works / engineering ordinance and code. Moreover, grading documentation requires separate permitting. It is inappropriate and confusing to include grading design and specification criteria in a water efficient ordinance. The landscape improvement base sheets should include all grading and drainage information, but should not duplicate the submittal of this civil engineering scope of separately permitted work.

Recommendation:

Strike grading design and specification requirements. Jurisdictional agency requirements to govern this section.

1. *Criteria*

- (a) The grading design plan shall ~~indicate finished~~ *delineate configurations* and elevations of *all* the landscaped areas, including the height of graded slopes, drainage patterns, pad elevations, and finished grade.
- (b) *Grading of a project site shall avoid disturbing natural drainage patterns and avoid soil compaction in landscape areas.*

2. *Specifications*

~~The A~~ grading design plan shall be drawn on project base sheets ~~It shall be separate from but use the same format as the landscape design plan~~ *at a scale identical to the landscape design plan to accurately and clearly identify the following specifications, where applicable:*

(a) *Site*

- (1) *Location map with north arrow, scale, and legal description of the property.*
- (2) *Project name.*
- (3) *Title block with name, license number, address, and phone number of registered civil engineer, licensed landscape architect, or licensed landscape contractor.*
- (4) *Benchmark name, elevation, and location.*
- (5) *Property lines and setbacks.*
- (6) *Street names.*
- (7) *Location of all utilities (e.g., telephone, electrical, gas, sewer, drainage, etc.). The use of this information is limited to the landscape design and installation.*
- (8) *Location and details of existing and proposed public improvements within right-of-way (e.g., curb, gutter, sidewalk, street light, fire hydrants, driveways, other approaches, etc.).*
- (9) *Topography with contours and elevations of existing, proposed, and finished grade.*
- (10) *Cross-sections of cuts, fills, building pads, sidewalks, driveways, etc.*

(b) *Other*

- (1) *Any supporting slope or other engineering calculations.*
- (2) *Installation details of any applicable stormwater best management practices.*
- (3) *Refer to the local agency guidelines for additional grading requirements.*
- (4) *Each sheet of the grading design plan shall contain the following statement along with a registered civil engineer's, licensed landscape architect's, or licensed landscape contractor's stamp and signature: "I have agreed to comply with the criteria and specifications of the ordinance and I have applied them accordingly for the efficient use of*

water in the grading design plan.”

Issue:

By licensure statute in the State of California, all licensed landscape architects are required to sign each sheet of project documentation acknowledging their compliance with all regulations applicable to the subject project. Requiring a separate acknowledgement of compliance with this ordinance is unnecessary and redundant.

Recommendation:

Strike this requirement.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

~~(12) Certification~~

~~(A) Upon completing the installation of the landscaping and the irrigation system, an irrigation audit shall be conducted by a certified landscape irrigation auditor prior to the final field observation. (See Landscape Irrigation Auditor Handbook as referenced in Section 492 (c) (9) (A)).~~

~~(B) A licensed landscape architect or contractor, certified irrigation designer, or other licensed or certified professional in a related field shall conduct a final field observation and shall provide a certificate of substantial completion to the city or county. The certificate shall specifically indicate that plants were installed as specified, that the irrigation system was installed as designed, and that an irrigation audit has been performed, along with a list of any observed deficiencies.~~

~~(C) Certification shall be accomplished by completing a Certificate of Substantial Completion and delivering it to the city or county the retail water supplier, and to the Owner of Record.~~

~~A sample of such a form, which shall be provided by the city or county is:~~

~~SAMPLE CERTIFICATE OF SUBSTANTIAL COMPLETION~~

~~Project Site:~~

~~Project Number:~~

~~Project Location:~~

~~Preliminary Project Documentation Submitted: (check indicating submittal)~~

~~- 1. Maximum Applied Water Allowance:(gallons or cubic feet per year)~~

~~- 2. Estimated Applied Water Use:(gallons or cubic feet/year)~~

~~* 2a. Estimated Amount of Water Expected from Effective Precipitation: (gallons or cubic feet/year)~~

~~3. Estimated Total Water Use:(gallons or cubic feet year)~~

~~Note: * If the design assumes that a part of the Estimated Total Water Use will be provided by precipitation, the Effective Precipitation Disclosure Statement in Section 495 shall be completed and submitted. The Estimated Amount of Water Expected from Effective Precipitation shall not exceed 25 percent of the local annual mean precipitation (average rainfall -)~~

