HANDBOOK
OF
WATER EFFICIENCY
LANDSCAPE MEASURES

City of Westminster, California

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1. Purpose and Applicability

1.1 Purpose

(A) The primary purpose of this Handbook of Water Efficiency Landscape Measures is to provide procedural and design guidance for project applicants proposing landscape installations or rehabilitation projects that are subject to the requirements of the City's Water Efficiency Landscape Measures, as specified in Section 17.310.010 (Applicability) of Chapter 17.310 (Landscaping) of the Westminster Municipal Code. This Handbook is also intended for use and reference by City staff and consultants in reviewing and approving designs and verifying compliance with the Water Efficiency Landscape Measures stated herein.

1.2 Applicability

(A) The provisions of this Handbook shall apply to all projects determined to be subject to the City's Water Efficiency Landscape Measures, as stated in Section 17.310.010 (Applicability) of Chapter 17.310 (Landscaping) of the Westminster Municipal Code.

(B) The requirements of the Handbook may be partially or wholly waived, at the discretion of the City or its designee, for landscape rehabilitation projects that are limited to replacement plantings with equal or lower water needs and where the irrigation system is found to be designed, operable and programmed consistent with minimizing water waste in accordance with the Westminster Municipal Code.

2. Submittal Requirements for New Landscape Installations or Landscape Rehabilitation Projects

(A) Projects determined by the City to be subject to the City's Water Efficiency Landscape Measures shall be required to submit a *Landscape Documentation Package* as prescribed in Section 17.310.030 (Landscape Plan Application Requirements) of the Westminster Municipal Code in addition to the provisions stated in Section 2.1 (Elements of the Landscape Documentation Package), of this Handbook.

(B) A *Landscape Documentation Package* is required to be submitted by the *project applicant* for review and approval prior to the issuance of a permit and prior to the start of construction.

2.2 Elements of the Landscape Documentation Package

(A) Unless otherwise directed by the City, the *Landscape Documentation Package* shall include the following elements either on plan sheets or supplemental pages as directed by the City:

(1) Project Information, including, but not limited to, the following:

(a) Project name, address, parcel/lot number(s) and plan preparation date

(b) Total landscape area (square feet), with total area devoted to live plants, impervious decorative hardscape and decorative pervious materials used as groundcover.

(c) Project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed);

(d) Water supply type (e.g., potable, recycled, or well);

(e) Checklist or index of all documents in the *Landscape Documentation Package*;

(f) A *Certification of Design* in accordance with **Appendix B** of this *Handbook* that includes a *landscape professional's* professional stamp, as applicable, signature, contact information (including email and telephone number), license number, and date, certifying the statement that "The design of this project complies with the requirements of the City's Water Efficiency Landscape Measures and all provisions of the Westminster Municipal Code" and shall bear the signature of the *landscape professional* as required by law; and

(g) Any other information the City deems relevant for determining whether the landscape project complies with the Water Efficiency Landscape Measures contained herein.

(2) *Maximum Applied Water Allowance* (*MAWA*) and *Estimated Applied Water Use* (*EAWU*) expressed as annual totals including, but not limited to, the following:

(a) *Water Efficient Landscape Worksheet* for the landscape project;

(b) *Hydrozone* information table for the landscape project; and

(c) Water budget calculations for the landscape project.

(3) A soil management report or specifications, or specification provision requiring soil testing and amendment recommendations and implementation to be accomplished during construction of the landscape project.

(4) A landscape design plan for the landscape project.

(5) An irrigation design plan for the landscape project.

(6) A grading design plan, unless grading information is included in the landscape design plan for the landscape project or unless the landscape project is limited to replacement planting and/or irrigation to rehabilitate an existing landscape area.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.3 Water Efficient Landscape Calculations and Alternatives

(A) The *project applicant* shall provide the calculated *Maximum Applied Water Allowance (MAWA)* and *Estimated Applied Water Use (EAWU)* for the *landscape area* as part of the *Landscape Documentation Package* submittal to the City. The *MAWA* and *EAWU* shall be calculated based on completing the *Water Efficient Landscape Worksheets* (in accordance with the sample worksheets found in **Appendix** C, which contain information on the *plant factor*, irrigation method, *irrigation efficiency* and area associated with each *hydrozone*. Calculations are then made to show that the *evapotranspiration adjustment factor* (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non-residential areas, exclusive of *Special Landscape Areas*. The ETAF for a landscape project is based on the *plant factors* and irrigation methods selected. The *Maximum Applied Water Allowance* is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non-residential areas) and expressed as annual gallons required. The EAWU is calculated based on the plants used and irrigation method selected for the landscape design.

(B) The EAWU allowable for the landscape area shall not exceed the MAWA. The MAWA shall be calculated using an *evapotranspiration adjustment factor* (ETAF) of 0.55 for residential areas and 0.45 for non-residential areas, except for the portion of the MAWA applicable to any *Special Landscape Areas* within the landscape project, which shall be calculated using an ETAF of 1.0. Where the design of the landscape area can otherwise be shown to be equivalently water-efficient, the *project applicant* may submit alternative or abbreviated information supporting the demonstration that the annual EAWU is less than the MAWA, at the discretion of and for the review and approval of the City.

