San Diego Municipal Code

Land Development Code

Landscape Standards

Appendix E

Water Budget Landscape Worksheets

WATER BUDGET
LANDSCAPE WORKSHEET

This project worksheet is to be submitted to the City when the proposed development is subject to the water budget requirement in Chapter 14, Article 2, Division 4 (Landscape Regulations).

Project Name: _____   **Project #:** _____

Project Address: _____

Individual/Business Completing the Worksheet _____

Phone Number _____

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1. *DEFINITIONS:*

Estimated Total Water Use (ETWU): The total water used for the landscape based on the plants used and irrigation method selected for the landscape design. The ETWU shall not exceed the MAWA.

Evapotranspiration: The quantity of water as measured in average inches per year that evaporated from adjacent soil surfaces and transpired by plants during a specific time period. (Evapotranspiration data may be found at www.cimis.water.ca.gov. You may obtain a free password from the Department of Water Resources. The site also holds an abundance of informational links and complete instructions.)

Evapotranspiration Adjustment Factor (ETAF): A factor that when applied to reference evapotranspiration adjusts for plant water requirements and irrigation efficiencies, two major influences on the amount of water that is required for a healthy landscape.

Hydrozone: A section or zone of the landscaped area having plants with similar water needs that are served by a valve or set of valves with the same schedule. A hydrozone may be irrigated or non-irrigated. For the purpose of the calculation, the surface area of manmade water features (see LDM Section 1.8) are included in the high water use hydrozone, and the surface area of artificial turf and temporary irrigation is included in the low water use hydrozone.

Irrigation Audit: An in-depth evaluation of the performance of an irrigation system conducted by a professional authorized by the State to perform such work. 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.

Landscape Area: The entire premises less the area of building footprints, non-irrigated portions of parking lots, driveways, hardscapes (as defined in Land Development Code Section 113.0103), and areas designated for habitat preservation or Brush Management Zone 2.

Maximum Applied Water Allowance (MAWA) Water Budget -: The upper limit of annual applied water for the established landscaped area expressed in gallons per year. It is based upon the area's reference evapotranspiration (ETo), the evapotranspiration adjustment factor (ETAF), and the size of the landscape area.

Plant Factor: A factor that when multiplied by the average inches per year evapotranspiration rate, estimates the amount of water used by plants. Plant water use calculations are based on the current Water Use Classification of Landscape Species (WUCOLS) list published by the University of California Cooperative Extension and the California Department of Water Resources: http://ucanr.edu/sites/WUCOLS/Download_WUCOLS_IV_List/

Plant Water Use	Plant Factor	Also includes
Very Low	0.0 to 0.1	
Low	0.1-0.3	Artificial Turf; Temporary Irrigation
Moderate	0.4-0.6	
High	0.7-1.0	Water features
Special Landscape Area	1.0	

Special Landscape Area: Areas used for active and passive recreation areas, areas solely dedicated to the production of fruits and vegetables, and areas irrigated with reclaimed water.

2. DETERMINE THE WATER BUDGET

MAWA Water Budget Calculation

The MAWA Water Budget is calculated using the following calculation formula:
MAWA Water Budget = (ETo)(0.62)[(ETAF x LA) + ((1-ETAF) x SLA)] = gallons per year