~~4. Landscape Design Plan~~

~~5. Irrigation Design Plan~~

~~6. Irrigation Schedules~~

~~7. Maintenance Schedule~~

~~8. Landscape Irrigation Audit Schedule~~

~~9. Grading Design Plan~~

~~10. Soil Analysis~~

~~Post-Installation Inspection: (Check indicating substantial completion)~~

~~A. Plants installed as specified~~

~~B. Irrigation system installed as designed~~

~~- dual distribution system for recycled water~~

~~- minimal run off or overspray~~

~~C. Landscape Irrigation Audit performed~~

~~(Certificate of Substantial Completion, continued)~~

~~Project submittal package and a copy of this certification has been provided to owner /manager and local water agency Comments:~~

~~I/we certify that work has been installed in accordance with the contract documents. Contractor Signature Date State License Number I/we certify that based upon periodic site observations, the work has been substantially completed in accordance with the Water Efficient Landscape Ordinance and that the landscape planting and irrigation installation conform with the approved plans and specifications. Landscape Architect Signature Date State License Number or Irrigation Designer/Consultant or Licensed or Certified Professional in a Related Field I/we certify that I/we have received all of the contract documents and that it is our responsibility to see that the project is maintained in accordance with the contract documents. Owner Signature Date~~

§492.11. Certificate of Completion.

1. *The project applicant and the local agency shall comply with the Certificate of Completion as specified under Section 492.2. See Appendix C for a sample Certificate of Completion.*
2. *The Certificate shall specifically indicate that:*
 - (a) *plants were installed as specified;*
 - (b) *the irrigation system was installed as designed;*
 - (c) *an irrigation audit has been performed;*
 - (d) *other criteria of the ordinance have been met along with a list of any observed deficiencies.*
3. *The following shall be submitted with the Certificate of Completion;*
 - (a) *Irrigation Schedule, see Section 492.12;*
 - (b) *Landscape and Irrigation Maintenance Schedule, see Section 492.13;*
 - (c) *Landscape Irrigation Audit Schedule, see Section 492.14; and*
 - (d) *Irrigation Audit Report.*

Issue:

Requiring an irrigation audit of a new system prior to final installation certification is unnecessary, very costly and will impact completion schedule. Water audits may be warranted when exceeding water allotments and should not necessarily have a schedule requirement. A water audit schedule submitted with the initial landscape development package is not necessary or regulatory.

Recommendation:

Strike any requirement for an irrigation audit as a prerequisite to the installation certification and strike all references to a schedule of water audits.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.12. Irrigation Scheduling Schedule

For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation

~~schedules satisfying the following conditions shall be submitted as part of the Landscape Documentation Package meeting the following criteria shall be submitted with the Certificate of Completion.~~

1. ~~(E) Whenever possible, Irrigation scheduling shall incorporate the use of evapotranspiration data such as those from the California Irrigation Management Information System (CIMIS) weather stations or other validated weather data or soil moisture monitoring systems to apply the appropriate levels of water for different climates.~~
2. ~~(G) Whenever possible, landscape irrigation shall be scheduled between 2:00 a.m. and 10:00 a.m. to avoid irrigating during times of high wind or temperature unless weather conditions are unfavorable. Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions are unfavorable. If allowable hours of irrigation differ from the local retail water purveyor, the stricter of the two shall apply.~~
3. ~~For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current ETo, so that applied water meets the Estimated Applied Water Use. Total annual applied water shall be less than or equal to MAWA.~~
4. ~~Using an appropriate controller, an annual irrigation program with monthly irrigation schedules shall be developed and submitted for each of the following:~~
 - ~~(a) the plant establishment period;~~
 - ~~(b) the established landscape; and~~
 - ~~(c) temporarily irrigated areas.~~
5. ~~(B) The _____ irrigation _____ schedule _____ shall:~~
 - ~~(i) include run time (in minutes per cycle), suggested number of cycles per day, and frequency of irrigation for each station; and~~
 - ~~(ii) provide the amount of applied water (in hundred cubic feet, gallons, or in whatever billing units the local water supplier uses) recommended on a monthly and annual basis. Each Irrigation Schedule shall include for each station all that apply:~~
 - ~~(a) Irrigation interval (days between irrigation);~~
 - ~~(b) Irrigation run times (hours or minutes per irrigation event to avoid runoff);~~
 - ~~(c) Number of cycle starts required for each irrigation event to avoid runoff;~~
 - ~~(d) Amount of applied water scheduled to be applied on a monthly basis;~~
 - ~~(e) Application rate setting;~~
 - ~~(f) Root depth setting;~~
 - ~~(g) Plant type setting;~~
 - ~~(h) Soil type;~~
 - ~~(i) Slope factor setting;~~
 - ~~(j) Shade factor setting;~~
 - ~~(k) Irrigation uniformity or efficiency setting;~~~~(C) The total amount of water for the landscape project shall include water designated in the Estimated Total Water Use calculation plus water needed for any water features, which shall be considered as a high water using hydrozone.~~

Issue:

The Model Ordinance requires that irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. There are a number of problems as to the way the Model Ordinance handles the concept of irrigation schedules.

