

City of Emeryville

Water Efficient Landscape Requirements

Performance Requirements for Larger Landscapes

This document defines the water efficient landscape design, construction and documentation standards referred to in Section 9-4.602 of the Emeryville Municipal Code.

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Applicability and Exceptions

New and rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet are subject to this section.

These requirements do not apply to the following:

- registered historical sites, or
- ecological restoration projects that do not require a permanent irrigation system.

For projects subject to these requirements, planting and irrigation shall be designed, installed, maintained, and operated to result in total annual applied water use less than or equal to the maximum applied water allowance calculated as specified in these requirements. These projects are required to obtain Design Review, a Building or Grading Permit, and a Certificate of Occupancy, and to meet the design, construction and documentation standards described in this document. Projects must also comply with stormwater (Section 6-13.301) and recycled water (Section 9-4.603) provisions of the Emeryville Municipal Code and Stopwaste.org's Bay-Friendly Landscape Guidelines.

Landscape Documentation Package Submitted as Part of the Design Review Application

The Landscape Documentation Package shall include project information, a soil management report, a landscape design plan, a water efficient landscape worksheet, and a grading design plan. This package shall be submitted as part of the Design Review Application for the project.

I. Project Information Form

Use the Water Efficient Landscaping Project Information Form on Page 12 to provide contact and project information.

II. Water Efficient Landscape Worksheet

The Water Efficient Landscape Worksheet shows the Estimated Total Water Use, the Maximum Applied Water Allowance, and the Evapo-Transpiration Adjustment Factor for the proposed landscape. The Estimated Total Water Use must be less than the Maximum Applied Water Allowance. The Evapo-Transpiration Adjustment Factor for the proposed regular landscape areas must be 0.55 or less for residential areas, and 0.45 or less for non-residential areas. The Water Efficient Landscape Worksheet form is on page 13 of this document.

A. Plant factors. Plant factors range from 0 to 0.1 for very low water use plants, from 0.2 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants. To determine if a plant's water use is low, medium or high, refer to any published plant reference book approved by the California Department of Water Resources, including any of the following books or more recent editions of them:

- California Native Plants for the Garden, Carol Bornstein, David Fross and Bart O'Brien, Cachuma Press, 2005. (CNP)

- Plants and Landscapes for Summer-Dry Climates, Nora Harlow (ed.), East Bay Municipal Utility District, 2004. (EBMUD)
- Landscape Plants for California Gardens, Robert C. Perry, Land Design Publisher, 2010.
- Sunset Western Garden Book, editors of Sunset Magazine, Oxmoor House, 2012.
- University of California Division of Agriculture and Natural Resources, Water Use Classification of Landscape Species (WUCOLS IV), www.ucanr.edu/sites/WUCOLS

B. Water, Plants, and Hydrozones. Include all water features in the high water use hydrozone, and temporarily irrigated areas in the low water use hydrozone. Exclude non-irrigated rain gardens from the hydrozones. If a hydrozone includes plants with two similar water use levels (very low-low, low-moderate, moderate-high), either calculate the plant factor based on the proportions of the plants with each water use factor, or use the plant factor for the higher use level.

III. Soil Management Report

In order to create drought resistant soil, reduce runoff and encourage healthy plant growth, submit a soil management report addressing soil attributes of the project site, including the following elements:

A. Soil Areas. Identify areas of quality topsoil to be protected during construction, and critical soil limitations such as compaction, water logged soils or wetlands, and thin, eroded or erosion prone soils.

B. Soil Analysis. Sample and analyze the soil(s) into which plantings are to be made. If all plantings will be in new imported soil, City staff may waive this requirement.

1. The soil analysis must be performed by a laboratory certified by the United States Composting Council (USCC) under the Seal of Testing Assurance (STA) Program.
2. Sample soils in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
3. Provide the soil laboratory with information about the types of plantings intended (such as turf, perennial bed, annual bed, swale, etc.).
4. At a minimum the soil analysis shall include:
 - a. soil texture;
 - b. infiltration rate determined by laboratory test or soil texture infiltration rate table;
 - c. pH;
 - d. total soluble salts;
 - e. sodium;
 - f. essential nutrients
 - g. percent organic matter; and
 - h. recommendations for soil with compost to bring the soil organic matter to a minimum of 6% by dry weight and incorporating organic fertilizers to recommended levels for planting areas. Acceptable organic fertilizers and amendment products are those allowed for use in crop production by at least one of the following:
Organic Materials Review Institute's Generac Materials List
California Department of Food and Agriculture's Organic Input Materials Program
U.S. Department of Agriculture's National Organic Program
5. The soil report shall include the following types of recommendations:

- a. if the soils are to be irrigated with recycled water, recommendations tailored to recycled water.
- b. management actions to remediate limiting soil characteristics, such as ripping the soil to alleviate compaction.