For residential landscape areas = (ETo)(0.62)[(0.55)(LA) + (0.45)(SLA)]
For non-residential landscape areas = (ETo)(0.62)[(0.45)(LA) + (0.55)(SLA)]
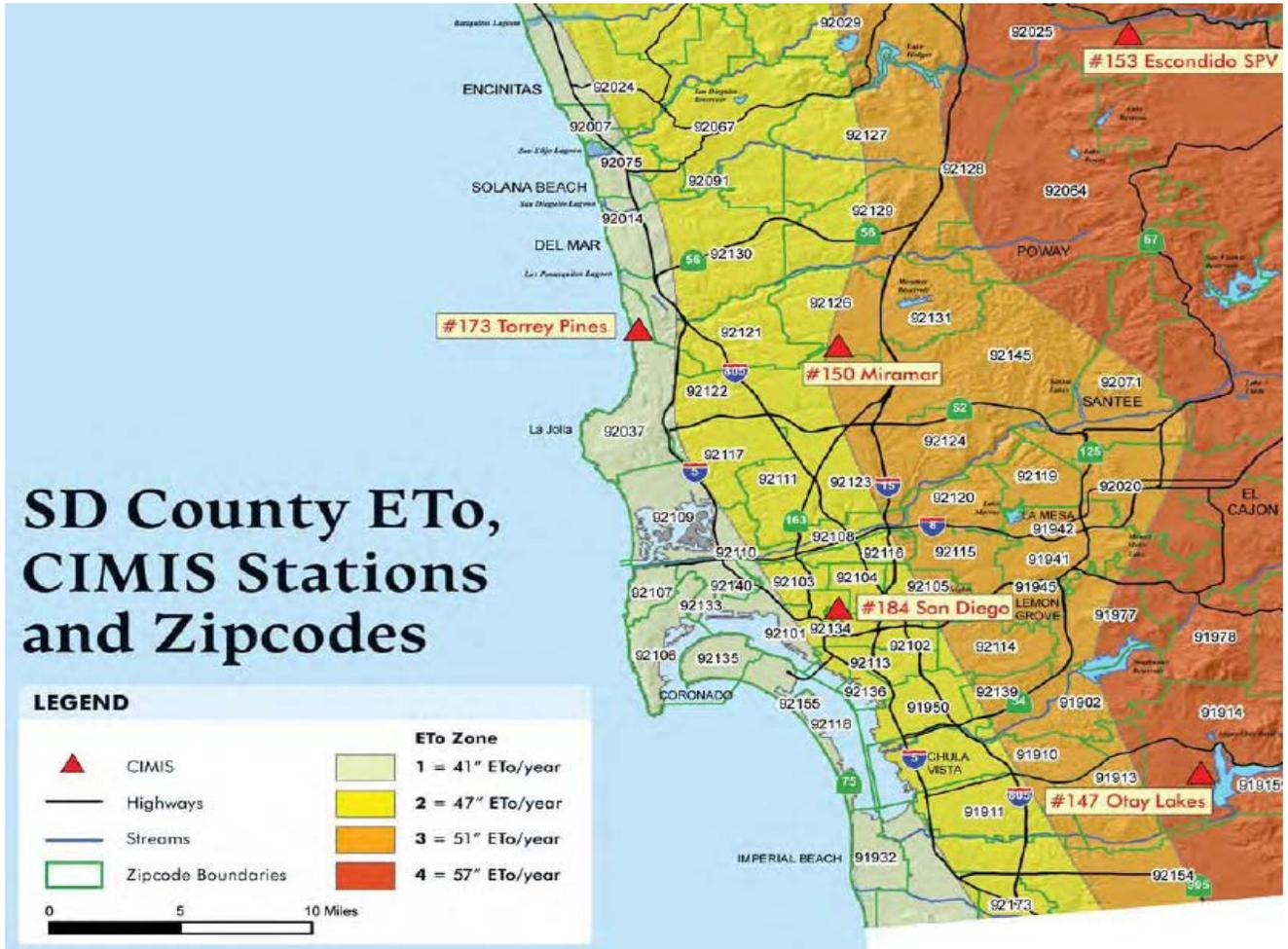
Legend for MAWA Water Budget Calculation Formula

Symbol	Description of Symbol
ETo	Evapotranspiration (inches per year); see Table 6 or ETo Map
0.62	Conversion factor to gallons
ETAF 0.55 for residential landscape areas; 0.45 for non-residential landscape areas	Evapotranspiration Adjustment Factor
LA	Landscape Area (square feet)
1- ETAF 0.45 for residential landscape areas; 0.55 for non-residential landscape areas	Additional Evapotranspiration Adjustment Factor for Special Landscape Areas and Reclaimed Water
SLA	Special Landscape Area (square feet)

In the calculation below provide the values for the water budget calculation used for the proposed project. The ETo for the calculation may be based on the precise location of the project using the ETo Map or based on the ETo for the Community Planning Area in Table 6 of the Landscape Standards each of which follows.