Issue #1:

The ordinance requires that a plant establishment irrigation schedule be developed. During the plant establishment of a project the irrigation schedule, as well as the growing patterns of the plant materials, is very dynamic and can change on a daily basis. Plant establishment irrigation should clearly be handled by the landscape installation contractor. The contractor will have the most knowledge of what the changing water requirements of new planted materials will be during the plant establishment period. Under the plant establishment period of a contract, the installing landscape contractor has the sole responsibility of maintaining the landscape in a healthy condition. There is no way that a scripted irrigation schedule using historic evapotranspiration rates can provide optimum irrigation water needs to the landscape during this critical period in the life cycle of the landscape.

Recommendation:

Strike the requirement that plant establishment irrigation schedules be a part of the Landscape Documentation Package.

Issue #2:

The ordinance requires that irrigation schedules for established landscapes and temporary irrigation systems be developed. An irrigation schedule as described by the Model Ordinance can only be developed as a snapshot in time based on historic evapotranspiration rates. Such a schedule is useless unless the landscape maintenance contractor adjusts the irrigation schedules on a daily basis or a least a weekly basis to the plants actual water needs based on actual weather conditions and not historic weather conditions. Actual weather conditions can produce ETo values that can vary as much as 30% from historic ETo values during any given time period. While using historic information was OK for developing irrigation schedules in the past, new technologies can provide optimum irrigation schedules, however these schedules can only be produced by the landscape water manager when actual environmental and irrigation system parameters are known.

Recommendation:

Strike the requirement that irrigation schedules for established landscapes and temporary irrigation systems be developed as a part of the Landscape Documentation Package.

Issue #3:

The ordinance requires that only weather based or sensor based irrigation controllers be included as a part of the irrigation design and installation. Both weather based and sensor based controllers automatically develop optimum irrigation schedules from data created actual environmental and irrigation system parameters. If the required weather based or sensor based control systems automatically generate real time irrigation schedule, why does a historic weather based irrigation schedule need to be provided as a part of the Landscape Documentation package?

Recommendation:

Require Smart Controller technology using the current Center for Irrigation Technology (CIT) testing protocol and as designated on the Irrigation Association website to develop optimum irrigation schedules based on real time environmental and irrigation system parameters. In addition, central irrigation control systems such as those used in golf courses and other large landscape applications which are not currently being tested under the smart controllers testing protocol, should also be included as an approved irrigation control system.

Query:

How can the consultant creating irrigation schedules currently required by the ordinance by utilizing historic information and other anticipated environmental and irrigation system parameters be held responsible for how its created irrigation schedule will function in some future landscape?

Creating an irrigation schedule from historical data would mean that the consultant would be providing inaccurate irrigation schedules when compared to real time irrigation schedules. If a lawsuit becomes the result of the historic irrigation schedules which use is required by this ordinance, who is responsible? Is it the landscape maintenance contractor or the consultant? This situation would not be insurable under the consultant's professional liability insurance. Remember, the landscape is dynamic and needs to have its irrigation schedules adjusted by the landscape water manager and not to use an erroneous irrigation schedule required by the ordinance.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.13. Landscape and Irrigation Maintenance Schedule.

1. Landscapes shall be maintained to ensure water *use* efficiency. A regular maintenance schedule shall be submitted *with the Certificate of Completion*.
2. A regular maintenance schedule shall include, but not be limited to, ~~checking,~~ *routine inspection, adjusting adjustment, and repairing repair of the irrigation system and its components equipment; resetting adjusting the automatic controllers; conducting water audits; and prescribing the amount of water applied per landscaped acre;* aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning, and weeding in all landscaped areas.
3. ~~Whenever possible,~~ Repair of *all* irrigation equipment shall be done with the originally specified ~~materials~~ components or their equivalents.
4. *A project applicant is encouraged to implement sustainable or environmentally-friendly practices for overall landscape maintenance.*

Issue:

This is a schedule issue as well as a questionable ordinance inclusion. Maintenance guidelines are never prepared with the construction documents and are not part of a permitted package. Governing agencies do not review or inspect non-permitted work. Maintenance requirements are dynamic. The critical aspect of maintaining a landscape project within water allotment requirements is already regulated by some water purveyors and has been highly recommended by this ordinance. Only landscape water managers, who are not included within this ordinance, can control the landscape maintenance requirements

Recommendation:

Strike this requirement. Water district / agency requirements shall govern.