C. Soil Specifications. Submit specifications for protecting topsoil, ameliorating soil limitations, and incorporating compost and/or amendments as per recommendations in the soil analysis report. If all planting soil is to be imported, submit information on the composition of the new soil and any amendments. If the imported soil does not contain adequate compost, then a minimum of 6 cubic yards of compost, with a composition according to City standards, per 1,000 square feet of landscape area shall be incorporated into the top 6 inches of soil.

D. Use in Design. Provide the soil management report to the landscape and irrigation designers in time to be used in the design. If significant mass grading is planned, the soil analysis report may be submitted as part of the Certificate of Completion rather than as part of the Landscape Documentation Package.

IV. Landscape Design Plan

Submit a landscape design plan meeting the following criteria as part of the Design Review Application. For the efficient use of water, carefully design the landscape for the intended function of the project.

A. Plants. Use the following criteria in plant selection.

1. The Estimated Total Water Use (ETWU) of the plant material selected must not exceed the Maximum Applied Water Allowance (MAWA), and the Evapo-Transpiration Factor must not exceed 0.55 for residential areas and 0.45 for non-residential areas. Methods to achieve water efficiency shall include one or more of the following:
 - a. protect and preserve native species and natural vegetation;
 - b. select plants based on local climate suitability, and disease and pest resistance;
 - c. select water-conserving plant, tree and turf species, especially local native plants;
 - d. select trees based on size at maturity as appropriate for the planting area;
 - e. select plants from local and regional landscape program plant lists;
 - d. use the Sunset *Western Garden Book's* Climate Zone System, which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;
 - e. select and locate plants considering invasive surface roots, to minimize damage to buildings, pavement, utility lines, and other property and infrastructure;
 - f. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.
2. Each hydrozone shall have plant materials with similar water use. Hydrozones may include a mix of plants with very low and low, low and moderate, or moderate and high water use.
4. Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape; 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).
5. Turf is allowed in multi-unit residential projects with five units or more and non-residential projects only if it is a recreational area. Turf is allowed in residential projects with one to four units if the water budget is met.
6. Do not use species identified by the California Invasive Plant

Council's "Don't Plant a Pest! San Francisco Bay Area" and "Don't Plant a Pest! Trees in California" brochures.

7. The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives per Civil Code Section 1351, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

8. High water use plants, those with a plant factor of 0.7 to 1.0, are prohibited in street medians..

B. Water Features. Features such as pools, fountains and spas have two requirements:

1. Use re-circulating water systems for water features.
2. Design water features to minimize water loss. Outdoor swimming pools and spas (hot tubs) must have covers.

C. Soil Preparation, Amendments and Mulch

1. Before planting any materials, transform compacted soils to a friable condition. On engineered slopes, only amended planting holes need to meet this requirement.

2. If there is a soils report, incorporate compost and soil amendments according to recommendations of the soil report and what is appropriate for the plants selected.

3. In the absence of a soils report, incorporate compost at a rate of 6 cubic yards per 1,000 square feet of landscape area, with a composition according to City standards, into the top 6 inches of soil. Soils with more than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling; an accredited soil testing laboratory must confirm organic matter. In projects that incorporate sheet mulching, compost may be installed above the cardboard layer instead of tilling it into the soil. Purchase compost from processors who participate in the U.S. Composting Council's (USCC) Standard Testing Assurance (STA) Program.

4. Apply a minimum 3-inch layer of mulch on all exposed soil surfaces of planting areas except in turf areas, areas receiving closely spaced plugs as a lawn alternative, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5% of the landscape area may be left without mulch; designated insect habitat must be included in the landscape design plan as such. Do not place nonporous material under the mulch.

5. Use biologically based stabilizing mulching products that meet current engineering standards on slopes.

6. The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.

7. Organic, recycled or post-consumer mulch shall take precedence over inorganic materials or virgin forest products.

8. Required trees shall have adequate rootable soil volume (600 cubic feet for small trees, 900 cubic feet for medium-size trees, and 1,200 cubic feet for large trees) and good drainage. Tree sizes refer to sizes of canopy at maturity: small 15-24' wide and 20' tall, medium 25-34' wide and 35' tall, large 35'+ wide.

