

The City of Santa Monica's Water Neutrality Ordinance

Presentation by:

Russell Ackerman, SITES[®] AP, CLIA-D Sustainability Analyst <u>Russell.Ackerman@smgov.net</u>

> Karina Sandique Sustainability Analyst Karina.Sandique@smgov.net

Tom Fleming, LEED AP BD+C, O+M Sustainability Analyst <u>Thomas.Fleming@smgov.net</u>



AGENDA

Santa Monica & Self Sufficiency Water Neutrality as a Tool to Self Sufficiency Water Neutrality & WELIS Water Neutrality's Effectiveness



SANTA MONICA & SELF SUFFICIENCY Tom Fleming



The City of Santa Monica



Size

- 8.3 mi2
- 93,000 population

Climate

- Mediterranean
- 13" avg. annual precipitation
- 2012-2017: 8" avg. annual

Water Utility

- 18,000 water accounts
- 27% CII, 23% SF, 41% MF
- 10 local groundwater wells
- 25-30% imported water
- 10-12 MGD

City of

Santa Monica[®]

Why Save Water? Driving Forces



Stage 2 Water Supply Shortage



- Water Shortage Response Plan (WSRP)
- Stage 2 declared by City Council in response to the drought (8/12/2014)
- Still in effect due to long-term local drought effects
- Stage 2 → Mandatory 20% reduction = Water Use Allowances



Water Use Allowances

- No longer just a drought response
- Started June 2015, still in effect
 - Achieve Water Self-Sufficiency
 - "Making Water Conservation a California Way of Life"
- Target → 20% below 2013 usage, all water customers
- Significant exceedances may result in a citation
- Water Neutrality \rightarrow Water Use Allowances



WATER NEUTRALITY AS A TOOL TO SELF-SUFFICIENCY Karina Sandique



What is Water Neutrality



Water Neutrality is a code that caps water use for new developments by limiting the project to the historical 5 year average water use for that individual parcel

Water neutrality ordinance went into effect on July 1, 2017



Applicability



New Developments are defined as:

- New structure with any plumbing fixtures
- New and enlarged pools, spas, ponds, and water features
- Any repair, alteration, or rehabilitation project where 50% or more of the exterior walls or structural supports are demolished



What is Water Neutrality

For example....

12345 Santa Monica Ave.

BASELINE WATER USAGE	50,000 GAL/YEAR
PROJECTED WATER DEMAND	150,000 GAL/YEAR
NEW WATER DEMAND REQUIRED TO OFFSET	100,000 GAL/YEAR

To comply with water neutrality, 12345 Santa Monica Ave. must offset 100,000 gal/year.

New development applicant can offset new water demand through performing on-site or offsite plumbing fixture retrofits or choosing to pay an in-lieu fee which 100% funds the City's Water Neutrality Direct Install Program.



Compliance

User Input Instructions		Baseline Water Demand (existing proper	ty water use)		
Fill in all white heres applie	able to the project	5-Year Annual Average (gal)			
rin in an write boxes applic	able to the project	(Provided by the City)			
Date (MM/DD/YY)					
Project Name		Pools, Spas, Ponds, or Water Features			
Permit Number		Provide surface area for the new total a	rea or for the		
A		enlarged area only.	Curtan Arrestor		
Assessor's Parcer Number(s)		Pool	Surface Area (So		
Street Number		Sna			
Street Name		Water feature			
City		Pond			
State		Total Annual Gallons	0 gal/yr		
Zip Code			0 801 11		
		Lanscape and Irrigation			
Applicant Name		Will 100% of the plantable landscape ar	ea covered with		
Applicant Email		minimum of 3" of mulch and no landscap	cape / irrigation		
Applicant Phone Number		demand is projected for this property?			
Water Account Number(s)			9		
		For the section below copy this informat	ion from the		
		Plantable Landscape Area Calculator on	the Landscape F		
		and the Hydrozone Matrix on the Irrigati	on Plan.		
		Plant Type	Area (sq.ft.)		
		Tree, Shrubs, Vines, Groundcovers			
ndoor		(woody plants)			
Choose the highest flow rate	for each type of fixture to be				
nstalled.		Herbaceous Perennials			
Fixture Type	Flow Rate	Desert Adapted Plants			
Channelsanda	0.50 millions and minute	Appual Flowers & Redding Plants			
snowerneads	0.50 gallons per minute	v			
Bathroom Faucets	0.80 gallons per minute	Cool-season Turfgrass (Tall fescue, Ky.			
		Bluegrass, Rye, Bent)			
Kitchen Faucets	1.00 gallons per minute	Warm-season Turfgrass (Bermuda,			
		Zoysia, St. Augustine, Buffalo)			
Toilets	0.80 gallons per flush	Deciduous Fruit Trees			
Total Annual Gallons	10,983 gal/yr	Evergreen Fruit Trees			
		Vegetables Crops			
		Total Annual Gallons	0 gal/yr		
) Inputs (Offset Requirements	(+)			