9) Landscape Irrigation Audit Schedules

~~A schedule of landscape irrigation audits, for all but single family residences, satisfying the following conditions shall be submitted to the city or county as part of the Landscape Documentation Package.~~

~~(A) At a minimum, audits shall be in accordance with the State of California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document, which is hereby incorporated by reference. (See Landscape Irrigation Auditor Handbook (June 1990) version 5.5 [formerly Master Auditor Training].)~~

~~(B) The schedule shall provide for landscape irrigation audits to be conducted by certified landscape irrigation auditors at least once every five years.~~

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.14. Landscape Irrigation Audits and Audit Schedules.

1. *At a minimum, all landscape irrigation audits shall be in accordance with the "Irrigation Association Certified Landscape Irrigation Auditor Training Manual (2004)," the entire document, which is hereby incorporated by reference.*
2. *All landscape irrigation audits and audit reports shall be conducted by a certified landscape irrigation auditor.*
3. *For new construction and rehabilitated landscape projects installed on or after January 1, 2010, the project applicant shall fulfill the following requirements for landscape irrigation audits: (a) submit a landscape irrigation audit report with the Certificate of Completion to the local agency; (b) For landscapes equal to or greater than one acre submit a schedule of landscape irrigation audits with the Certificate of Completion to the local agency; (c) implement the recommendations from the landscape irrigation audit report; and (d) For landscapes equal to or greater than one acre submit a landscape irrigation audit report every 5 years to the local agency.*
4. *For new construction and rehabilitated landscape projects installed after January 1, 2010, except for home owner-installed, home owner-provided landscape less than 2500 square feet, the local agency shall fulfill the following requirements for landscape irrigation audits:*
 - (a) annually compare customers' maximum applied water allowances, which are found in the Water Efficient Landscape Worksheet (Section C) submitted as part of the Landscape Documentation Package, to customers' water use and identify customers whose landscapes exceed the maximum applied water allowance for at least one year, to the extent that customer water use information is available to the local agency.*
 - (b) annually conduct landscape irrigation audits on a minimum 20% of the total customer landscapes identified in 492.14 (4) (a).*
 - (1) The local agency shall obtain permission from the project applicant to access the property for the purposes of conducting a landscape irrigation audit.*
 - (2) The local agency's cost of conducting the landscape irrigation audit shall be paid by the project applicant.*

A local agency that is not the local retail water purveyor shall make a good faith effort to obtain necessary water use information from the local retail water purveyor.

Issue:

Audits traditionally show low irrigation system efficiencies which create excessive water use schedules.

Audits cannot create irrigation schedules using real time ET data.

Audits can not be conducted on drip systems or in shrub areas. Audits can only be conducted in turf areas.

A certified irrigation auditor is not trained, qualified or involved in the irrigation design process and is not qualified to conduct recommend irrigation system changes.

Irrigation audit results cannot be duplicated nor are they verifiable.

Irrigation sprinkler head manufacturers use sophisticated testing labs to determine a sprinkler heads distribution uniformity. Irrigation sprinkler head manufacturers do not publish the distribution uniformity rates of some of their sprinkler heads. The reason for this is that the manufacturers cannot duplicate distribution uniformity results even though their sprinklers are tested in a in a building with no wind effect, with catchment devices one foot on center and the water caught by the catchment devices are measured by electronic data logging equipment.

We have been led to believe that a certified irrigation auditor who takes a one or two day class, takes a test, becomes certified, purchases some "Catch Can" equipment and is now qualified to prepare a water audit which we are expected to believe is providing the correct irrigation system distribution uniformity data from which an irrigation schedule will be developed. This method of auditing produces low irrigation distribution uniformity because the number of catch can devices used by a certified water auditor results in a smaller number of catch cans to make up the lower quarter DU. Consider, a manufacturer would use 1000 catch cans for 1000 square feet of area dedicating 250 catch cans to the lower quarter DU. This is contrasted by a certified water auditor using maybe 40 catch cans for the same 1000 square feet of area resulting in only 10 catch cans being dedicated to the lower quarter DU. This method of auditing does not give a true picture of the irrigation efficiency. The audit will show the irrigation distribution uniformity as being lower that it actually is. If this happens, the landscape package plans will not be approved or if approved the audit will generate an irrigation schedule that will exceed the irrigation systems maximum water allowance.