D. The Landscape Design Plan Document. Draw the landscape design plan clearly on project base sheets, to a scale that is adequate to identify each component of the plan, at least 1 inch equals 20 feet. The plan shall include the following elements:

1. Project base sheet including dimensioned property lines, building footprints, and pervious and non-pervious hardscape areas including parking, paving and sidewalks;
2. Existing trees and shrubs and whether each will be kept or removed;
3. Hydrozone delineation and water use as low, moderate, high water, or mixed water use;

3. Recreational areas (turf used as a play surface);
4. Edible plant areas that are permanently and solely dedicated to edible plants;
5. Recycled-water irrigated areas, indicating whether recycled water is available now or not;
6. Soil amendments, type, and quantity;
7. Mulch type and application depth;
8. Water features, indicating type and surface area;
9. Stormwater retention and infiltration facilities, with location, depth, and 24-hour infiltration capacity;
10. Rain harvesting facilities;
11. If the project includes graywater, graywater discharge piping, system components and area(s) of distribution;
12. Location of plants indicating each species of tree, shrub, groundcover, turf and vine using a unique symbol for each;
13. Table of plants including botanical name, common name, container size, spacing, quantity and water use level for each species of plant;
14. Tree staking and soil preparation details including planting specifications;
15. Statement: “I have complied with the criteria of the Water Efficient Landscape Ordinance and applied them for the efficient use of water in the Landscape Design Plan”; and
16. Signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape.

V. Grading Design Plan

Submit a grading plan as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for other City permits satisfies this requirement, but is not necessary for all projects. For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste.

A. Preventing Erosion and Runoff. To prevent excessive erosion and runoff, it is highly recommended that project applicants:

1. Grade so that all irrigation and normal rainfall remains within property lines and does not drain onto non-permeable hardscapes;
2. Avoid disruption of natural drainage patterns and undisturbed soil; and
3. Avoid soil compaction in landscape areas.

B. The Grading Design Plan Document. Draw the grading design plan clearly on project base sheets, to a scale that is adequate to identify each component of the plan, at least 1 inch equals 20 feet. The plan shall indicate finished configurations and elevations of the landscape, and shall include the following elements:

1. Height of graded slopes;
2. Contour elevations with spacing shown at no greater than 5 feet;
3. Drainage patterns;
4. Pad elevations;
5. Finish grade;
6. Stormwater retention improvements, if applicable;
7. Statement: “I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan;” and
8. Signature of a licensed professional as authorized by law.

VI. Bay-Friendly Landscape Scorecard

Include a filled-in copy of the attached Bay-Friendly Landscape Scorecard.

**Irrigation Documentation Package
Submitted as Part of the Grading or Building Permit Application**

This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. The Irrigation Documentation Package shall include an updated Landscape Documentation Package, an irrigation design plan, an irrigation schedule, and a copy of a letter or e-mail sending documents to the water purveyor. This package shall be submitted as part of the Building Permit or Grading Permit application for the project.

I. Updated Landscape Documentation Package

During and after the design review process, the project information, water efficient landscape worksheet, soil management report, landscape design plan and/or grading design plan may be revised. Submit the final versions of these documents, or resubmit the design review documents if they have not been changed.

II. Irrigation Design Plan

Submit an irrigation design plan meeting the irrigation design criteria as part of the application for a Building Permit or a Grading Permit. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. Design the irrigation system and its related components to allow for proper installation, management, and maintenance.

A. System. The system shall meet the criteria described below.

1. Provide a dedicated landscape water meter separate from indoor water for 5,000 square feet. Install a private submeter for non-residential irrigated landscapes of 1,000 sq. ft. but not more than 5,000 sq. ft.
2. Use rain, freeze and wind sensors, either integral or auxiliary, that suspend or alter irrigation operation during rain or windy or freezing weather.
3. Automatic irrigation controllers are required, and shall utilize soil moisture sensor data with non-volatile memory for irrigation scheduling.
4. If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, install a pressure regulating device.
5. Master shut-off valves are required on all projects except landscapes that allow for the individual control of sprinklers or emitters that are individually pressurized in a system equipped with low pressure shut down features.
6. Install a backflow prevention device to protect the potable water supply from contamination by the irrigation system.