MAWA Water Budget calculation = $(ET_0)(0.62)$ $[(ETAF)(LA) + (1\text{-}ETAF)(SLA)]$ = gallons per year

ETo Map

SD County ETo, CIMIS Stations and Zipcodes

LEGEND

▲ CIMIS
— Highways
— Streams
▭ Zipcode Boundaries

0   5   10 Miles

ETo Zone
1 = 41" ETo/year
2 = 47" ETo/year
3 = 51" ETo/year
4 = 57" ETo/year

EVAPOTRANSPIRATION (ETo) TABLE
BY COMMUNITY PLANNING AREA

Community Planning Area	Average Annual ETo (inches/year)	Community Planning Area	Average Annual ETo (inches/year)
Barrio Logan	40	North City FUA Subarea II	47
Black Mountain Ranch	47	Ocean Beach	40
Carmel Mountain Ranch	47	Old San Diego	47
Carmel Valley	47	Otay Mesa	47
Centre City	40	Otay Mesa-Nestor	40
City Heights	47	Pacific Beach	40
Clairemont Mesa	47	Pacific Highlands Ranch	47
College Area	47	Peninsula	40
Del Mar Mesa	47	Rancho Bernardo	57
East Elliott	47	Rancho Encantada	57
Eastern Area	47	Rancho Penasquitos	47
Encanto	47	Sabre Springs	47
Fairbanks Country Club	47	San Pasqual	54
Greater Golden Hill	47	San Ysidro	47
Greater North Park	47	Serra Mesa	47
Kearney Mesa	47	Scripps Miramar Ranch	47
Kensington-Talmadge	47	Skyline-Paradise Hills	47
La Jolla	40	Southeastern San Diego	47
Linda Vista	47	Tierrasanta	47
Midway-Pacific Highway Corridor	40	Tijuana River Valley	40
Mira Mesa	47	Torrey Highlands	47
Miramar Ranch North	47	Torrey Hills	47
Mission Beach	40	Torrey Pines	40
Mission Valley	47	University	47
Navajo	47	Uptown	47
Normal Heights	47	Via De La Valle	47

3. **DETERMINE THE ESTIMATED TOTAL WATER USE (ETWU)**

The Estimated Total Water Use (ETWU) is calculated using the following formula:

ETWU = [(ETo)(0.62)][(PF/IE x HA/IE) + SLA] = gallons per year

Legend for Estimated Total Water Use (ETWU) Calculation Formula

Symbol	Description of Symbol
ETo	Evapotranspiration (inches per year)
0.62	Conversion factor to gallons
PF	Plant Factor
HA	Hydrozone Area[3]–(square feet)
IE	Irrigation Efficiency (0.81 for Drip System devices) (0.75 for Overhead Spray devices)
SLA	Special Landscape Area (square feet)

Use the following table to track information about each controller in the system.

Controller No.	Hydrozone No.	Valve Circuit	Plant Factor (PF)	Hydrozone Area in s.f. (HA)	Irrigation Method	Irrigation Efficiency (IE)	% Total Landscape Area
						Total	

Then plug in the numbers from each controller/hydrozone into the ETWU equation. Then total the gallons per year of each controller/hydrozone for the Estimated Total Water Use per year. **The total ETWU cannot exceed the total Water Budget-MAWA.**

Controller No.	ETWU $[(ETo)(0.62)][-(\frac{PF \times HAIE}{}) + SLA]$	Result in Gallons per Year
	Total ETWU gallons per year	