Water audits are warranted by exceeding water allotments and should not necessarily have a schedule requirement.

Recommendation:

Delete the need for water audits altogether or at a maximum, water audits should only be required when it is shown that a new or existing landscape exceeds the MAWA as determined in Worksheet "C". Use manufacturer's or CIT "DU" data for determining sprinkler system distribution uniformity..

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.15. Irrigation Efficiency.

~~(ii) Irrigation Efficiency.~~

For the purpose of determining the maximum applied water allowance, irrigation efficiency is assumed to be ~~0.625~~ 0.71. Irrigation systems shall be designed, maintained, and managed to meet or exceed ~~0.625~~ 0.71 efficiency.

Issue:

Under AB 325 the maximum water allowance was based on an irrigation efficiency of 0.625. Under the model ordinance the irrigation efficiency allowed has been increased to 0.70. There have been no tests or studies completed to how landscape will survive with the higher required efficiency even though it was highly recommended by the task force for studies should be completed prior to requiring the higher efficiency in the Model Ordinance. In fact, no studies were completed to determine if the irrigation efficiency used under AB 325 was even viable.

To arrive at a higher efficiency, the Department of Water Resources (DWR) changed the way

irrigation efficiency is to be determined. As outlined in a draft white paper entitled “Evapotranspiration Adjustment Factor Whitepaper” dated December 18, 2007 DWR changed the way sprinkler head distribution uniformity is calculated. Traditionally sprinkler head distribution uniformity has been calculated using lower quarter distribution information in favor of lower half distribution information. This increases the irrigation system efficiency without any physical change or management style change in the irrigation system. What was an irrigation system efficiency of 60% under the old Model Ordinance will now be an irrigation system efficiency of 75% under the new Model Ordinance. This change was made without any studies or testing

Additionally, DWR uses an irrigation management efficiency (how well the irrigation manager manages the water) of 90% as recommended by the Irrigation Association (IA). Using 90% for the irrigation management efficiency implies that most of the inefficiencies of an irrigation system are caused by the design, the installation or the irrigation equipment. Experience tells a different story. IRWD, a local water purveyor, uses a tiered rate water structure and tracks water use on all metered landscape. Water bills for many irrigation systems has changed from IRWD’s wasteful water use rate to an excessive water use rate, to an inefficient water use rate, to basic water use rate and even to low volume use rate. This reduction in water use was accomplished without a change in the irrigation system design or installation? What reduced the water use in the landscape was a change in the management of the irrigation system. It is all in the management, management, management. Allowing the irrigation management to be 90% efficient and the irrigation system to be 50% efficient is like saying when an automobile is in accident that the accident was caused by the automobile and not by the driver of the car. While 90% may be a desirable number for irrigation management efficiency, there is no evidence that this is the appropriate number in determining overall irrigation system efficiency. If irrigation management was at 90% as suggested by the DWR white paper, then there would be no need for Smart Controllers.

In review of the IA’s 190 page “Landscape Irrigation Scheduling & Water Management” handbook which includes 5 pages of irrigation management equations and a 27 page Chapter 3 on “Landscape Irrigation Water Management. Chapter 3 includes complicated formulas for determining, but not limited to, such water management factors as;

- Plant water requirements
- Run time Multiplier
- Irrigation water requirements
- Irrigation management efficiency
- Water management factor
- Lower half or lower quarter distribution uniformity
- Distribution uniformity within the rootzone
- Total irrigation water requirement
- Allowable soil moisture depletion
- Irrigation system efficiency
- Determining actual water management efficiency

Unless you are a professional landscape irrigation manager on a large landscape project, the possibility of understanding these terms let alone using them in your calculation to determine your irrigation systems management efficiency is non-existent. No where in the IA handbook does it

document that the water managers efficiency will be 90%. No studies have been completed by the IA or other agencies that can support a claim of 90% water management efficiency. In real world situation, irrigation water management efficiency probably varies between 50% and 90%. If a compromise number of 70% irrigation water management efficiency was used to calculate the ET Adjustment Factor (ETFA), then the ETAF would be as follows;

The average DU as outlined in the whitepaper is 0.78 $[(0.754+0.80+0.80)/3=0.78]$ with an assumed Irrigation Management Efficiency $IME=0.90$, as recommended by Irrigation Association. Therefore the Irrigation

Efficiency (IE) = (average DU)(0.9IME) = $(0.784)(0.90IME) = 0.71$

The ETAF is calculated as follows: $ETAF = \text{Plant Factor}/IE = 0.5/0.71 = 0.70$.