7. Flow sensors that detect and report high flow conditions created by system damage or malfunction are required for all non-residential landscapes, and for residential landscapes of 5,000 square feet or larger.
8. Design the irrigation system to prevent irrigation 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.
9. Use information from the soil management plan, such as soil type and infiltration rate, when designing the irrigation system.
10. The design of the irrigation system shall conform to the hydrozones of the landscape design plan.
11. In mulched planting areas, use low volume irrigation to maximize water infiltration into the root zone.
12. All irrigation emission devices must meet the requirements set in the American National Standards Institute (ANSI) standard, American Society of Agricultural and Biological Engineers'/International Code Council's (ASABE/ICC) 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard." All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.
13. Head to head coverage is recommended. In any case, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.
14. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turf grass.
15. Check valves or anti-drain valves are required on all sprinkler heads where low point drainage could occur.
16. Areas less than 10 feet in width in any direction shall be irrigated with subsurface irrigation or other means that produce no runoff or overspray.
17. Overhead irrigation is not permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:
 - a. the landscape area is adjacent to permeable surfacing and no irrigation runoff occurs;
 - or
 - b. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.
18. Slopes greater than 25% shall not be irrigated with an irrigation system with an application rate exceeding 0.75 inches per hour. Prevention of runoff and erosion must be confirmed during the irrigation audit.

B. Hydrozones.

1. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.
2. Plants in storm water bio-treatment zones shall be on a separate valve.
3. Select sprinkler heads and other emission devices based on what is appropriate for the plant types within that hydrozone.
4. Where feasible, place trees on separate valves from shrubs, groundcovers, and turf to facilitate the appropriate irrigation of trees. Consider the mature size and extent of the root zone when designing irrigation for the tree.

5. On the landscape design plan and irrigation design plan, designate hydrozone areas by number, letter, or other designation. On the irrigation design plan, designate the area irrigated by each valve, and assign a number to each valve. Use this valve number in the Water Efficient Landscape Worksheet.

C. The Irrigation Design Plan Document. Draw the irrigation design plan clearly on project base sheets, to a scale that is adequate to identify each component of the plan, at least 1 inch equals 20 feet. The plan shall include the following elements:

1. Designated hydrozones and area irrigated by each valve;
2. Location and size of the water meter for the landscape area;
3. Location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;
4. Static water pressure at the point of connection to the public water supply;
5. Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station (valve);
6. Recycled water irrigation systems if recycled water is available or projected to be available in the foreseeable future, as specified in Article 9-4.68, Water Reuse;
7. Statement: “I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan”; and
8. Signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system.

Project Completion Package Submitted Prior to Issuance of Certificate of Occupancy or Final Inspection

I. Certificate of Completion

Use the form on pages 14-15 to provide contact information and certification that the landscape project for the property has been installed according to the approved Landscape Design Plan and the Irrigation Design Plan. Attach As-Built Drawings, an Irrigation Scheduling Parameters, Schedule of Landscape and Irrigation Maintenance, Landscape Irrigation Audit Report, Soil Analysis Report if not submitted earlier with the Landscape Design Package, and documentation verifying compliance with the recommendations in the Soil Analysis Report, as specified below.

A. As-Built Drawings and Hydrozone Diagram. Attach as-built drawings and a hydrozone diagram.

1. As-Built Drawings. Show changes made in the field during construction on attached as-built record drawings. If no changes were made, attach the landscape and irrigation plans.
2. Hydrozone Diagram. Attach a diagram of the irrigation plan showing hydrozones, and keep it with the irrigation controller for subsequent management purposes.

B. Irrigation Scheduling. Attach irrigation schedules and the parameters used to set them. For the efficient use of water, develop, manage, and evaluate the irrigation schedules to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

1. Controllers. Irrigation scheduling shall be regulated by automatic irrigation controllers.

2. **Overhead Hours.** Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
3. **Meeting MAWA.** Specify run times, emission devices, and flow rates so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Regulate actual irrigation schedules by automatic irrigation controllers using current reference evapotranspiration data (e.g. California Irrigation Management Information System - CIMIS) or soil moisture sensor data.
4. **Parameters.** Develop and submit parameters used to set the automatic controller for the plant establishment period, the established landscape, and temporarily irrigated areas.
5. **Factors.** Each irrigation schedule shall consider for the station all of the following that apply: irrigation interval (days between irrigation), irrigation run times (hours or minutes per irrigation event to avoid runoff), number of cycle starts required for each irrigation event to avoid runoff, amount of applied water scheduled to be applied on a monthly basis, application rate setting, root depth setting, plant type setting, soil type and mulch depth, slope factor setting, shade factor setting, and irrigation uniformity or efficiency setting.