(C) Water budget calculations shall adhere to the following requirements:

(1) The *MAWA* shall be calculated using the *Water Efficient Landscape Worksheets* and equation presented in **Appendix C** on page B-1. The example calculation on page B-1 is a hypothetical example to demonstrate proper use of the equation.

(2) The *EAWU* shall be calculated using the *Water Efficient Landscape Worksheet* and equations presented in **Appendix C**

(3) For the calculation of the *MAWA* and *EAWU*, a *project applicant* shall use the *ETo* values from the closest location listed the *Reference Evapotranspiration* Table in **Appendix D**. For geographic areas not covered in **Appendix D**, data from other cities, or zip codes, located nearby in the same *reference evapotranspiration* zone may be used

(4) For calculation of the *EAWU*, the *plant water use factor* shall be determined as appropriate to the project location from the *Water Use Efficiency of Landscape Species* (*WUCOLS*) Species Evaluation List or from horticultural researchers with academic institutions or professional associations as approved by the California Department of water Resources (DWR). The *plant factor* ranges from 0 to 0.1 for very low water use plants, 0.1 to 0.3 for low water use plants, 0.4 to 0.6 for moderate water use plants, and 0.7 to 1.0 for high water use plants.

(5) For calculating the *EAWU*, the *plant water use factor* shall be determined for each *valve hydrozone* based on the highest-water-use plant species within the zone. The *plant factor* for each *hydrozone* may be required to be further refined as a "*landscape coefficient*," according to protocols defined in detail in the *WUCOLS* document, to reflect planting density and *microclimate* effects on water need at the option of the *project applicant* or the *City*.

(6) For calculation of the *EAWU*, the area of a *water feature* shall be defined as a high water use *hydrozone* with a *plant factor* of 1.0.

(7) For calculation of the *EAWU*, a temporarily irrigated *hydrozone* area, such as an area of highly drought-tolerant native plants that are not intended to be irrigated after they are fully established, shall be defined as a very low water use *hydrozone* with a *plant factor* of 0.1.

(8) For calculation of the *MAWA*, the *ETAF* for S*pecial Landscape Areas (SLA)* shall be set at 1.0. For calculation of the *EAWU*, the *ETAF* for SLA shall be calculated as the *SLA plant factor* divided by the *SLA irrigation efficiency factor*.

(9) *Irrigation efficiency (IE)* of the irrigation heads used within each *hydrozone* shall be assumed to be as follows, unless otherwise indicated by the irrigation equipment manufacturer's specifications or demonstrated by the *project applicant*:

Irrigation Method	**DU_{LQ}**	**DU_{LH}***	**EU**	**IE****
Spray nozzles	65%	79%		71%
High efficiency spray nozzles	70%	82%		73%
Multi stream/Multi trajectory rotary (MSMT) nozzles	75%	85%		76%
Stream rotor nozzle	70%	82%		73%

Microspray	75%	85%		76%
Bubblers			85%	77%
Drip emitter			90%	81%
Subsurface drip			90%	81%

*DU_{LH} = .386 + (.614)(DU_{LQ})
** IE (spray) = (DU_{LH})(IME)
** IE (drip) = Emission uniformity (EU)(IME)

(D) The *Maximum Applied Water Allowance* shall adhere to the following requirements:

(1) The *Maximum Applied Water Allowance* shall be calculated using the equation presented in **Appendix C**. The *reference evapotranspiration* (*ETo*) values used for this calculation are from the *Reference Evapotranspiration* Table in **Appendix D** and are for planning purposes only. For actual irrigation scheduling, automatic irrigation controllers are required and shall use current *ETo* data, such as from the California Irrigation Management Information System (CIMIS), other equivalent data, or soil moisture sensor data.

2.4 Soil and Stormwater Management

(A) All planted landscape areas are required to have friable soil to maximize retention and infiltration. On engineered slopes, only amended planting holes need meet this requirement.

(B) In order to reduce *runoff* and encourage healthy plant growth, a soil management report shall be completed by the *project applicant*, or his/her designee, as follows:

(1) Submit soil samples to a certified agronomic soils laboratory for analysis and recommendations.

(a) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

(b) The soil analysis may include, but is not limited to:

1. soil texture;

2. *infiltration rate* determined by laboratory test or soil texture *infiltration rate* table;

3. pH;

4. total soluble salts;

5. sodium;

6. percent organic matter; and

7. recommendations.

(2) In projects with multiple landscape installations (i.e. production home developments or *common interest developments* that are installing landscaping) a soil sampling rate of 1 in 7 lots or approximately 15% will satisfy this requirement; evenly disbursed throughout the development. Large landscape projects shall sample at a rate equivalent to 1 in 7 lots or approximately 15% landscape area. The *project applicant*, or his/her designee, shall comply with one of the following:

(a) The soil analysis report shall be submitted to the City as part of the Landscape Documentation Package; or

(b) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans in order to make any necessary adjustments to the design plans.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

(C) It is strongly recommended that landscape areas be designed for capture and infiltration capacity that is sufficient to prevent *runoff* from impervious surfaces (i.e. roof and paved areas) from additional capacity as required by any applicable local, regional, state, or federal regulation and/or one of the following: the one inch, 24-hour rain event or the 85th percentile, 24-hour rain event.