If the Irrigation Management Efficiency IME equaled 70% instead of 90% as suggested by the whitepaper then:

Irrigation Efficiency (IE) = (average DU)(0.7IME) = $(0.784)(0.70IME) = 0.5488$ say 0.55 then

The new ETAF would be calculated as follows: $ETAF = \text{Plant Factor}/IE = 0.5/0.55 = 0.90$.

There are no studies to support the 0.7 or the suggested 0.9 numbers.

Also, in order to achieve overall irrigation distribution uniformity the DRW white paper suggests that all medium and low water use plants use drip or microspray irrigation system as a means to supply irrigation water to the plant. While drip or microspray irrigation systems have their place, a hundred acres of hydro-seeded erosion control plantings is not one of them. A drip system under these conditions would not work and a microspray system would be cost prohibitive.

Consider the following:

- Many Cities and other governmental agencies as well as large land developers have statements such as the following from the City of San Jose irrigation design standards.

4.17.13 Drip Irrigation: Drip irrigation systems of any sort utilizing drip emitters, micro-spray heads, and/or spaghetti tubing are not allowed in City Streetscape Projects due to the high levels of maintenance required for these types of systems.

- Drip or sub-surface irrigation cannot germinate seed or hydro-seed. Hydro-seed is used almost exclusively to stabilize and landscape slopes including fuel modification slopes for fire protection.
- Drip and sub-surface irrigation systems cost more than conventional; irrigation systems with a much shorter life expectancy.

Under the circumstances, the only thing that lowering the irrigation system efficiency to 70% does is to dictate the types of landscape that can be used on a project. This in turn will change the design and esthetics trying to be created by the landscape architect. The irrigation system efficiency should not be lowered until more extensive testing can be completed to justify lowering the irrigation system efficiency number.

Recommendation:

Allow the ET adjustment factor shall remain at 0.8 until such time that more testing can be completed to determine the proper ET adjustment factor number.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.16. Recycled Water.

1. ~~(i)~~ The installation of recycled water irrigation systems (*i.e.*, dual distribution systems) shall be required to allow for the current and future use of recycled water, unless a written exemption has been granted as described in ~~the following~~ 492.16.2. ~~ii~~.
2. ~~(ii)~~ Irrigation systems shall make use of recycled water unless a written exemption has been granted by the local water agency, stating that recycled water meeting all *public health codes and standards* is ~~are~~ not available and will not be available in the foreseeable future.
3. ~~(iii)~~ All ~~The~~ recycled water irrigation systems shall be designed and operated in accordance with all local *agency* and State codes.
4. *If the irrigation water (recycled water or blended water) has electrical conductivity equal to or greater than 3 deciSeimens per meter (dS/m) or 3 millimhos per centimeter (mmh/cm) or 2000 mg per liter total dissolved solids (TDS), a leaching fraction of up to 10% may be included in the MAWA calculation. The leaching fraction shall not exceed 10% of MAWA.*
5. *For more information on recycled water, see the University of California Agriculture & Natural Resources "Landscape Plant Salt Tolerance Selection Guide for Recycled Water Irrigation (2005)," the entire document, which is hereby incorporated by reference.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

§492.17. Stormwater Management

1. *Stormwater management combines practices to minimize runoff and water waste to recharge groundwater, and to improve water quality. Implementing stormwater best management practices into the landscape, irrigation, and grading design plans to minimize runoff, and increase on-site retention and infiltration are highly recommended.*
2. *Project applicants shall refer to the local agency or Regional Water Quality Control Board for information on any stormwater ordinances and stormwater management plans.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Section 65596, Gov. Code.

Issue

Water quality/run-off management documentation is based on federal legislation and is governed by a myriad of existing ordinances and codes. These documents require separate submittal and permits.

Recommendation:

Strike this submittal requirement which is legislated otherwise.

§492.18. ~~(d)~~ Public Education.

1. ~~(1) Publications. (A) Local agencies shall provide information to owners of all new, single family residential homes regarding the design, installation, and maintenance of water efficient landscapes. (B) Information about the efficient use of landscape water shall be provided to water users throughout the community. Education is a critical component to promoting the efficient use of water in landscapes. Encouraging the use of appropriate principles of design, installation, management, and maintenance that save water shall occur at all levels in the community. (a) A local agency shall provide information to owners of new, single-family residential~~

homes regarding the design, installation, management, and maintenance of water efficient landscapes.