C. Schedule of Landscape and Irrigation Maintenance. Attach a schedule of landscape and irrigation maintenance, and convey a copy to the owner. Landscapes shall be maintained to ensure water use efficiency.

1. **Schedule elements.** The regular maintenance schedule shall include routine inspection, adjustment and repair of the irrigation system and its components, aerating and dethatching turf areas, top dressing with compost, replenishing mulch regularly to a depth of 3 inches, fertilizing, pruning, weeding, replacing failed plants with the same or equivalent plants, removing any obstruction to emission devices, and annual transmittal of total annual irrigation water use to the City Environmental Programs Supervisor.
2. **Auditing and Maintenance.** Operation of the irrigation system outside the normal watering hours is allowed for auditing and system maintenance.
3. **Replacement Parts.** Repair of all irrigation equipment shall be done with the originally installed components or their equivalents.
4. **Sustainable Best Practices.** The project applicant is encouraged to implement established landscape industry sustainable best practices for all landscape maintenance activities.

D. Landscape Irrigation Audit Report and Implementation. Attach a Landscape Irrigation Audit Report and implementation documents as specified in section 4 below.

1. **Who may conduct the audit.** The irrigation audit report shall be prepared by a City landscape irrigation auditor or a third party Certified Landscape Irrigation Auditor. Audits shall not be conducted by the person who designed or installed the landscape or irrigation system.
2. **Audit elements.** Audits shall include inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or irrigation runoff that causes overland flow, and edits to or approval of the irrigation schedule.
3. **Audit method.** The audit must be conducted in a manner consistent with the Irrigation Association's Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency "Watersense" labeled auditing program.
4. **Documents to be submitted with audit.** The applicant shall also submit information on how any overspray and irrigation runoff have been eliminated, a final irrigation schedule incorporating the auditor's edits, where the irrigation schedule will be kept on site, and who will implement the irrigation schedule.

E. Soil Management Report. Attach a soil analysis report if it was not submitted earlier with the Landscape Documentation Package. Attach documentation verifying implementation of recommendations from the soil analysis report.

II. Final Landscape Inspection

Call the project planner and the Environmental Program Supervisor to arrange for a final landscape inspection. They will check to see that the plants and irrigation system have been installed as specified and there is no or minimal irrigation runoff or overspray. Submit a record of an approved final inspection.

WATER EFFICIENT LANDSCAPE PROJECT INFORMATION FORM

Date: _____

Project Name _____ Planning Project Number _____

Project Address _____

Assessor's Parcel Number(s) _____

Applicant: Name and Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____ E-Mail _____

Property Owner: Name _____

Address _____

Phone _____ E-Mail _____

Total Landscape Area (Sq. Ft.) _____

Landscape Type (check one): New Rehabilitated

Land Use Type (check one):

Multi-Family Single-Family Commercial Other (specify) _____

Irrigation Water Supply Type (check one):

Potable Recycled (Reclaimed) from EBMUD Graywater Rain Cisterns

Compliance Method: Prescriptive – Smaller Landscapes Performance – Larger Landscapes

Documents Included (only for projects meeting Performance Requirements for Larger Landscapes):

Worksheet Soil Report Landscape Plan Grading Plan

I agree to comply with the requirements of the Water Efficient Landscape Ordinance.

Applicant Signature

Date

WATER EFFICIENT LANDSCAPE WORKSHEET

Project Address _____ Date _____

Hydrozone # or Planting Description ^a	Plant Factor (PF) (water use) ^b	Irrigation Method ^c	Irrigation Efficiency (IE) ^d	Proposed ETAF ^e	Landscape Area (sq. ft.)	Proposed ETAF x Area	Estimated Water Use ^f
Regular Landscaped Areas							
Totals					(A)	(B)	
Special Landscape Areas (SLA)^g							
				1			
				1			
				1			
Totals					(C)	(D)	
Estimated Total Water Use (ETWU)^h							
Maximum Applied Water Allowance (MAWA)ⁱ							

Estimated Total Water Use (ETWU) must be less than Maximum Applied Water Allowance (MAWA).