The Water Neutrality calculator requires inputs for indoor fixtures, outdoor water features, and landscape and irrigation to estimate the customer's projected water demand

The projected water demand will become the utility customer's water use allowance moving forward.



Occupancy

- Residential Single Family: 2.55 per unit
- Residential Multi-Family: 1.75 per unit
- Commercial Occupancy is based on 2016 California Building Code Part 9 Chapter 10 Table 1004.2

Indoor Water Use

Water use per day based on 2016 California Building Code Part 5 Chapter 4 Plumbing Fixtures and Fixture Settings and LEED
 4 Daily Use

Pools, Spas, Ponds, or Water Features

- Evaporation per year = Square feet of surface area x .021 feet of evaporation per day x 7.48052 gallons per cubic foot x 365
 days per year
- Surface of evaporation is based on ASHRAE Handbook: Fundamentals

Landscape and Irrigation

- References the City of Santa Monica's Water Efficient Landscape and Irrigation Standards (WELIS)



WATER NEUTRALITY AND WELIS Russell Ackerman



Water Efficient Landscape and Irrigation Standards

The Green Building Ordinance SMMC 8.108 Subpart A *"Water-Efficient Landscape and Irrigation Standards"* sets standards for landscaping and irrigation systems related to urban runoff, water use-efficiency, and landscape health and diversity for all existing and new landscapes in the City of Santa Monica.

This update is at least as effective as the CA State's Model Water Efficient Landscape Ordinance (MWELO).

- 100% prescriptive
- Limits Turf to 20% of plantable landscape area
- Bans overhead irrigation with exceptions





Water Neutrality & WELIS

For the section below copy this information from the Plantable Landscape Area Calculator on the Landscape Plan and the Hydrozone Matrix on the Irrigation Plan.

Plant Type	Area (sq.ft.)
Tree, Shrubs, Vines, Groundcovers	
(woody plants)	
Herbaceous Perennials	
Desert Adapted Plants	
Annual Flowers & Bedding Plants	
Cool-season Turfgrass (Tall fescue,	
Ky. Bluegrass, Rye, Bent)	
Warm-season Turfgrass (Bermuda,	
Zoysia, St. Augustine, Buffalo)	
Deciduous Fruit Trees	
Evergreen Fruit Trees	
Vegetables Crops	
Total Annual Gallons	0 gal/yr

For All New Development Water Neutrality Calculators

Copy this information from the Plantable Landscape Area Calculator on the Landscape Plan and the Hydrozone Matrix on the Irrigation Plan

Landscape water use per day by plant type and is based on ANSI/ASABE Standard S623, Determining Landscape Plant Water Requirements, 2015