2. ~~(2)~~ Model Homes. At least one model home that is landscaped in each project consisting of eight or more homes shall demonstrate via signs and information the principles of water efficient landscapes described in this ordinance. *All model homes that are landscaped shall demonstrate via signs and information the principles of water efficient landscapes described in this ordinance.*
 - (a) ~~(A)~~ Signs shall be used to identify the model as an example of a water efficient landscape and featuring elements such as hydrozones, irrigation equipment, and others which contribute to the overall water efficient theme.
 - (b) ~~(B)~~ Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

Issue

Requiring all model homes to include signs and other educational information regarding water efficient landscaped is vague, ineffective and intrusive upon creating an attractive residential sales setting.

Recommendation:

Strike any model home signage and information requirements.

Note: Authority cited: Sections 65595 Gov. Code. Reference: Sections 65593, 65594, 65596, 65597, Gov. Code.

§492.19. Environmental Review.

1. *This ordinance is not subject to California Environmental Quality Act (CEQA).*
2. *All local agencies are required to adopt specific objectives, criteria, and procedures for the evaluation of projects under CEQA. It is the local agency's responsibility to conduct environmental reviews before taking any action to approve projects subject to the ordinance. A multidisciplinary environmental review is a set of procedures used to identify potential environmental impacts of a proposed project.*

Note: Authority cited: Sections 21082, Public Resources Code. Reference: Sections 21080, 21082, Public Resources Code.

§493. Provisions for Existing Landscapes.

Note: Authority cited: Section 65595 Gov. Code.

~~(a) Water Management~~

~~All existing landscaped areas to which the city or county provides water that are one acre or more, including golf courses, green belts, common areas, multi-family housing, schools, businesses, parks, cemeteries, and publicly owned landscapes shall have a landscape irrigation audit at least every five years. At a minimum, the audit shall be in accordance with the California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document which is hereby incorporated by reference. (See Landscape Irrigation Auditor Handbook, Dept. of Water Resources, Water Conservation Office (June 1 990) version 5.5.) (1) If the project's water bills indicate that they are using less than or equal to the Maximum Applied Water Allowance for that project site, an~~

~~audit shall not be required. (2) Recognition of projects that stay within the Maximum Applied Water Allowance is encouraged.~~

§493.1. Landscape Irrigation Audits. *For existing landscapes installed before January 1, 2010, the following shall apply;*

1. *At a minimum, all landscape irrigation audits shall be in accordance with the “Irrigation Association Certified Landscape Irrigation Auditor Training Manual (2004)” in Section 492.14.*
2. *All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.*
3. *For existing landscapes equal to or greater than one acre (43,560 square feet), the property owner or his/her designee of the landscape project shall fulfill the following requirements for landscape irrigation audits:*
 - (a) Submit a landscape irrigation audit report every 5 years to the local agency.*
 - (b) Implement the water management and maintenance recommendations from the landscape irrigation audit report.*
4. *For existing landscapes equal to or greater than 2,500 square feet, the local agency shall fulfill the following irrigation audit requirements:*
 - (a) Annually survey and compare customers’ landscape water use to local reference evapotranspiration and identify customers whose landscapes exceed 80% of local reference evapotranspiration for at least one year, to the extent that customer water use information is available to the local agency.*
 - (b) Annually conduct landscape irrigation audits on a minimum 20% of the total customer landscapes identified in Section 493.1.4 (a)*
 - (1) The local agency shall obtain permission from the property owner or his/her designee to access the property for the purposes of conducting a landscape irrigation audit.*
 - (2) The local agency’s cost of conducting the landscape irrigation audit shall be paid by the property owner or his/her designee.*
 - (3) A local agency that is not the local retail water purveyor shall make a good faith effort to obtain necessary water use information from the local retail water purveyor.*

Refer to issues and recommendations at the end of Section 492.14 for additional information.

Issue:

Section 493.1 is unrealistic. If we look at the Irvine Ranch water District (IRWD) as an example of one of the 29 water districts or water agencies in the County of Orange, we would find that IRWD has over 82,000 residential and irrigation water meters within its jurisdiction. If we assumed that only 25% (a conservative number) of these 82,000 water meters or 20,500 water meters qualified for water audits and we multiplied the qualifying 20,500 water meters by the 29 water districts and water agencies located in orange county, this would mean that water audits would be required on 594,500 water meters or 118,900 water meters per year over a five year period. Knowing that there are only 10 to 12 certified water auditors in the County of Orange, it would stand to reason that each of the 12 certified auditors in the county would need to perform 9,908 audits per year or more that 40 audits per day per auditor based on 240 working days per year.