(D) It is recommended that storm water projects incorporate any of the following elements to improve on-site stormwater and dry weather *runoff* capture and use:

(1) Grade impervious surfaces, such as driveways, during construction to drain into vegetated areas.

(2) Minimize the area of impervious surfaces such as paved areas, roof, and concrete driveways.

(3) Direct *runoff* from paved surfaces and roof areas into planting beds or landscape areas to maximize site water capture and reuse.

(4) Consider constructed wetlands and ponds that retain water, equalize excess flow, and filter pollutants.

[Note: Authority cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.5 Landscape Design Plan

(A) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. The following design criteria shall be submitted as part of the *Landscape Documentation Package*.

(1) Plant Material

(a) Any plant may be selected for the *landscape area* provided the *EAWU* in the *landscape area* does not exceed the *MAWA*. Methods to achieve water efficiency shall include one or more of the following:

(2) Protection and preservation of non-*invasive* water-conserving plant, tree and *turf* species;

(3) Selection of water-conserving plant plant, tree, and and turf species;

(4) Selection of plants based on local climate suitability disease and pest resistance;

(5) Selection of trees based on the City adopted Design Guidelines Manual or the City's List of Street Trees; and size at maturity as appropriate for the planting area; and

(6) Selection of plants from local and regional landscape program plant lists.

(B) Each *hydrozone* shall have plant materials with similar water use, with the exception of *hydrozones* with plants of mixed water use, as specified in Section 2.5(a)(2)(D) of this Handbook.

(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. Methods to achieve water efficiency shall include one or more of the following:

(1) Use the Sunset Western Climate Zone System, or equivalent generally accepted models, which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;

(2) Recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure (e.g., buildings, sidewalks, and power lines); allow for adequate soil volume for healthy root growth; and

(3) Consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(D) *Turf* is discouraged on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).

(E) The use of *invasive plant species* such as those listed by the California Invasive Plat Council is strongly discouraged.

(F) High water use plants, characterized by a plant factor of 0.7 to 1.0 are prohibited in street medians.

(G) A landscape design plan for projects in fire-prone areas and fuel modification zones shall comply with requirements of the Orange County Fire Authority, where applicable. Refer to the local Fuel Modification Plan Guidelines. When conflicts between water conservation and fire safety design elements exist, the fire safety requirements shall have priority.

(H) The architectural guidelines of a *common interest development*, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of *water efficient plant species* as a group.

(1) Water Features

(a) Re-circulating water systems shall be used for water features.

(b) Where available and consistent with public health guidelines, recycled water shall be used as a source for decorative water features.

(c) The surface area of a water feature shall be included in the high water use *hydrozone* area of the water budget calculation.

(d) Pool and spa covers are highly recommended.

(2) *Soil Preparation, Mulch* and Amendments

(a) Prior to planting of any materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need to meet this requirement.

(b) Soil amendments shall be incorporated according to the recommendations of the soil report and what is appropriate for plants selected.

(c) For landscape installations, compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall be

incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.

(d) A minimum three inch (3″) layer of *mulch* shall be applied on all exposed soil surfaces of planting areas except in *turf* areas, creeping or rooting groundcovers, 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.

(e) Stabilizing mulching products shall be used on slopes that meet current engineering standards such as those detailed in the USDA/USAID Low-Volume Roads Engineering Best Management Practices Field Guide

(f) The mulching portion of the seed/*mulch* slurry in hydro-seeded applications shall meet the mulching requirement.

(g) Organic *mulch* materials made from recycled or post-consumer shall take precedence over inorganic materials or virgin forest products unless the recycled post-consumer organic products are not locally available. Organic mulches are not required where prohibited by local fuel Modification Plan Guidelines or other applicable local ordinances.

(I) In addition to the information specified in Section 17.31.030 (Landscape Plan Application Requirements), The landscape design plan, at a minimum, shall:

(1) Delinate and label each *hydrozone* by number, letter, or other method;

(2) Identify each *hydrozone* as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the *landscaped area* shall be included in the low water use *hydrozone* for the water budget calculation;

(3) Identify recreational areas;

(4) Identify areas permanently and solely dedicated to edible plants;

(5) identify areas irrigated with recycled water;

(6) Identify type of *mulch* and application depth;

(7) Identify soil amendments, type, and quantity;

(8) Identify type and surface area of water features;

(9) Identify hardscapes pervious and impervious);

(10) Identify location and installation details, and 24-hour retention or infiltration capacity of any applicable storm water best management practices that encourage on-site retention and infiltration of storm water. Project applicants shall refer to the Public Works Department for information on the applicable stormwater technical requirements. Storm water best management practices are encouraged in the landscape design plan and examples are provided in Section 2.4(C) –(D).

(a)

(b)

(c)

(11) Identify any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);

(12) Contain the following statement: "I have complied with the criteria of the City's *Water Efficiency Landscape Measures* and all applicable provisions of the Westminster Municipal Code, and applied them for the efficient use of water in the landscape design plan;" and

(13) Bear the signature of a California-licensed *landscape professional*.

[Note: Authority Cited: Section 65595, Reference: Section 65596, Government Code and Section 1351, Civil Code.]