HYDROZONE MATRIX

AREA	(Sq. Ft.)	0.0			-												
HYDROZONE / VALVE	CONTROLLER STATION	SQ. FTI.	6 OF TOTAL PLANTABLE LANDSCAPE AREA (PLA)	% OF SLOPE AT FINISH GRADE	EXPOSURE OR MICROCLIMATE	HYDROZONE BASIS	YDROZONE DESCRIPTION	ALTERNATIVE WATER SOURCE	LANT FACTOR IS BASED ON ANSI/ASABE S623.1	IRRI METHOD	IRRIGATION DEVICE MAN FACT/MODEL #	DEVICE FLOW RATE GPM or GPH (DRIP/M)	ALC. PRECIP RATE IN/HR	ZONE GPM	ZONE PSI		
A	1	0.0	#DIV/0!	0%			<u> </u>		н				0.00				
В	2	0.0	#DIV/0!	0%									0.00				
С	3	0.0	#DIV/0!	0%									0.00				
D	4	0.0	#DIV/0!	0%									0.00				
Е	5	0.0	#DIV/0!		ſ		CALCU	I JLATION	I S OF PI	LANT A	ABLE LANDSCAPE	AREA (S	QUARE	FEET) 07.01.17		
F	6	0.0	#DIV/0!													PERCENTAGE	SQUARE FEET
G	7	0.0	#DIV/0!	A PARCEL 0.0 #DIV/0! B COMBINED AREA OF ALL BUILDING FOOTPRINTS 0.0 C TOTAL NON-PERMEABLE HARDSCAPE 0.0 #DIV/0! D TOTAL POOL, SPA, AND POND SERVICE AREA 0.0											0.00		
Н	8	0.0	#DIV/0!												0.00		
I	9	0.0	#DIV/0!	#DIV/0! E TOTAL WATER FEATURE(S) SURFACE AREA 0 #DIV/0! F TOTAL PLANTABLE LANDSCAPE AREA (A - B - C - D - E) 100% 0										0.00 0.00			
J	10	0.0	#DIV/0!	GTOTAL PERMEABLE HARDSCAPE AREAS#DIV/0!0.4#DIV/0!HTOTAL PLANTED AREAS (F - G)#DIV/0!0.4										0.00 0.00			
К	11	0.0	#DIV/0!	DIV/0! 1 TOTAL AUTO IRRIGATED PLANTED AREAS (HYDROZONE MATRIX) 0.0									0.00				
L	12	0.0	#DIV/0!	2 TOTAL NON-AUTO IRRIGATED PLANTED AREAS (HAND WATERED AREAS; NOT MULCH, DG OR NON-PLANTED PERMEABLE AREAS) 0.00									0.00				
SUBTOTAL		0.0	#DIV/0!		(F) FOR AL NEW AND	L PLANT	ED AREAS (IRF G PLANT MATE	UKEMEN LIGATED ERIAL	AND NO	QUARI ON-IRI	EFEET AND AS A PE RIGATED) USING PLA	ANT FA	CTORS A	AS DEF	TAL PL.	ANTABLE LANDSC. ANSI/ASABE S623.	1 FOR BOTH
					a) TOTALb) TOTALc) TOTALd) TOTALe) TOTAL	TURFGR. MODERA LOW AN EDIBLE I PLANTEI	ASS AND HIGH TE WATER US D VERY LOW V PLANT MATER D AREA IRRIGA	WATER E PLANT VATER U IAL (NOT ATED WIT	USE PL. MATEF SE PLAI INCLU	ANT M RIAL (1 NT MA DED II APPRO	IATERIAL (Cool/Warm s Trees, Shrubs, Vines, Grounde NTERIAL (Desert Adapte N 1. a-c, e) (Deciduous/Ev VED ALTERNATIVE	eeason gra overs, Her d Plants) ergreen Fri WATER	sses, Annu baceous Per nit Trees, V	als, Bedd rennials, egetable 7 (DO 1	ding Plants) Hedges) Crops) NOT	#DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0!	0.00 0.00 0.00 0.00 0.00
		-			INCLUI	DE IN 1. a-	d)										



OTAL PLANTABLE LANDSCAPE

Slide

SLIDE (Simplified Landscape Irrigation Demand Estimation) is a scientific method for estimating the water demand of established landscapes that provides a research-based set of plant factors for landscape plant materials and rules for assigning and applying them to estimate landscape water demand.

The City of Santa uses the American National Standards Institute (ANSI) and the American Society of Agricultural and Biological Engineers (ASABE) Standard S623.1 to determine the plant water demand or "plant factor" (PF) for landscape plant material. SLIDE serves as the basis for the ANSI/ASABE S623 Standard, Determining Landscape Plant Water Demands.

For more information visit http://ucanr.edu/sites/UrbanHort/Water_Use_of_Turfgrass_and_Landscape _Plant_Materials/



Plant Factors & ANSI/ASABE S623.1

Plant Factors for the following plant material categories as defined by ANSI/ASABE S623.1