Recommendation:

Strike the need for water audits. Refer to issues and recommendations at the end of Section 492.14 for additional information.

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Section 65596, Gov. Code.

(b) Water Waste Prevention

~~Cities and counties shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, or structures. Penalties for violation of these prohibitions shall be established locally. Authority cited: Section 65594, Gov. Code. Reference: Section 65597, Gov. Code.~~

§493.2. Water Waste Prevention.

Water waste resulting from inefficient landscape irrigation, such as runoff, low head drainage, overspray, etc, is prohibited. Similar conditions where water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures are also prohibited. Penalties for violation of these prohibitions shall be subject to procedures of the local agency.

Note: Authority cited: Sections,65595 Gov. Code. Reference: Sections 65593, 65594, 65596, 65597, Gov. Code.

§494. Effective Precipitation.

If effective precipitation is included in the calculation of the Estimated Total Water Use, then an Effective Precipitation Disclosure Statement from the ~~landscape professional~~ *licensed landscape architect, licensed landscape contractor or certified irrigation designer* and the property owner or his/her designee shall be submitted with the Landscape Documentation Package. *See Appendix D for a sample Effective Precipitation Disclosure Statement.*

Note: Authority Cited: Sections 65595, Gov. Code. Reference: Sections 65596, Gov. Code.

~~SAMPLE EFFECTIVE PRECIPITATION DISCLOSURE STATEMENT I certify that I have informed the project owner and developer that this project depends on (gallons or cubic feet) of effective precipitation per year. This represents percent of the local mean precipitation of inches per year.I have based my assumptions about the amount of precipitation that is effective upon: I certify that I have informed the project owner and developer that in times of drought, there may not be enough water available to keep the entire landscape alive. Licensed or Certified Landscape Professional
I certify that I have been informed by the licensed or certified landscape professional that this project depends upon (gallons or cubic feet) of effective precipitation per year. This represents percent of the local mean precipitation of inches per year. I certify that I have been informed that in times of drought, there may not be enough water available to keep the entire landscape alive. Owner Developer~~

~~Section 495. Reference Evapotranspiration
in inches (Historical Data, extrapolated from 12-month Normal Year ETo Maps and U.C. publication 21426).~~

Additional Issue:

Appendix “B” Sample Water Efficient Landscape Worksheet is cumbersome to use and requires a

duplication of work that is already included as a part of the landscape and irrigation plans. Appendix "B" adds to the cost of preparing landscape and irrigation design plans without assuring any additional water savings. Providing this duplication of work will also increase work loads and time constraints on the local agencies.

Additional Recommendation:

Rewrite Appendix "B" Sample Water Efficient Landscape Worksheet so that it eliminates any duplication of work prepared in the landscape and irrigation design plans. Eliminate Section "D" of Appendix "B" in its entirety.

CONCLUSIONS

The Model Ordinance is an import document in its effort to curtail water waste in the landscape. However, the Model Ordinance puts a big burden on local agencies, owners and developers to do their part in the design and construction of a project without looking at the financial burden and time requirements to implement such an ordinance. By the same token, the Model Ordinance does not to place same level of water management requirements on water agencies, other agencies and on the most important piece of the puzzle, landscape management companies.

Because the Model Ordinance does not include water agencies, other agencies and landscape management companies it is doubtful that the Model Ordinance will be able achieve or even be able to measure the water savings desired.

ALSO CONSIDER:

The American Society of Irrigation Consultants (ASIC) already promotes reducing the use of irrigation water runoff and pollution. ASIC believes that while the ordinance has great intention its design and enforcement requirements, these requirements are unrealistic for local agencies, owners and developers. Most local agencies believe cost to hire and train City staff to implement this ordinance will be restrictive so as to make this legislation impossible to enact. Eventually these costs will be passed on to owners and developers.

While ASIC is committed to the goals as outlined in the ordinance, such as water efficiency and runoff reduction. ASIC believes that the most direct and cost effective method to achieve the goals of the legislation will be by implementing a water budget tiered rate structure for all customers. Using an appropriate maximum applied water allowance and incorporating the allowance into a water budget rate structure is the only practical way to meet the intent of this legislation. Therefore, we strongly recommend that an additional provisions be included that allows a local agency to be in compliance with this legislation by allowing implementation of a water budget tiered rate structure. Furthermore, a local agency would not be considered out of compliance with this action when compared to the many requirements suggested in the model ordinance.