2.6 Irrigation Design Plan

(A) This section applies to landscape areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturer's recommendations. The 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 design criteria, in addition to the information specified in Section 17.31.030 (Landscape Plan Application Requirements), shall be submitted as part of the *Landscape Documentation Package*.

(1) System

(a) Dedicated landscape water meters are required per Title 13 (Public Services) of the Westminster Municipal Code.

(b) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data with non-volatile memory shall be

required for irrigation scheduling in all irrigation systems, recommending U.S. EPA WaterSense labeled devices as applicable.

(c) *Sensors* (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.

(d) If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system.

2. *Static water pressure,* dynamic or *operating pressure,* and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

(e) Backflow prevention devices shall be required as specified in Title 13 (Public Services) of the Westminster Municipal Code.

(f) A *master shutoff valve* shall be as close as possible to the point of connection and is required on all projects; with the exception for landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

(g) *Flow sensors* that detect high flow conditions created by system damage or malfunction are required for all non-residential landscapes and residential landscapes of 5,000 sq. ft. or larger. The flow sensor must be in combination with a *master shut-off valve*.

(h) *Manual isolation valves* (such as a gate *valve,* ball *valve,* or butterfly *valve*) shall be required downstream of the point of

connection of the water supply to minimize water loss in case of an emergency (such as a *main line* break) or routine repair.

(i) 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.

(j) Relevant information from the soil management plan, such as soil type and *infiltration rate*, shall be utilized when designing irrigation systems.

(k) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(l) 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 ASBE/ICC 802-2014.

(m) Average *irrigation efficiency* (IE) for the project shall be determined in accordance with the EAWU calculation sheet in **Appendix C**. Unless otherwise indicated by the irrigation equipment manufacturer's specifications or demonstrated by the *project applicant***,** the *irrigation efficiency* of the irrigation heads used within each *hydrozone* shall as listed in Section 2.3(C)(9).

(n) It is highly recommended that the *project applicant* consult with the City's Water Department about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

(o) In *mulched* planting areas, the use of *low volume irrigation (drip or low volume overhead irrigation)* is required to maximize water infiltration into the root zone; with the exception of areas with fuel modification requirements and/or those that require plant establishment to comply with local grading ordinances.

(p) *Sprinkler heads* and other emission devices shall have matched *precipitation rates*, unless otherwise directed by the manufacturer's recommendations.

(q) Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible *distribution uniformity* using the manufacturer's recommendations.

(r) *Swing* jointcomponents are required on all sprinklers subject to damage that are adjacent to hardscapes or in high traffic areas of turf.

(s) *Check valves* or *anti-drain valves* are required on all *sprinkler heads* where low point drainage could occur.

(t) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no *runoff* or *overspray*.

(u) *Overhead* irrigation shall not be 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:

1. the *landscape area* is adjacent to permeable surfacing and no *runoff* occurs; or

2. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or

3. the irrigation designer for the landscape project specifies an alternative design or technology, as part of the *Landscape Documentation Package,* and clearly demonstrates strict adherence to the irrigation system design criteria in Section 2.5 (a)(1)(h) hereof. Prevention of overspray and runoff must be confirmed during an irrigation audit.

4. Slopes greater than 25% shall not be irrigated with an irrigation system with a *application rate* exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer of the landscape project specifies an alternative design or technology, as part of the *Landscape Documentation Package*, and clearly demonstrates no *runoff* or erosion will occur. Prevention of *runoff* and erosion must be confirmed during the *irrigation audit*.

(2) Hydrozone

(a) Each *valve* shall irrigate a *hydrozone* with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(b) *Sprinkler heads* and other emission devices shall be selected based on what is appropriate for the plant type within that *hydrozone*.

(c) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and *turf* to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.

(d) Individual *hydrozones* that mix plants of moderate and low water use or moderate and high water use may be allowed if:

1. The *plant factor* calculation is based on the proportions of the respective plant water uses and their respective *plant factors*; or

2. The *plant factor* of the higher water using plant is used for the calculations.

(e) Individual *hydrozones* that mix high and low water use plants shall not be permitted.

(f) On the landscape design plan and irrigation design plan, *hydrozone* areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each *valve* and assign a number to each *valve*.

(g) The irrigation design plan, at a minimum, shall contain:

1. the location and size of separate water meters for landscape;

2. the 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*;

3. *static water pressure* at the point of connection to the public water supply;

4. *flow rate* (gallons per minute), application rate (inches per hour), and design *operating pressure* (pressure per square inch) for each *station*;

5. irrigation schedule parameters necessary to program smart timers specified in the landscape design;

6. the following statement: "I have complied with the criteria of the City's *Water Efficiency Landscape Measures* and all applicable provisions of the Westminster Municipal Code, and applied them accordingly for the efficient use of water in the irrigation design plan;" and

7. the signature of a California-licensed *landscape professional.*

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

2.7 Grading Design Plan

(A) For the efficient use of water, grading of a landscape project site shall be designed to minimize soil erosion, *runoff*, and water waste. Finished grading configuration of the *landscape area*, including pads, slopes, drainage, post-construction erosion control, and storm water control Best Management Practices, as applicable, shall be shown on the Landscape Plan unless this information is fully included in separate Grading Plans for the project, or unless the project is limited to replacement planting and/or irrigation to rehabilitate an existing *landscape area*.