(H=High; M=Moderate/Medium; LVL=Low/Very Low; T=Turf; E=Edible)	<u> Plant Factor</u>	A.
Tree, Shrubs, Vines, Groundcovers (includes hedges and woody plants	s) 0.5 M	-
Herbaceous Perennials	0.5 M	
Desert Adapted Plants (includes CA natives w/ low summer water nee	eds) 0.3 LVL	
Annual Flowers & Bedding Plants	0.8 H	
Cool-season Turfgrass (i.e. tall fescue, Ky. bluegrass, rye, bent)	0.8 T	
Warm-season Turfgrass (i.e., bermuda, zoysia, St, Augustine, buffalo)	0.6 T	
Deciduous Fruit Trees (i.e. peach, plum, nectarine)	0.8 E	
Evergreen Fruit Trees (i.e., citrus)	1.0 E	
Vegetables crops	1.0 E	



CA MWELO Irrigation Terminology

Irrigation terms as defined by CA MWELO

"distribution uniformity" means the measure of the uniformity of irrigation water over a defined area.

"irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. *The irrigation efficiency for purposes of this ordinance are 0.75 for overhead spray devices and 0.81 for drip systems.*



The SLIDE equation to estimate a landscape's irrigation requirement:

Irrigation Demand (gal.) = $\sum \{([ETo \times PF] - P) \times LA \times (1 \div DU)\} \times 0.623$

ETo is historic or real-time annual or monthly average reference evapotranspiration data in inches for months January through December, or other period of interest.

PF is the Plant Factor from Table 1 for the plant category represented in a hydrozone or occupying a portion of landscape area, 1 through x; when plant categories are mixed in a landscape or a hydrozone it is the highest PF among the plant categories represented.

P is the historical average or real-time effective precipitation in inches for months January-December, or other period of interest; 50% or similar percentage of precipitation is usually considered effective and is the amount used in the equation.

LA is the landscape area or hydrozone, in square feet, devoted to the respective PF.

0.623 is the factor to convert depth of water to volume (gal. ÷ [in. x sq. ft.]).

DU is the distribution uniformity of irrigation in the landscape area or hydrozone 1 through x (often mandated to be ≥ 0.7).



Estimating a Landscape's Irrigation Requirement

The SLIDE equation to estimate a landscape's irrigation requirement:

Irrigation Demand (gal.) = $\sum \{ ([ETo \times PF] - P) \times LA \times (1 \div IE) \} \times 0.623 \}$

ETo is historic or real-time annual or monthly average reference evapotranspiration data in inches for months January through December, or other period of interest.

PF is the Plant Factor from Table 1 for the plant category represented in a hydrozone or occupying a portion of landscape area, 1 through x; when plant categories are mixed in a landscape or a hydrozone it is the highest PF among the plant categories represented.

P is the historical average or real-time effective precipitation in inches for months January-December, or other period of interest; 50% or similar percentage of precipitation is usually considered effective and is the amount used in the equation.

LA is the landscape area or hydrozone, in square feet, devoted to the respective PF.

0.623 is the factor to convert depth of water to volume (gal. ÷ [in. x sq. ft.]).

IE is the irrigation efficiency in the landscape area or hydrozone 1 through x (often mandated to be ≥ 0.7).



WATER NEUTRALITY'S EFFECTIVENESS



Program Results



Within 6 months of the ordinance's adoption, 32 new development and pool projects have been required to comply

Total new water demand created by projects: 381,917 gal/year

- 20 pool and spa permits: 347,172 gal/year
- 12 new development projects: 34,745 gal/year

9/12 new development projects had a projected water demand that was

less than the five year historical baseline



Water Neutrality Direct Install Program



Water Neutrality Direct Install Program

Estimated 199 .8 GPF Tank Toilets expected to be funded from this program within 6 months of its implementation

Without marketing and outreach efforts yet implemented:

- 9 properties on the waitlist (SFH and MF properties with 3-43 units)
- Santa Monica Unified School District up to 14 potential campuses impacted



Next Steps



Next Steps

Staff is always looking at ways to improve the effectiveness of this program. Our team is analyzing the results from the program so far and feedback from our stakeholders and plan to make modification to the policy as well as implementation procedures

- Release of online version of the calculator by January 2019
- Expanding applicability (Dec 2018)
- Streamlining permitting for residential and commercial graywater systems
- Creating more incentives for water efficient new construction residential and commercial properties that utilizes more on-site water efficiency measures





Thank you! www.smgov.net/waterneutrality

Russell Ackerman <u>Russell.Ackerman@smgov.net</u>

Thomas Fleming <u>Thomas.Fleming@smgov.net</u>

Karina C. Sandique <u>Karina.Sandique@smgov.net</u>