^aHydrozone # or Planting Description: for example - 1, front planting bed, or low water use plants

^bPlant Factor (PF) (water use): very low 0-0.1, low 0.2-0.3, moderate 0.4-0.6, high 0.7-1.0

^cIrrigation Method: overhead spray or drip

^dIrrigation Efficiency: spray head 0.75; drip 0.81

^eProposed Evapo-Transpiration Adjustment Factor (ETAF) = Plant Factor (PF)/Irrigation Efficiency (IE)

^fEstimated Water Use (Annual Gallons Required) = (Proposed ETAF x Area) x 41.8 x 0.62

where 41.8 is Emeryville's Reference Evapo-Transpiration rate per year and

0.62 converts from acre-inches per acre per year to gallons per square foot per year

^gSLA: edibles, recreation, recycled water irrigation, recycled water features

^hEstimated Total Water Use (ETWU) = Total Proposed ETAF x Area x 41.8 x 0.62 = (B+D) x 25.916

ⁱMAWA = [(Max Allowed ETAF x Total Landscape Area) + ((1 - Max Allowed ETAF) x SLA)] x 41.8 x 0.62

Residential Max Allowed ETAF is 0.55. Non-residential Max Allowed ETAF is 0.45.

So Residential MAWA = [(0.55 x (A+C)) + ((0.45) x (C))] x 25.916

Non-residential MAWA = [(0.45 x (A+C)) + ((0.55) x (C))] x 25.916

Evapo-Transpiration Adjustment Factor (ETAF):

Regular Landscape Areas

Total Proposed ETAF x Area (B)
Total Area (A)
Average Proposed ETAF (B / A)
All Proposed Landscape Areas
Total Proposed ETAF x Area (B + D)
Total Proposed Area (A + C)
Site-wide Proposed ETAF (B + D) / (A + C)

Average Evapo-Transpiration Adjustment Factor (ETAF) for Regular Landscape Areas must be 0.55 or less for Residential areas, and 0.45 or less for Non-residential areas.

WATER EFFICIENT LANDSCAPE CERTIFICATE OF COMPLETION

Project Information

Date: _____

Project Name _____ Planning Project Number _____

Project Address _____

Assessor's Parcel Number(s) _____

Applicant: Name and Title _____

Company _____

Address _____

Phone _____ Email _____

Property Owner: Name and Title _____

Company _____

Address _____

Phone _____ Email _____

"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package, the Irrigation Documentation Package, and the Certificate of Completion, and that it is my/our responsibility to see that the project is maintained in accordance with the Schedule of Landscape and Irrigation Maintenance."

Property Owner Signature

Date

Landscape Documentation Package:

Date submitted _____

Date approved _____

Irrigation Documentation Package:

Date submitted _____

Date approved _____

Certificate of Installation According to the Landscape Documentation Package

Certifier: ___Landscape Designer ___Irrigation Designer ___ Licensed Landscape Contractor

Name and Title _____

License or Certification Number _____

Company _____

Address _____

Phone _____ Email _____

“I/we certify based upon periodic site observations, that the work has been completed in accordance with the ordinance and that the landscaping planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package and the approved Irrigation Documentation Package.”

Signature Date

Attachments

- | | | |
|-----------|----------|--|
| Submitted | Approved | |
| _____ | _____ | As-Built Drawings |
| _____ | _____ | Hydrozone Diagram – copy to be kept with irrigation controller |
| _____ | _____ | Irrigation Schedules and Scheduling Parameters |
| _____ | _____ | Schedule of Landscape and Irrigation Maintenance |
| _____ | _____ | Landscape Irrigation Audit Report |
| _____ | _____ | Soil Analysis Report |
| _____ | _____ | Documentation verifying implementation of soil recommendations |
| _____ | _____ | Final Landscape Inspection |

Approved – City Staff Date

DEFINITIONS

as-built drawings 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.

automatic controller An automatic timing device used to remotely control valves that operate an irrigation system, using either evapotranspiration (weather-based) or soil moisture data.

backflow prevention device A safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

certified irrigation designer A person certified to design irrigation systems by an accredited academic institution a professional trade organization or other program such as the US Environmental Protection Agency's "WaterSense" irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.

certified landscape irrigation auditor A person certified to perform landscape irrigation audits by an accredited academic institution, professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program or Irrigation Association's Certified Landscape Irrigation Auditor program.

check valve A valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

compost The safe and stable product of controlled biological decomposition of organic materials that is beneficial to plant growth..