(B) The *project applicant* shall submit a landscape grading plan that indicates finished configurations and elevations of the *landscape area* including:

(1) Height of graded slopes;

(2) Drainage patterns;

(3) Pad elevations;

(4) Finish grade; and

(5) Storm water retention improvements, if applicable.

(C) To prevent excessive erosion and *runoff,* it is highly recommended that the *project applicant*:

(1) Grade so that all irrigation and normal rainfall remains within property lines and does not drain on to non-permeable *hardscapes*;

(2) Avoid disruption of natural drainage patterns and undisturbed soil; and

(3) Avoid soil compaction in *landscape areas*.

(D) The Grading Design Plan shall contain the following statement: "I have complied with the criteria of the City's *Water Efficiency Landscape Measures* and all applicable provisions of the Westminster Municipal Code and applied them

accordingly for the efficient use of water in the grading design plan" and shall bear the signature of the *landscape professional,* as required by law.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.8 Landscape Installation and Certification of Completion

(A) Landscape project installation shall not proceed until the *Landscape Documentation Package* has been approved by the City.

(B) A permit final of the landscape project shall be granted by the City to the *project applicant* upon the successful completion of all required inspections and corrections. Prior to requesting a permit final, the *project applicant* shall submit to the City the following information for review and approval:

(1) A *Landscape Installation Certificate of Completion* in the form included as **Appendix E** of this Handbook, which shall include: (i) certification by a *landscape professional* that the *landscape project* has been installed per the approved *Landscape Documentation Package*; and (ii) the following statement: "The landscaping for the identified property has been installed in substantial conformance with the approved Landscape Documentation Package and complies with the requirements of Chapter 17.310 (Landscaping) of the Westminster Municipal Code and the City of Westminster's Handbook of Water Efficiency Landscape Measures.";

(a) Where there have been significant changes (as deemed by the local permitting agency) made in the field during construction, these "as-built" or record drawings shall be included with the certificate

(b) A diagram of the irrigation plan showing *hydrozones* shall be kept with the irrigation controller for subsequent management purposes.

(2) Documentation of the irrigation scheduling parameters used to set the *controller*(s);

(3) An *irrigation audit* report from the City's landscape irrigation auditor or third party *certified landscape irrigation auditor*, documentation of enrollment in regional or local water purveyor's water conservation programs, and/or documentation that the MAWA and EAWU information for the *landscape project* has been submitted to the local water purveyor, may be required at the option of the *City*.

(a) Landscape audits shall not be conducted by the *person* who designed or installed the landscape.

(b) In large projects or projects with multiple landscape installations (i.e. production home developments or *common interest developments*) an auditing rate of 1 in 7 lots or approximately 15% will satisfy this requirement.

(4) The Landscape Inspection Job Card for the project, indicating that all inspections have been successfully completed and no further corrections and inspections are required.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.9 Post-Installation Irrigation Scheduling

(A) 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 shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) *Overhead* irrigation shall be scheduled in accordance with the applicable provision of the Westminster Code. Operation of the irrigation system outside the normal *watering window* is allowed for auditing and system maintenance.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

2.10 Post-Installation Landscape and Irrigation Maintenance

(A) Landscapes shall be maintained to ensure water use efficiency in accordance with all applicable provisions of the Westminster Municipal Code.

3. Provisions for Existing Landscapes

(A) Irrigation of all *landscape areas* shall be conducted in a manner conforming to the applicable regulations of the Westminster Municipal Code and shall be subject to penalties and incentives for water conservation and water waste prevention, as specified in the Westminster Municipal Code.

(B) The *City* and/or the regional or *local water purveyor* may administer programs such as irrigation water use analyses, irrigation surveys and/or *irrigation audits*, tiered water rate structures, water budgeting by parcel, or other approaches to achieve landscape water use efficiency community-wide to a level equivalent to or less than would be achieved by applying a *MAWA* calculated with an ETAF of 0.8 to all *landscape areas* in the *City* over one acre in size.

The architectural guidelines of a *common interest development*, including apartments, condominiums, 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.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

4. Public Education

(A) Publications. Education is a critical component to promote the efficient use of water in landscapes. The use of appropriate principles of design, installation, management, and maintenance that save water is encouraged in the community.

(B) Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes as described.

(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as *hydrozones*, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the site water efficient landscape; and demonstrate low water use approaches to landscaping such as using appropriate plants, alternative water sources, or rainwater catchment systems.

(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

[Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.]

Appendix A

City of Westminster

CERTIFICATION OF LANDSCAPE DESIGN

I hereby certify that:

(1) I am a professional appropriately licensed in the State of California to provide professional landscape design services.

(2) The landscape design and water use calculations for the property located at:

_____ (provide street address or parcel number(s)) were prepared by me or under my supervision.

(3) The landscape design and water use calculations for the identified property comply with the requirements of the City of Westminster's Water Efficiency Landscape Measures and all applicable provisions of the Westminster Municipal Code.

(4) The information I have provided in this Certificate of Landscape Design is true and correct and is hereby submitted in compliance with the City of Westminster Handbook of Water Efficiency Landscape Measures

_____ _____

Print Name Date

_____ _____

Signature License Number

_____

Address

_____ _____

Telephone E-mail Address

Landscape Design Professional's Stamp
(If applicable)

City of Westminster
EXAMPLE WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the *project applicant* for each Point of Connection. Please complete all sections of the worksheet.

Point of Connection # 1

Maximum Applied Water Allowance (MAWA)

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

where:
MAWA = *Maximum Applied Water Allowance* (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
0.7 = *Evapotranspiration Adjustment Factor (ETAF)*
1.0 = ETAF for *Special Landscaped Area*
LA = *Landscaped Area* (square feet)
0.62 = *Conversion factor* (to gallons per square foot)
SLA = *Special Landscaped Area* (square feet)

Example Calculation: a hypothetical landscape project in Santa Ana, CA with an irrigated landscaped area of 40,000 square feet with 10,000 square feet of *Special Landscaped Area*. To calculate *MAWA*, the annual *reference evapotranspiration* value for Santa Ana is 48.2 inches as listed in the Reference Evapotranspiration Table in **Appendix C**.

	ETo		ETAF		LA or *SLA* (ft^2)		Conversion		*MAWA (*Gallons Per Year)
MAWA for LA =	48.2	x	0.7	x	40,000	x	*0.62*	=	836,752
MAWA for *SLA* =	48.2	x	1.0	x	10,000	x	*0.62*	=	298,840
Total *MAWA* =					50,000				1,135,592 Gallons per year for LA+*SLA*

Estimated Applied Water Use

EAWU = ETo x K_L x LA x *0.62* ÷ *IE* = Gallons per year

where:

EAWU = Estimated Applied Water Use (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
K_L = *Landscape Coefficient*
LA = *Landscaped Area* (square feet)
0.62 = Conversion factor (to gallons per square foot)
IE = Irrigation Efficiency = IME x DU (See definition in Appendix E for example IE percentages)
IME = Irrigation Management Efficiency (90%)
DU = Distribution Uniformity of irrigation head

K_L = K_s x K_d x K_{mc}

K_s = species factor (range = 0.1-0.9) (see *WUCOLS* list for values)
K_d = density factor (range = 0.5-1.3) (see *WUCOLS* for density value ranges)
K_{mc} = *microclimate* factor (range = 0.5-1.4) (see *WUCOLS*)

WUCOLS – ***www.owue.water.ca.gov/docs/wucols00.pdf***

Example Calculation:

	ETo		K_L		LA		Conversion		*IE*		*EAWU (Gallons per year)*
Special Landscaped Area	48.2	x	1.00	x	10,000	x	*0.62*	÷	0.75	=	398,453
Cool Season Turf	48.2	x	1.00	x	0	x	*0.62*	÷	0.71	=	0
Warm Season Turf	48.2	x	0.65	x	0	x	*0.62*	÷	0.71	=	0
High Water Using Shrub	48.2	x	0.70	x	0	x	*0.62*	÷	0.71	=	0
Medium Water Using Shrub	48.2	x	0.50	x	15,000	x	*0.62*	÷	0.65	=	344,815
Low Water Using Shrub	48.2	x	0.30	x	25,000	x	*0.62*	÷	0.75	=	298,840
Very Low Water Using Shrub	48.2	x	0.20	x	0	x	*0.62*	÷	0.71	=	0
Other	48.2	x	0.50	x	0	x	*0.62*	÷	0.71	=	0
Other	48.2	x	0.50	x	0	x	*0.62*	÷	0.71	=	0
Total *EAWU* =					50,000						1,042,109 Gallons per year

Compare *EAWU* with *MAWA*.
The *EAWU* (1,042,109 gallons per year) is less than *MAWA* (1,135,592 gallons per year). For this example, the water budget complies with the *MAWA*.

List *sprinkler heads*, microspray, and drip *emitters* here along with average *precipitation rate* and *Distribution Uniformity of Irrigation Head*.

***Sprinkler Head* Types**	**Average *Precipitation Rate***	***Distribution Uniformity of Irrigation Head***
Drip		
Microspray		
Bubbler		
Low precipitation rotating nozzles		
Stream rotors		

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the *project applicant* for each Point of Connection. Please complete all sections of the worksheet.

Point of Connection #__

Maximum Applied Water Allowance (MAWA)

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

where:

MAWA = *Maximum Applied Water Allowance* (gallons per year)
ETo = *Reference Evapotranspiration* **Appendix C** (inches per year)
0.7 = *Evapotranspiration Adjustment Factor* (ETAF)
1.0 = ETAF for *Special Landscaped Area*
LA = *Landscaped Area* (square feet)
0.62 = *Conversion factor* (to gallons per square foot)
SLA = *Special Landscaped Area* (square feet)

MAWA Calculation:

	ETo		ETAF		LA or *SLA* (ft^2)		Conversion		*MAWA (*Gallons Per Year)
MAWA for LA =		x	0.7	x		x	*0.62*	=	
MAWA for *SLA* =		x	1.0	x		x	*0.62*	=	
Total *MAWA* =									

Estimated Applied Water Use

EAWU = ETo x K_L x LA x *0.62* ÷ *IE* = Gallons per year

where:

EAWU = Estimated Applied Water Use (gallons per year)
ETo = Reference Evapotranspiration **Appendix C** (inches per year)
K_L = *Landscape Coefficient*
LA = *Landscaped Area* (square feet)
0.62 = Conversion factor (to gallons per square foot)
IE = Irrigation Efficiency = IME x DU
IME = Irrigation Management Efficiency (90%)
DU = Distribution Uniformity of irrigation head

$K_L = K_s \times K_d \times K_{mc}$

K_s = species factor (range = 0.1-0.9) (see *WUCOLS* list for values)
K_d = density factor (range = 0.5-1.3) (see *WUCOLS* for density value ranges)
K_{mc} = *microclimate* factor (range = 0.5-1.4) (see *WUCOLS*)

WUCOLS – ***www.owue.water.ca.gov/docs/wucols00.pdf***

EAWU Calculation:

	ETo		K_L		LA		Conversion		*IE*		*EAWU (*Gallons Per Year)
Special Landscaped Area		x		x		x	*0.62*	÷		=	
Cool Season Turf		x		x		x	*0.62*	÷		=	
Warm Season Turf		x		x		x	*0.62*	÷		=	
High Water Using Shrub		x		x		x	*0.62*	÷		=	
Medium Water Using Shrub		x		x		x	*0.62*	÷		=	
Low Water Using Shrub		x		x		x	*0.62*	÷		=	
Very Low Water Using Shrubs		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
		x		x		x	*0.62*	÷		=	
Other		x		x		x	*0.62*	÷		=	
Total *EAWU* =											

List *sprinkler heads*, microspray, and drip *emitters* here along with average *precipitation rate* and *Distribution Uniformity of Irrigation Head*.

***Sprinkler Head* Types**	**Average *Precipitation Rate***	***Distribution Uniformity of Irrigation Head***
Drip		
Microspray		
Bubbler		
Low precipitation rotating nozzles		
Stream rotors		

Appendix C

Reference Evapotranspiration (ETo) Table

Appendix C - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
Orange													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
* The values in this table were derived from:1) California Irrigation Management Information System (CIMIS) 2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and California Dept of Water Resources 1999, 3) Reference Evapotranspiration for California, University of California, Department of Agriculture and Natural Resources (1987) Bulletin 1922 4) Determining Daily Reference Evapotranspiration, Cooperative Extension UC Division of Agriculture and Natural Resources (1987), Publication Leaflet 21426													

Appendix D

CITY OF WESTMINSTER

LANDSCAPE INSTALLATION CERTIFICATE OF COMPLETION

I hereby certify that:

(1) I am a professional appropriately licensed in the State of California to provide professional landscape design services.

(2) The landscape project for the property located at:

_____

(provide street address or parcel number(s)) and identified as Case No. _____ was installed by me or under my supervision.

(3) The landscaping for the identified property has been installed in substantial conformance with the approved Landscape Documentation Package and complies with the requirements of Chapter 17.310 (Landscaping) of the Westminster Municipal Code and the City of Westminster's Handbook of Water Efficiency Landscape Measures.

(4) The information I have provided in this Landscape Installation Certificate of Completion is true and correct and is hereby submitted in compliance with Chapter 17.310 (Landscaping) of the Westminster Municipal Code and the City of Westminster's Handbook of Water Efficiency Landscape Measures.

_____	_____
Print Name	Date
_____	_____
Signature	License Number

_____

Address

_____	_____
Telephone	E-mail Address

Landscape Design Professional's Stamp
(If Appropriate)

Appendix E

Definitions

The following terms used in this Handbook have the meaning set forth below and shall apply only to this Handbook and those portions of Chapter 17.31(Landscaping) which pertain to the Water Efficiency Landscape Measures:

Applied water" means the portion of water supplied by the irrigation system to the landscape.

"*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.

"*Conversion factor*" means the number that converts acre-inches per acre per year to gallons per square foot per year.

"*Check valve*" or "*anti-drain valve*" means 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.

"*Certified Landscape Irrigation Auditor*" means a landscape professional authorized by the City to prepare and/or review a landscape irrigation audit.

"*Certification of Landscape Design*" means the certification included as Exhibit A of this Handbook that must be included in the *Landscape Documentation Package* pursuant to Section 2.1 of this Handbook.

"*City*" means the City of Westminster or its authorized designee.

"*Common interest developments*" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351

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

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

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

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

"*Evapotranspiration adjustment factor*" or "*ETAF*" is equal to the *plant factor* divided by the *irrigation efficiency factor* for a *landscape project*, as described in this Handbook. The *ETAF* is

calculated in the context of local *reference evapotranspiration*, using site-specific *plant factors* and *irrigation efficiency factors* that influence the amount of water that needs to be applied to the specific *landscaped area*.

A combined plant mix with a site-wide average *plant factor* of 0.5 (indicating a moderate water need) and average *irrigation efficiency* of 0.71 produces an *ET adjustment factor* of (0.7) = (0.5/0.71), which is the standard of water use efficiency generally required by this Handbook, except that the *ETAF* for a *special landscape area* shall not exceed 1.0.

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

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

"*Hardscapes*" means any durable material or feature (*pervious* and *non-pervious*) installed in or around a *landscaped area*, such as pavements or walls and decorative hardscaped areas. Pools and other water features are considered part of the *landscaped area* and not considered *hardscapes* for purposes of this Handbook.