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

drought resistant soil Soil that has been managed, by amending with compost and covering with mulch, for example, to maximize rainfall infiltration, increase the soil's capacity to hold water, and allow for plant roots to penetrate and proliferate such that the landscape can survive with less than optimal water (i.e. less than the Maximum Applied Water Allowance).

ecological restoration project A project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

emitter A drip irrigation emission device that delivers water slowly from the system to the soil.

established landscape The point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

Estimated Total Water Use (ETWU) The total water used for the landscape as described in Section 9-4.70.7.

Evapotranspiration Adjustment Factor (ETAF) A factor 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.

evapotranspiration rate The quantity of water evaporated from soil and other surfaces and transpired by plants during a specified time.

flow sensor An inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. A combination flow sensor/controller may function as a water meter or submeter.

friable soil Soil that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

graywater Untreated waste water which has not come into contact with toilet, food, or chemical waste. Graywater includes used water from bathtubs, showers, bathroom sinks, clothes washing machines and laundry tubs. It does not include waste water from kitchen sinks, photo lab sinks, dishwashers or laundry water from soiled diapers.

hardscape Any durable material (pervious and non-pervious).

hydrozone A portion of the landscaped area having plants and/or water with similar water needs (classified as high, medium, low or very low water use) and rooting depth. A hydrozone may be irrigated or non-irrigated.

infiltration rate The rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

Irrigation Efficiency (IE) 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 average irrigation efficiencies for purposes of this ordinance are 0.75 for overhead spray devices and 0.81 for drip systems.

irrigation runoff Applied 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 where there is a slope.

landscape architect A person who holds a license to practice landscape architecture as specified in the State of California Business and Professions Code, Section 5615.

landscape area All the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, or other non-planted areas.

landscape contractor A person licensed by the State of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

landscape water meter An inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

lateral line The water delivery pipeline that supplies water to emitters or sprinklers from a valve.

low volume irrigation The application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

main line The pressurized pipeline that delivers water from the water source to the valve.

master shut-off valve An automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed, water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

Maximum Applied Water Allowance (MAWA) The upper limit of annual applied water for the established landscaped area. It is based upon Emeryville's Evapotranspiration Adjustment Factor and the size of the landscape area, including the Special Landscape Area.

mulch Any organic material such as leaves, arbor or wood chips, recycled wood waste, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

operating pressure The pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

overhead spray Water delivered through the air (e.g., sprinkler heads and rotors).

overspray Irrigation water which is delivered beyond the target area.

plant factor or **plant water use factor** A factor that, when multiplied by an evapotranspiration rate, estimates the amount of water needed by plants. The plant factor range for very low water use plants is 0 to 0.1, the plant factor range for low water use plants is 0.2 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the Department of Water Resources publication "Water Use Classification of Landscape Species" (WUCOLS). Plant factors may also be obtained from horticultural researchers from academic institutions or professional associations as approved by the California Department of Water Resources.

precipitation rate The rate of application of water measured in inches per hour.

rain shutoff device A component which automatically suspends irrigation when it rains.

recreational area Area designated for active play, recreation or public assembly, such as a park, sports field, picnic ground, pool, spa, amphitheater, or informal play area where turf provides a playing surface.

recycled water Reclaimed, treated 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.

rehabilitated landscape Any re-landscaping project in which the modified area was previously planted and the modified landscape area is equal to or greater than 2,500 square feet.

rootable soil volume The volume of soil in and around tree wells and planting islands that tree roots can easily utilize.

soil moisture sensor A device that measures the amount of water in the soil. The device may also suspend or initiate irrigation.

soil texture The classification of soil based on its percentage of sand, silt, and clay.

Special Landscape Area (SLA) An area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

sprinkler head A device which delivers water through a nozzle.

static water pressure The pipeline or water supply pressure when water is not flowing.

station An area served by one valve or by a set of valves that operate simultaneously.

submeter A device to measure water applied to the landscape that is installed after the primary utility water meter.

subsurface irrigation Irrigation placed either under the soil or under the mulch on top of the soil.

swing joint A component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent damage.

turf A ground cover surface of mowed grass. Annual bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

valve A device used to control the flow of water in the irrigation system.

water conserving plant species A plant species that has a very low or low plant factor.

water feature A design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used solely for on-site wastewater treatment or storm water best management practices that are not irrigated are not water features and, therefore, are not subject to the water budget calculation.