"Homeowner installed landscape" means any landscaping either installed by a private individual for a single family residence or installed by a licensed contractor hired by a homeowner. A homeowner, for purposes of this Handbook, is a person who occupies the dwelling he or she owns. This definition excludes speculative homes, which are not owner-occupied dwellings and which are subject under this ordinance to the requirements applicable to developer-installed residential landscape projects.

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

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

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

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

"*Irrigation Management Efficiency"* or "*IME*" means the measurement used to calculate the *irrigation efficiency* of the irrigation system for a landscaped project. A 90% IME can be

achieved by using evaportranspiration controllers, soil moisture sensors, and other methods that will adjust irrigation run times to meet plant water needs.

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

a. Pop-up stream rotator heads = 75%

b. Stream rotor heads = 75%

c. Microspray = 75%

d. Bubbler = 80%

e. Drip emitter = 85%

f. Subsurface irrigation = 90%

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

"L*andscape contractor*" means a person licensed by the State of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

"*Landscape Documentation Package*" means the package of documents that a *project applicant* is required to submit to the *City* pursuant to Chapter 17.31 (Landscaping) of the Westminster Municipal Code and Section 2.1 of this Handbook.

"*Landscape professional*" means a licensed *landscape architect*, licensed landscape contractor, or any other *person* authorized to design a landscape pursuant to Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the California Business and Professions Code, Section 832.27 of Title16 of the California Code of Regulations, and Section 6721 of the California Food and Agriculture Code.

"*Landscape project*" means total area of landscape in a project, as provided in the definition of "*landscaped area*," meeting the requirements under Section 1.1 of this Water Efficient Landscape Ordinance.

"*Landscaped area*" for the purpose of determining applicability of the City's Water Efficiency Landscape Measures means all the planting areas, *turf* areas, and *water features* in a landscape design plan subject to the *Maximum Applied Water Allowance* and *Estimated Applied Water Use* calculations. The *landscaped area* does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other *pervious* or *non-*

pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

"*Lateral line*" means the water delivery pipeline that supplies water to the *emitters* or sprinklers from the *valve*.

"*Low volume irrigation*" means 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.

"Low volume overhead irrigation" means aboveground irrigation heads with an upper flow limit of 0.5 GPM.

"*Main line*" means the pressurized pipeline that delivers water from the water source to the *valve* or outlet.

"*Maximum Applied Water Allowance*" or "*MAWA*" means the upper limit of annual applied water for the established *landscaped area,* as specified in Section 2.2 of this Handbook. It is based upon the area's *reference evapotranspiration*, the *ETAF*, and the size of the *landscaped area*. The *Estimated Applied Water Use* shall not exceed the *Maximum Applied Water Allowance*.

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

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

"*New construction*" means, for the purposes of the Water Efficiency Landscape Measures, a new building with a landscape or other new landscape such as a park, playground, or greenbelt without an associated building.

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

"*Operating pressure*" means the pressure at which the parts of an irrigation system of sprinklers are designed to operate at by the manufacturer

"*Overspray*" means the irrigation water which is delivered beyond the target area.

"*Person*" means any natural person, firm, joint venture, joint stock company, partnership, public or private association, club, company, corporation, business trust, organization, public or private agency, government agency or institution, school district, college, university, any other user of

water provided by the *City*, or the manager, lessee, agent, servant, officer, or employee of any of them or any other entity which is recognized by law as the subject of rights or duties.

"*Permit*" means an authorizing document issued by the City for *new construction* or *rehabilitated landscape*.

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

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

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

"*Project applicant*" means the person submitting a *Landscape Documentation Package* required under Section 2.1 to request a permit, plan check, or design review from the City. A *project applicant* may be the property owner or his or her designee.

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

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

"*Recycled water*" or "*reclaimed 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.

"*Rehabilitated landscape*" means any re-landscaping project where the modified landscape area is greater than 2,500 square feet, is 50% of the total landscape area, and the modifications are planned to occur within one year.

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

"*Special Landscaped Areas*" or "*SLA*" means an area of the landscape dedicated solely to edible plants such as orchards and vegetable gardens, areas irrigated with *recycled water*, *water features* using *recycled water*, and areas dedicated to active play such as parks, sports fields, golf courses, and where *turf* provides a playing surface.

"*Smart automatic irrigation controller*" means an automatic timing device used to remotely control *valves* that operate an irrigation system and which schedules irrigation events using either evapotranspiration (weather-based) or soil moisture data.

"*Sprinkler head*" means a device which delivers water through a nozzle.

"*Static water pressure*" means the pipeline or municipal water supply pressure when water is not flowing.

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

"*Swing joint*" means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

"*Turf*" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

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

"*Water Efficient Landscape Worksheets*" means the worksheets required to be completed pursuant to Section 2.2 of this Handbook and which are included in Appendix B hereof.

"*Water feature*" means 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 *landscaped area*. Constructed wetlands used for on-site wastewater treatment, habitat protection, or storm water best management practices that are not irrigated and used solely for water treatment or storm water retention are not *water features* and, therefore, are not subject to the water budget calculation.

"*Watering window*" means the time of day irrigation is allowed.

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